



Treasury Board of Canada
Secretariat

Secrétariat du Conseil du Trésor
du Canada

An Enhanced Framework for the Management
of Information Technology Projects

***CREATING AND USING A BUSINESS CASE
FOR INFORMATION TECHNOLOGY PROJECTS***

February, 1998
Project Management Office
Chief Information Officer Branch
Treasury Board Secretariat

Canada¹³¹

*Additional copies of this publication are available
from the Treasury Board Distribution Centre,
(613) 995-2855 or fax (613) 996-0518
Publication number xxxx*

ACKNOWLEDGMENTS

This guide is the result of the teamwork of many volunteers under the able direction of Henry Pasko (Canadian Security Intelligence Service).

The working group was supported unflinchingly by Virginia Lee (Revenue Canada) in the preparation of the text. She patiently and cheerfully worked and reworked the document through countless revisions and after numerous, lengthy discussions. Sharron Denofsky (Treasury Board of Canada Secretariat) and Doug O'Keefe (Transport Canada) also contributed extensively to the rewriting exercise.

Written contributions, reviews and comments were provided by:

- André Bourdon (House of Commons)
- Eric Culley (Transport Canada)
- Greg Evanik (Public Works and Government Services Canada)
- Yves Gélinas (Revenue Canada)
- Murray Kronick (Andersen Consulting)
- Jane McGill (Department of Justice)
- Rick Morris (Canadian International Development Agency)
- Dave White (Royal Canadian Mounted Police)

Important contributions were also made by:

- Joan Basinski (Natural Resources Canada)
- Norman Bryon (Revenue Canada)
- André Faulkner (Department of Indian Affairs and Northern Development)
- Robert Gardham (Veterans Affairs Canada)
- Ian Sinclair (Treasury Board of Canada Secretariat)

The Australian Department of Finance's publication *Value for Your IT Dollar*, served as the inspiration and basis for this guide.

Finally, many other people from both the public and private sectors, too numerous to identify individually, contributed to the meetings of our working group. It was only through the continuing interest, efforts and co-operation of many people that this guide was produced. Thank you to all!

Readers are welcome to share their IT investment experiences. Please contact:

Martin Cobb
Chief Information Officer Branch
Treasury Board of Canada Secretariat
L'Esplanade Laurier, East Tower, 10th Floor
140 O'Connor Street
Ottawa, Ontario K1A 0R5
Telephone: (613) 952-3371
Fax: (613) 957-8020

By keeping the dialogue current, it will be possible to continue learning and developing new approaches that can be used to evaluate IT investment options. Copies of Business Cases that are created would be most appreciated as they will be used to develop a set of case studies that will be appended to a revised version of this document.

TABLE OF CONTENTS

1. ABOUT THIS GUIDE..... 1

1.1 Purpose..... 1

1.2 What is a business case? 1

1.3 Who should use this guide?..... 2

1.4 How to use this guide..... 2

1.5 Context for this work 4

2. OPTION IDENTIFICATION..... 5

2.1 Introduction 5

2.2 Define the problem or opportunity..... 6

2.3 Identify the options..... 7

2.4 Screen the options 9

2.5 Prepare for evaluation 9

3. COST SCENARIOS..... 12

3.1 Introduction 12

3.2 Assess direct up-front IT costs 12

3.3 Assess direct ongoing IT costs 13

3.4 Assess indirect or hidden IT costs..... 13

3.5 Assess client costs 15

4. BENEFITS DEFINITION AND ANALYSIS..... 16

4.1 Introduction 16

4.2 Identify comparative advantages..... 16

4.3 Identify level-of-service advantages 17

4.4 Quantify tangible benefits 18

4.5 Quantify intangible benefits 18

4.6 Identify conditional benefits..... 19

5. RISK..... 21

5.1 Introduction 21

5.2 Dealing with risk in IT investment..... 21

5.3 Assess risk..... 22

5.4 Devise an approach to manage risk..... 24

6. OPTION ANALYSIS..... 27

6.1 Introduction 27

6.2 Considerations..... 27

6.3 Select investment criteria 27

6.4 Conduct a cost-benefit analysis..... 29

6.5 Use a multi-criteria approach 32

7. DOCUMENTING THE CASE	34
7.1 Introduction	34
7.2 Identify the audience	34
7.3 Present the context	34
7.4 Prepare the contents of the report.....	35
8. MAKING THE CASE	37
8.1 Introduction	37
8.2 Find a champion	37
8.3 Promote, market and sell	37
8.4 Model, pilot and test market.....	37
9. ONGOING REVIEWS	39
9.1 Introduction	39
9.2 Types of reviews	39
9.3 Plan and manage reviews	40
9.4 Select review participants.....	42
10. APPENDICES	44
10.1 Appendix A – Logical Framework Analysis.....	44
10.2 Appendix B – Bibliography	50

1. ABOUT THIS GUIDE

1.1 Purpose

As the federal government faces increasing pressure to streamline operations and improve levels of service, departments and agencies are increasingly turning to information technology (IT) for solutions. Perhaps inevitably, in the rush to take advantage of the promise of IT, many projects have been undertaken without a thorough analysis of their full costs and benefits, and without the detailed planning necessary to set the stage for benefits recovery and to understand and manage the risks. The result has been major problems with numerous IT projects, either because they could not be completed within budget or because they did not, when completed, deliver the desired result.

The Treasury Board of Canada Secretariat (TBS) has approved an *Enhanced Framework for the Management of Information Technology Projects*, which is designed to ensure:

- that federal government IT projects fully meet the needs of the business functions they are intended to support and deliver all expected benefits; and
- are completed on time and within budget. Moreover, it identifies the need for a business case analysis before a government IT investment can be approved.

The responsibility for developing business cases to evaluate proposed IT investments lies with government responsibility centre (RC) and IT managers. This guide, which has been developed by Public Service managers for their colleagues, offers a blueprint that managers can use to build the business cases needed to make informed investment decisions.

As a model for structuring such decisions, this guide complements the TBS's *Management of Information Technology* policy on the strategic use of IT. It also outlines a process that will allow users to base investment decisions on their organization's strategic objectives and business plans.

1.2 What is a business case?

A business case puts the investment decision into a strategic context, and positions the business objectives and options that will affect both the decision and the investment itself. A business case provides the information necessary to make a decision about whether a project should proceed. It is the indispensable first activity in the lifecycle of an IT investment.

A business case is a detailed investment proposal. It provides an analysis of all the costs, benefits and risks associated with a proposed investment and offers reasonable alternatives.

The importance of the business case in the decision process continues throughout the entire lifecycle of an IT investment implementation project — from the initial decision to proceed, to the decisions made at periodic project reviews to continue, modify or terminate the project. The business case is reviewed and re-validated at each scheduled project review and whenever there is a significant change to the project or the business function. If the business case changes during the course of an IT project, the project should be re-approved through the departmental planning and approval process.

1.3 Who should use this guide?

There is no firm rule dictating who is responsible for producing business cases for IT investment proposals. The onus will most often be on project sponsors, (i.e. the senior official in the organization responsible for the business function that the project is intended to support), to provide the impetus behind IT investment proposals in co-ordination with the RC and IT managers involved.

Assembling a business case should be a collaborative effort involving all the stakeholders affected by the outcome of the project or who will be involved in its delivery. These representatives should include business specialists with an understanding of the business requirements to be met, and IT specialists who understand the costs and risks inherent in the technologies being considered.

1.4 How to use this guide

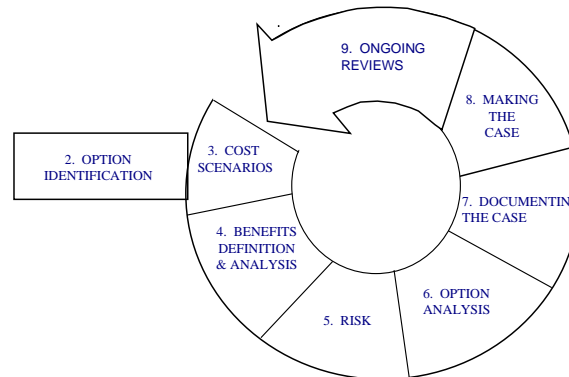
This guide can be used as both a source book and a road map through the investment process. Its structured approach can also introduce other stakeholders to the framework that shapes the decision-making model. These stakeholders should include clients and other federal government departments, and can include other levels of government and the private sector, particularly when the project is not the sole responsibility of one department, or when one department's project has requirements attached to it by another department or government (e.g. economic benefits).

This guide can be used as a planning tool; users can mark and monitor the factors that are crucial to implementing IT successfully. At the same time, they may refer to the TBS's Management of Information Technology policy, particularly those sections relating to information management planning. For TBS principles and practices essential to managing IT projects, reference to an Enhanced Framework for the Management of Information Technology Projects would also be helpful.

Each chapter of this guide deals with a different aspect of the IT business case. Each of these elements are carried out in a sequential fashion at the conceptual

phase of a project and may be repeated during latter phases of a project as it evolves to meet the changes in the business and technical environment requirements.

The chapters in the document and the purpose of each element are displayed graphically in the figure below.



- | | |
|---|--|
| Chapter 2. Option Identification: | Which defines the options and a framework for structuring the investment decision. |
| Chapter 3. Cost Scenarios: | Which defines the various costs that will influence the investment decision. |
| Chapter 4. Benefits Definition & Analysis: | Which defines how to identify both quantitative and qualitative benefits, how to identify productivity and level-of-service improvements and how to ---- benefits. |
| Chapter 5. Risk: | Which defines the risk factors affecting any IT investment, and how proper management can control or minimize these risks. |
| Chapter 6. Option Analysis: | Which defines how to choose the most beneficial option from among those examined in the business case. |
| Chapter 7. Document The Case: | Which defines how to put together the business case documentation. |
| Chapter 8. Making The Case: | Which defines tips on how to present proposals successfully. |
| Chapter 9. Ongoing Reviews: | Which defines how to ascertain that the decision to invest remains valid. |

1.5 Context for this work

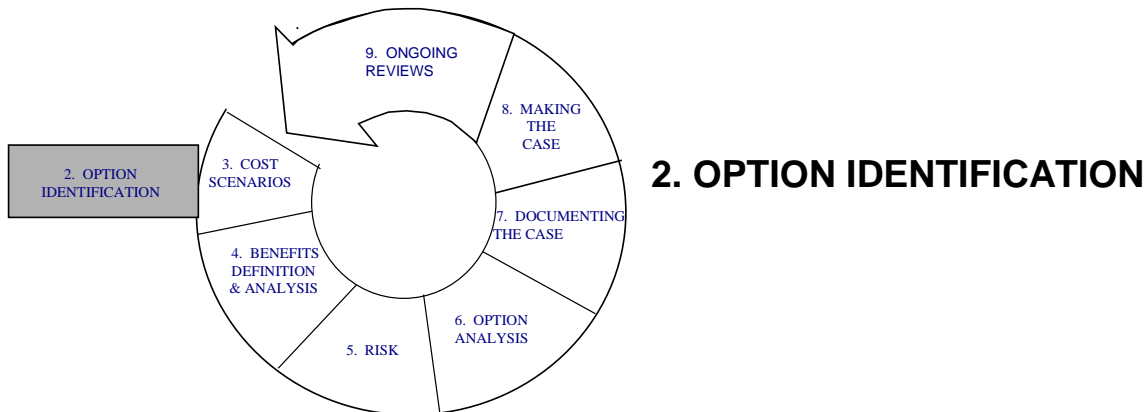
A number of reference works were consulted in the drafting of this guide and all of them are listed in the bibliography at the end of this volume. Some are of immediate interest to readers as they contain information directly relevant to the creation of a business plan or the planning of an IT project. This key set of references is given below.

Canada. Transport Canada. *Guide to Benefit-Cost Analysis in Transport Canada*, Ottawa, 1994.

———. Treasury Board of Canada Secretariat. *An Enhanced Framework for the Management of Information Technology Projects*. Ottawa, 1996.

———. Treasury Board of Canada Secretariat. *Benefit-cost Analysis Guide*, Ottawa, 1976.

———. Treasury Board of Canada Secretariat. 'Business Case Approach,' in *Information and Administrative Management Component* Ottawa, 1994.



2.1 Introduction

IT investments should be part of a business strategy that must, in turn, be part of the overall corporate strategy. Mismatched IT investments will only move the organization in the wrong direction more quickly.

An investment in information technology may be based on a need to:

- support efficient and effective program delivery;
- enhance client services;
- reduce costs;
- support business priorities; or
- implement a new program or a legislative change.

Under the Treasury Board's *Management of Information Technology* policy, it is up to managers to evaluate, select and fund IT projects on the basis of a business case approach. The business case should show how the technology will lead to enhanced value or improved service. Managers should also examine new project proposals to identify opportunities to share existing information, technology, applications and facilities.

The TBS's *An Enhanced Framework for the Management of Information Technology Projects* identifies planning as key to the success of an IT project. A business case is the key element of front-end planning and sets the stage for the management of the project and for the achievement of the planned benefits.

There is no single solution to any problem. Until one looks at all the available options and alternatives, it is impossible to know which is the best way to deal

with a given business situation. This chapter describes how to assemble and examine the options that should be considered before making an IT investment decision and how to prepare the analysis that will form the business case.

Options identified at this stage of the preparation of the business case are analysed in due course with respect to cost (Chapter 3), benefits (Chapter 4) and risk (Chapter 5). Overall analysis of the options and selection of the optimum solution (Chapter 6) complete the major elements in the preparation of a business case.

2.2 Define the problem or opportunity

The first step in the evaluation process is to state the problem in such a way as to clearly define the circumstances leading to the consideration of the investment. This step is important because it identifies the questions to be resolved by the analysis and the boundaries of the investigation. The problem statement identifies the need to be satisfied, the problem to be solved, or the opportunity to be exploited.

The problem statement should address:

- the department's program goals and other objectives affected by the proposed investment;
- a description of the problem, need, or opportunity; and
- a general indication of the range of possible actions.

The decision to consider an investment in IT usually arises from the needs associated with a department's business priorities, and its evaluation must focus on the best way of responding to these needs. The business case must show how the department's program goals and other objectives can be furthered. These goals and objectives should be defined in the department's Business Plan and Long Term Capital Plan. These plans may be consulted for guidance in identifying the benefits to be achieved.

Although one's immediate concern may be with fulfilling the needs of single branch or business unit, one must nevertheless consider the department's corporate goals. A business solution that does not take into account corporate priorities and business strategies may never deliver its expected benefits due to unanticipated changes within the organization or its processes.

Federal government departments should have an overall information management strategy and an information management plan that defines IT direction for departments. IT direction has important implications for the costs and risks facing IT options. Making IT investment decisions without reference to an information plan might, for example, lead to incompatible systems that cannot share information, needlessly duplicate data entry and are expensive to maintain.

2.3 Identify the options

How solutions or opportunities are described will shape the analysis that follows. One should not focus on specific technologies, products or methods, as this may exclude other options that might produce the same benefits but at a lower cost or increased benefits for the same cost.

Instead, all the possible ways an organization can meet the business objectives described in the problem statement should be identified. This way, the options that are developed and 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.

Available options must include the base case, as well as a wide range of other potential solutions, as described below.

2.3.1 The base case option

The base case should show how an organization would perform if it did not pursue the IT investment proposal or otherwise change its method of operation. This base case might, in fact, be the only acceptable alternative so it is important that it be realistic.

It is not adequate to state the base case simply as the continuation of the current situation. It must account for future developments 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. Maintenance costs might become prohibitive, service delays intolerable or workloads unmanageable. 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 should predict the long-term costs and benefits 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.

2.3.2 Other options

Problems can be solved in different ways and to different extents. In many cases, options are available that concentrate on making optimum use of existing systems or on altering current procedures. These options may require little or no new investment.

It may be possible to implement some options, IT ones in particular, using a number of different strategies. Including alternative strategies increases the effective range of options. For example, an IT application requirement may be met by one or more of these options:

- redefining business processes to achieve the desired result without making an IT investment;
- re-using or adapting an application developed by another business unit or department;
- re-engineering the existing system (if there is one) to provide the functionality required;
- acquiring a commercial off-the-shelf (COTS) product; or
- custom building a new application.

Strategies for building, adapting or re-engineering an application include doing it in-house or contracting out, and implementing in phases or all at once.

Options for acquiring IT hardware include:

- buying it;
- leasing it;
- renting it; and
- ‘greening’ (i.e. leasing with regular upgrades).

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

One should consider strategies that are broad enough to capture all of the effects and costs of the investment on the organization. Within a single option or strategy, premature decisions on important issues should be avoided. In the event of doubt, these issues can be identified and resolved through the evaluation process.

For each option, it would be helpful to list any assumptions about the state of technology and the environmental conditions or organizational constraints within which the investment is expected to operate. Changes in these assumptions can be considered later in a sensitivity analysis. When the evaluation is complete, the decision between options is made on cost-benefit grounds.

The comparative and level-of-service advantages of a proposed IT investment can be demonstrated by analyzing options. Including alternative options in the analysis makes it possible to identify the most promising solution to an organization's IT concerns. The options should be broad enough to capture the organizational implications of the IT proposal and its effects on client service.

2.4 Screen the options

A full-scale analysis of all options is, of course, neither achievable nor necessary. A screening process is the best way to ensure that the analysis proceeds with only the most promising options. Screening allows a wide range of initial options to be considered, while keeping the level of effort reasonable. The establishment of a 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.

Options should be ruled out as soon as it becomes clear that other choices are superior from a cost-benefit perspective. A comparative cost-benefit framework should quickly identify the key features likely to make a difference among options. Grouping options with similar key features can help identify differences associated with cost disadvantages or benefit advantages that would persist even if subjected to more rigorous analysis.

Options may be ruled out on the basis that their success depends too heavily on unproven technology or that they just will not work. Care should be taken not to confuse options that will not work with options that are merely less desirable. Options that are simply undesirable will drop out when the costs and benefits begin to be measured.

The objective is to subject options to increasingly rigorous analysis. A good rule of thumb is that, when in doubt about the economic merits of a particular option, the analyst should retain it for subsequent, more detailed rounds of estimation.

2.5 Prepare for evaluation

Having defined the options, it now remains to establish a basis for comparison. The next three chapters outline how to identify and quantify the costs, benefits and risks associated with each option. Answering the following questions should help to prepare for these tasks.

- How does the option relate to the department's objectives and priorities?
- How will the option enhance service to the public, improve program delivery or strengthen Canadian competitiveness?
- What overall program performance results will the option achieve? What might happen if the option were not selected?

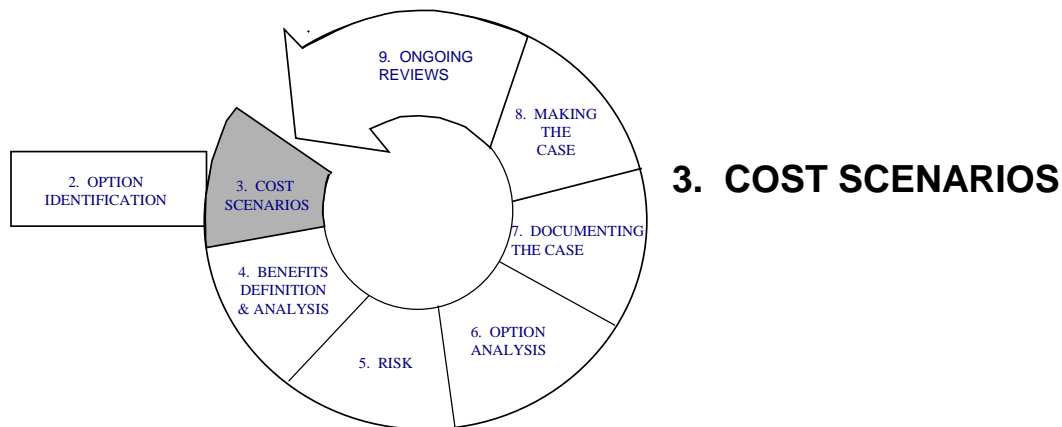
- What additional outcomes or benefits could occur if this option were selected?
- Who are the stakeholders? What are their interests and responsibilities? What effect does the option have on them?
- What will be the implications for the organization's human resources? How will the appropriate officials manage the option's effects on education, training, support and workforce adjustment, as specified in Guideline 7 of the TBS's *Management of Information Technology* policy?
- Does this option empower managers and staff?
- When will employees be told about this option and its effect on them?
- When will bargaining agents be consulted in accordance with collective agreements?
- When will employee health and safety concerns, including ergonomic criteria, be addressed?
- Can employees use the technology in either official language, as specified in Appendix A, 'Official Languages and Information Technology,' of the TBS's policy on *Management of Information Technology*? Can the public use the technology in either English or French?
- When will any required interdepartmental consultations take place? Have partnerships with other departments, or alternative service delivery with the private sector, been considered?
- Have all the 'make or buy' options been considered? Or, has consideration been given to using common systems and services and innovative funding approaches?
- What are the projected improvements in timeliness, productivity, cost savings, cost avoidance, quality and service?
- How much will it cost to acquire the IT?
- How much will it cost to develop the application?
- What are the procurement plans?
- Does the option involve the innovative use of technology? If so, what risks does that involve?

SUMMARY

IT investments usually support more affordable, accessible and responsive service. They should reflect corporate strategies and priorities to ensure that they make the best use of an organization's limited resources. Before developing a business case, analysts should:

- define the problem or opportunity to clearly identify the requirement;
- determine what the organization would look like if no IT investment were made (base case);
- identify a wide range of options and strategies; and
- screen the options to find the most promising ones.

Analysts should also consider a broad range of questions to prepare for the evaluation.



3.1 Introduction

A sound investment decision must include all costs associated with the investment, no matter who pays for them. The business case should be based on the full cost of the system, from initiation through development and implementation, and the estimated annual cost of five years of operation.

This chapter will help identify and quantify the costs, both direct and indirect, of a proposed IT investment.

3.2 Assess direct up-front IT costs

Direct up-front costs are the ‘out-of-pocket’ development and implementation expenses. These can be substantial and should be carefully assessed. Fortunately, these costs are generally well documented and easily determined, except for projects that involve new technology or software applications.

The main categories of direct up-front costs are:

- hardware and peripherals;
- packaged and customized software;
- initial data collection or conversion of archival data;
- telecommunications equipment;
- facilities upgrades, including site preparation and renovation;
- user specification;
- design and programming;
- office accommodations, furniture and related items;

- initial user training;
- workforce adjustment for affected employees;
- transition, such as costs of running parallel systems or converting legacy systems; and
- quality assurance and post-implementation reviews.

3.3 Assess direct ongoing IT costs

Direct ongoing costs are the ‘out-of-pocket’ expenses that occur over the lifecycle of the investment. The costs to operate a facility, as well as to develop or implement an option, must be identified.

The main categories of direct ongoing costs are:

- salaries for IT staff;
- software maintenance and upgrades;
- computer supplies;
- user support;
- ongoing training;
- telecommunications; and
- reviews and audits.

3.4 Assess indirect or hidden IT costs

In addition to the direct costs, most IT investment options have indirect or hidden costs. To assess an IT investment accurately, one must consider these costs. In some cases, they may even exceed the direct costs. For example, the hidden ongoing costs of local and wide area networks can be three times the direct ongoing costs. (A 1992 study by Nolan, Norton & Co., *Managing End User Computing*, shows hidden costs per workstation from \$6,000 to \$12,000 annually, compared to direct costs of \$2,000 to \$6,500.)

Causes of hidden costs include the following factors:

3.4.1 Initial loss of productivity

At first, productivity may drop while staff members learn to work with new IT tools. Sometimes, local computer 'experts' emerge who can help other staff, but they may wind up spending more time tinkering with other people's computer problems than doing their own work. Another kind of drop in productivity occurs when organizations indirectly pay non-IT professionals to perform IT support functions ('peer group support').

3.4.2 Corporate IT support

Distributed communication environments require efficient corporate IT support, which includes network management, data management to protect data integrity, security and information management policies, and hotline support for end users. Studies suggest that investing in corporate IT support reduces reliance on peer group support.

3.4.3 Corporate overheads

When analyzing an IT project, corporate overhead should be considered, including general administration and the management of human resources, finance and materiel. An easy way to count these costs is to calculate the percentage of departmental staff affected by the investment and multiply that percentage by the total overhead cost of these corporate non-IT support functions.

3.4.4 Human resources

Human resources normally account for most of the savings from an IT investment; therefore, the implications of such investments on employees and on human resources planning should be assessed. Early in the process, IT strategies and plans should include a human resources impact analysis to assess workforce composition and competencies. Situations in which this analysis is most crucial are the ones where changes to the underlying program work activities are occurring. For example, in a typical business process re-engineering initiative. This allows the organization to resolve the human resources issues associated with transition and change. If employees are to be transferred, managers should consult the relevant TBS human resources policies. The Work Force Adjustment Directive currently addresses implied costs, which must be identified clearly if the investment calls for fewer staff. A full cost and risk assessment must, therefore, be conducted.

3.5 Assess client costs

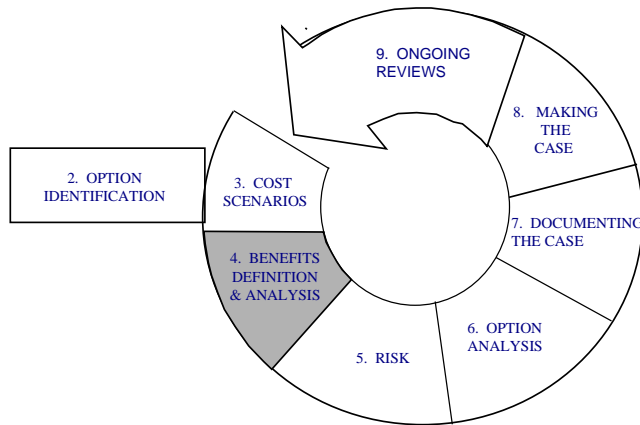
Federal government IT projects can increase costs for clients, especially if government costs are shifted to the client. For example, an IT project may provide raw, unanalyzed data to clients who should then be shown how the service benefits outweigh the additional expense. In this example, clients now bear the expense of analyzing the information, but it is more complete and more flexible.

Client costs may be direct or indirect, are similar to those faced by the department and should be carefully assessed. For instance, clients may not have compatible systems; however, in some cases, it may be necessary to assume that some of the department's clients are already equipped to work with the proposed system, or would equip themselves even if the system were not implemented.

SUMMARY

When conducting a business-case analysis, one should consider various types of IT investment costs including:

- direct up-front costs;
- direct ongoing costs;
- indirect and hidden costs;
- client costs; and
- enterprise-wide costs.



4. BENEFITS DEFINITION AND ANALYSIS

4.1 Introduction

This chapter will help to identify and quantify the potential benefits of a proposed IT investment. It also discusses the development of a benefit realization plan to ensure that conditional benefits are realized.

To structure the evaluation, the analyst must first identify and then quantify all of the project's comparative and level-of-service advantages.

4.2 Identify comparative advantages

Comparative advantages help to reduce costs and increase productivity. Some costs can be reduced by automating work or by re-engineering the way work is performed. Productivity gains can also be made from IT investments that:

- replace low-value staff activities with high-value work (e.g. a lawyer might spend less time on paperwork and more time dealing with legal issues);
- improve decision making by providing timely, integrated, comprehensive and accurate information;
- reduce errors, duplication and needless work;
- improve the flow of operations by reducing the number of steps in a business process; or
- result in any combination of the above.

4.3 Identify level-of-service advantages

Although comparative advantages tend to be focused on a program's resources, an IT investment's level-of-service advantages enhance a program's value to its clients or beneficiaries. These benefits can include:

- less paperwork for clients (e.g. taxpayers can file their returns electronically);
- less time spent getting information or services (e.g. single-window kiosks can be shared by several departments or even by different levels of government);
- extended hours or increased service locations (e.g. banks provide 24-hour service at automated teller machines in service stations and convenience stores);
- faster service; and
- increased quality or quantity of service or information.

The Export Development Corporation (EDC) developed a computerized decision support system called GAMBLE to improve performance and control costs when EDC underwrites short-term export insurance. GAMBLE has shown both comparative and level-of-service advantages.

The comparative advantages are evident: EDC has been able to handle a 120-per-cent increase in credit cases by increasing staff by just 13.7 per cent.

The level-of-service advantages include an improvement in insurance approval turnaround times. Before GAMBLE, these approvals took an average of 11 days. Now they take, on average, only 4.4 days. In fact, 60 per cent of approvals take only one day.

Canadian exporters can now respond more rapidly to opportunities in overseas markets, which increases their sales, which benefits all Canadians.

4.4 Quantify tangible benefits

In some cases, the benefits of an IT project are obvious and relatively easy to quantify. For example, an automation project that does not affect the organization's products, services or work processes could be evaluated adequately by analyzing the cost reductions or cost avoidance attributable to the project.

In the case of an infrastructure investment such as a wide-area network, however, this kind of investment would affect the organization's structure and processes, and may make it possible to support future projects that change the organization's products or services. A cash flow analysis would be important because it might show that the investment is a practical way to use the organization's short-term resources. Although it may not be practical to trace all of a project's comparative benefits and show them as long-term cash flows, all comparative benefits will ultimately translate into hard financial returns.

4.5 Quantify intangible benefits

There are at least three ways to quantify intangible IT benefits.

Intangible benefits can be linked to tangible benefits, which, in turn, can be linked to cost savings or productivity gains. For example, improved communication can decrease the number of face-to-face meetings. Fewer face-to-face meetings can save travel costs. Better communications may also make meetings shorter or more effective. This would increase productivity and give managers and professionals more time for more important work.

Level-of-service benefits can be quantified by calculating how much clients would be willing to pay for the service improvement. For example, if an IT investment saves time for a group of clients, the value of that time can be based on the average wage rate for the clients. If an IT investment leads to quicker payment of invoices, the value of this benefit can be based on the interest that the organization could earn by investing that money.

Another way to estimate the willingness of a client to pay for a particular feature would be to compare the prices of products or services that have this feature with similar products or services that do not have the feature. For example, to set the value of getting information on line, compare the price of products available in both on-line and paper form.

4.6 Identify conditional benefits

Some benefits may depend on events that are beyond the scope of the defined options. For example, an organization might not be able to vary labour costs when workload changes. Getting the most out of these conditional benefits frequently depends on the way management restructures the organization. Conditional benefits, therefore, need particular attention:

- to provide an assessment of their certainty;
- to provide information to managers on how best to manage the risks associated with an investment; and
- to provide an indication of their time frame for the accrual of benefits (assuming, of course, that the benefits will actually accrue).

For example, to realize hard IT benefits such as person-year savings and cost savings, one should plan future budgets, future resource levels, or both. The plan might also include organizational restructuring or re-engineering of work processes. When the benefits of an IT investment depend on a certain demand or use, the benefit realization plan should include activities that will lead to that level of demand or use.

Suppose that a key assumption in calculating the benefits of electronic filing of income tax returns is that 20 per cent of all returns would be filed electronically within five years. A benefit realization plan might encourage the public to adopt electronic filing. As part of the plan, Revenue Canada might market the service directly to high-volume users, and undertake communications activities in trade magazines and on electronic bulletin boards.

For soft IT benefits, such as level-of-service improvements, the benefit realization plan might include activities that reach out to service beneficiaries. This plan might promote the service and gauge its effects, intended and unintended, on clients. Periodic surveys and client focus groups may determine not only whether the benefits are being realized, but also how the IT component of a service can be improved to increase its value. It is important to work with affected program managers and senior management to develop plans for realizing conditional benefits. If a consensus cannot be reached, leave conditional benefits out of the benefit realization plan.

SUMMARY

When assessing the benefits of IT investments, identify and quantify both the comparative and level-of-service advantages offered by an IT investment.

Comparative advantages include:

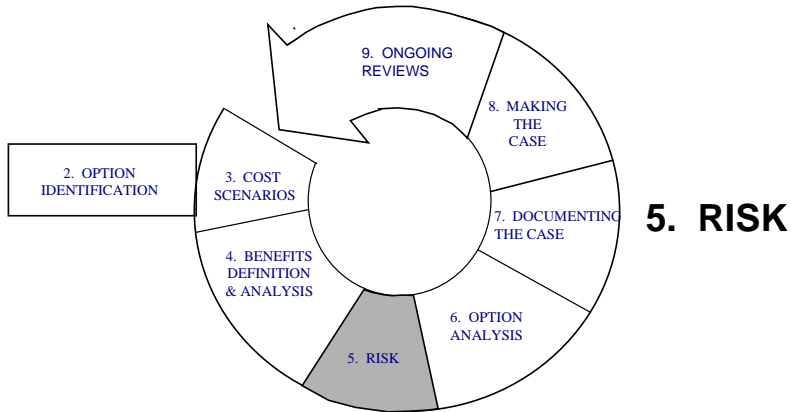
- time spent on highly valued activities;
- improved inputs into the decision-making process;
- resource savings achieved by avoiding errors and needless work; and
- reductions in the number of steps in a given business process process, resulting in improved workflow.

Level-of-service advantages include:

- reductions in clients' paperwork;
- improved client access to services;
- more timely services; and
- improved quality or quantity of service.

Be sure to quantify both tangible and intangible benefits and to identify conditional benefits.

Achievement of some of the benefits of the IT investment may depend on factors beyond the mere implementation of the investment, so one should develop a plan for realizing them.



5.1 Introduction

Every project is imperilled by certain risks. IT implementation projects face possibly more risk than other types because information system development is an evolving discipline, and IT continues to change very rapidly. The effects of risk on IT investments can be seen in the statistics of failure: a 1994 study¹ of 8,380 IT implementation projects in the United States indicated that a staggering 31 per cent of all IT projects are cancelled before they are completed; whereas 53 per cent of those that are completed cost an average of 189 per cent of their original estimates and average only 42 per cent of the originally proposed features and functions. Information systems development is maturing as a discipline, however, and methodologies have been developed to help assess and manage the risk associated with IT development projects.

This chapter presents 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 discusses how to plan to control or minimize the risk associated with implementing an IT investment.

5.2 Dealing with risk in IT investment

Risk assessment and management determine and resolve, respectively, all threats to the successful achievement of IT investment objectives and especially to the benefits identified in the business case. The assessment and management of risk are ongoing processes that continue throughout the duration of IT investment implementation and are used to guide decisions about the implementation project. The first decision faced by an IT investment option is whether to proceed. The

¹ *Charting the Seas of Information Technology*, Chaos, The Standish Group International, Inc.

better the risks are understood and planned for when this decision is made, the more reliable a decision it will be and the better the chances of success.

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 impact, likelihood of occurrence, and interdependence;
- prioritize the risks to determine which need the most immediate attention;
- devise an approach to assume, avoid or control the risks; and
- monitor the risks.

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. The federal government recognizes risk management as a key element of project management. It is essential, therefore, to understand the risks facing an IT implementation project before it can be approved.

5.3 Assess risk

Regardless of the dollar value of each IT investment, assess the critical factors that may affect its success. A group can assess risk more thoroughly than an individual. Do not use the unreliable practice of discounting the expected net gains and then assuming that the remainder is safe. Refer to the TBS's *Management of Major Crown Projects Policy and Information Management/Information Technology Policy* for a framework for assessing and managing risk. Some tactics for the assessment of risks are described in the sections that follow.

Cost estimates must reflect the assessed risk for the various phases of a project.

5.3.1 Identify risks

Risks can be found in any area of an IT investment project. There are three broad areas or classes to examine for risk: product engineering, the development environment and program constraints. The following list, from the Software Engineering Institute's *Taxonomy-Based Risk Identification*, provides a detailed breakdown of these classes into elements and their attributes. Analysts should identify the potential risks facing their IT investment proposal for each of the attributes listed.

- **Product engineering**

- Requirements
 - stability, completeness, clarity, validity, feasibility, precedent and scale
- Design
 - functionality, difficulty, interfaces, performance, testability, hardware constraints, and non-developmental software
- Code and unit test
- Feasibility, testing and coding/implementation
- Integration and test
 - environment, product and system
- Engineering specialties
 - maintainability, reliability, safety, security, human factors and specifications
- **Development environment**
 - Development process
 - formality, suitability, process control, familiarity and product control
 - Development system
 - capacity, suitability, usability, familiarity, reliability, system support and deliverability
 - Management process
 - planning, project organization, management experience and program interfaces
 - Management methods
 - monitoring, personnel management, quality assurance and configuration management
 - Work environment
 - quality attitude, co-operation, communication and morale

- **Program constraints**
 - Resources
 - schedule, staff, budget and facilities
 - Contract
 - type of contract, restrictions and dependencies
 - Program interfaces
 - customer, associate contractors, subcontractors, prime contractor, corporate management, vendors and politics

5.3.2 Characterize risks

Not all risks are created equal. For each risk identified, characterize the degree of risk in terms of:

- its impact on the project (e.g. slight delay or show-stopper);
- the probability of its occurrence (e.g. from very unlikely to very likely; and
- its relationship to other risks (e.g. poor project organization can lead to problems in product engineering).

5.3.3 Prioritize risks

Once the risks have been identified and characterized, they can then be ranked in order of priority to determine which should be tackled first. Priority should be based on a combination of an event's impact, likelihood and interdependence. For example, an event that has a severe impact, is very likely to occur, and can increase a number of other risks should be dealt with first.

One can assign priorities to risk factors by assigning a weight to each risk for each of the three characteristics (impact, likelihood and interdependence) and multiplying the three values to create a composite score. The risk with the highest score gets the highest priority.

5.4 Devise an approach to manage risk

Be sure to have strategies in place to manage risk, as well as contingency plans in case these strategies do not work. Be alert to any unexpected risks that may arise and develop responses to minimize their repercussions. This section discusses some of the types of risks that can occur, and lists the types of possible responses.

5.4.1 Types of risks

Three main types of risks arise in IT development projects:

- **Lack of control.** Risks of this type arise from a project team's lack of control over the probability of occurrence of an event and/or its consequences. For example, the risks related to senior managers' decisions are often a result of the lack of control a project team has over senior managers.
- **Lack of information.** Risks of this type arise from a project team's lack of information regarding the probability of occurrence of an event or its consequences. For example, risks related to the use of new technologies are often the result of a lack of information about the potential or performance of these technologies.
- **Lack of time.** Risks of this type arise from a project team's inability to find the time to identify the risks associated with the project or a given course of action, or to assess the probability of occurrence of an event or the impact of its consequences.

Each type of risk can occur in any area of an IT investment project. It is essential to know the type of risk in order to plan a response.

5.4.2 Responses to risk

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:

- **Assume.** In this type of response, a department accepts the risk and does not take action to prevent an event's occurrence or to mitigate its impact.
- **Control.** In this type of response, a department takes no action to reduce the probability of occurrence of an event, but upon occurrence, attempts to mitigate its impact.
- **Avoidance.** In this type of response, a department takes action prior to the occurrence of an event in order either to reduce its probability of occurrence or mitigate its impact.

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.

Once a type of response has been selected, the type of risk suggests the strategy of that response. If the response type is control or avoidance, these strategies are available, depending on the type of risk:

- Take control of the risk factors to prevent them from occurring or to minimize their impact.
- Acquire the information necessary to assess a risk.
- Increase the time available to assess a risk by increasing or reorganizing resources or adjusting the schedule.

SUMMARY

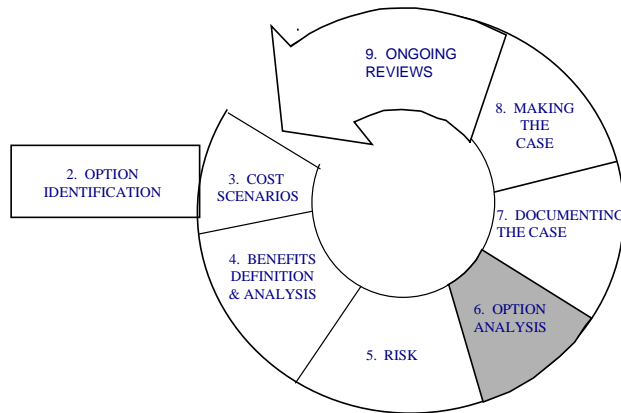
All IT investments face risk in their implementation. The better these risks are understood before deciding to proceed, the better the chances for success.

Assess the risks facing an IT investment proposal:

- identify risks;
- characterize risks; and
- prioritize risks;

Devise an approach to manage risk, choosing a response type appropriate to the risk's priority and a strategy appropriate to the type of risk.

This will help to identify the risk area, the type of risk, the type of response and the response strategy, enabling the project team to develop a risk management strategy.



6. OPTION ANALYSIS

6.1 Introduction

Once the options have been identified and their costs, benefits and risks examined, what remains is the choice of one to recommend. This chapter identifies criteria that will help analysts to decide which option to recommend.

Departments should identify and select the most beneficial investments, using an institution-wide strategic planning process based on the business-case approach. Project approval must be based on a business-case analysis that relates each investment directly to the business function and demonstrates the benefits of the investment to the department or to the government as a whole.

6.2 Considerations

Before selecting an option to recommend, one needs to have a good understanding of the organization's goals, its business processes, and the business requirements that must be satisfied. These considerations govern which of the potential solutions will best meet an organization's needs.

6.3 Select investment criteria

To evaluate investment options, select criteria that will allow measurement and comparison. The following list (which is by no means exhaustive) arranges some possible analyses, starting with those that involve hard financial returns and progressing to those that are more strategic:

Analysis of cost effectiveness:

- demonstrates, in financial terms, improvements in performance or in service delivery; and
- shows whether the benefits from the IT investment outweigh its costs.

Analysis of displaced or avoided costs:

- compares the proposed system's costs to those of the system it would displace or avoid; and
- may justify the proposal on a least-cost basis if it can be assumed that the new system will have as many benefits as the current system.

Work value analysis:

- predicts the cost savings as white-collar workers do work of higher value;
- requires analysis of work patterns throughout the organization and of ways that IT would re-adjust the number and types of skills required; and
- assumes that additional work needs to be done, that management allocates resources efficiently, and that workers allocate time efficiently.

Cost of quality analysis:

- estimates the savings to be gained by reducing the cost of quality assurance, such as the cost of preventing or repairing a product failure; and
- can consider savings that are internal and external to the organization, such as the client's cost to return a product.

Option value analysis:

- estimates the value of future opportunities that the organization may now pursue because of the IT project;
- uses decision trees and probability analysis; and
- includes savings on future projects, portions of the benefits of future projects, and reductions in the risks associated with future projects.

Analysis of technical importance:

- justifies an infrastructure investment because a larger IT project that has already received approval could not proceed without it.

Alignment with business objectives:

- includes the concept of strategic alignment modelling, which is one way to examine the interaction between IT strategy and business strategy; and
- allows managers to put a value on the direct contribution of an investment to the strategic objectives of the organization.

Analysis of level-of-service improvements:

- estimates the benefits to clients of increases in the quantity, quality or delivery of services; and
- must be done from the client's viewpoint.

Research and development (R&D):

- is a variant of option value analysis, except that the decision on whether to invest in a large IT project depends on the outcome of a pilot project;
- is most useful for high-risk projects, where R&D can assess the likelihood of failure and help managers decide whether to abort the project or better manage its risks; and
- requires management to accept the consequences of failure and to accept that the pilot is a reasonable expense in determining the viability of an IT project.

6.4 Conduct a cost-benefit analysis

Once the costs and benefits have been quantified, it is essential to conduct a cost-benefit analysis of the various options. Showing the incremental benefits of each option relative to the base case requires less analysis, since the analyst does not have to evaluate the benefits and costs of an entire program or service. Some IT benefits may not be quantifiable. Nevertheless, these benefits should be included in the analysis, along with the benefits to individuals within and external to the organization. The analyst has to look at the project from two perspectives: the organization's perspective as the supplier of products and services; and the client's or public's perspective as the consumer of those services.

For example, when conducting a cost-benefit analysis of an IT investment that would allow taxpayers to file their income tax returns electronically, the efficiency gains to Revenue Canada should be considered. The benefits to taxpayers should also be considered, including:

- time saved by preparing the form electronically instead of manually;
- time saved by using e-mail instead of personal or mail delivery;
- reduced calculation errors and greater certainty; and
- earlier receipt of refunds.

Hard cost savings come from dedicated resources, while more uncertain savings come from allocated costs such as overheads and workload. When estimating cost avoidance, keep these two types of savings separate. Assess how likely it is that the organization will realize savings from allocated resources, and estimate how long it will take to realize these savings.

A cost-benefit analysis examines the costs and benefits of each of the options under consideration. Consider the following tips when preparing the cost-benefit analysis.

6.4.1 Use financial analytical techniques

Use analytical techniques, such as discounted cash flow (DCF), internal rate of return (IRR), return on investment (ROI), net present value (NPV), or break-even/payback analysis to estimate the dollar value of options. Detailed descriptions of each of these techniques can be found in the *Benefit-cost Analysis Guide*, published by the Treasury Board of Canada Secretariat.

6.4.2 Decide between full or incremental costing

A business case can describe only the full costs. When comparing different investment options, however, one may consider the incremental costs of each option. Clearly identify whether full or incremental costs are being compared.

6.4.3 Set the analysis period

Technology will often affect the lifecycle of the investment. Be sure to project costs and benefits over five years.

6.4.4 Adjust for real price and movement

It may be necessary to adjust costs and benefits for real price and movement. First, decide on a discount factor or a compounding factor that represents the cost of borrowing money. This may be done by using the Department of Finance Canada's Crown Corporation Monthly Borrowing Rate, although another rate may be used if justifiable. Second multiply this factor by the current year cost of the item.

6.4.5 Conduct a sensitivity analysis to test the risk

Perform a sensitivity analysis to check the stability of the cost-benefit analysis. A sensitivity analysis tests variations in costs and benefits, especially in the assumptions used to derive them, and sees how those variations will affect an option's value to the organization. It provides insight into the risks of each option. It can identify the factors that must be carefully managed throughout the life of the investment if it is to deliver the expected benefits.

A cost-benefit analysis should be tested by re-calculating performance using high, optimistic values and low, pessimistic values. Test assumptions by systematically increasing and decreasing rates.

Conduct the sensitivity analysis on one variable at a time so that the impact of that one variable can be assessed.

6.4.6 Conduct a probability analysis

Probability analysis is an extension of the basic cost-benefit investment criteria. By calculating a probability distribution for the NPV on the basis of assumed probability distributions for key variables, it is more comprehensive and sophisticated than single-variable sensitivity tests.

A probability analysis allows for variations in all key variables to be tested simultaneously using a Monte Carlo simulation technique. By contrast, in a single-variable sensitivity approach, several variables could be varied at the same time but with only one future outcome being predicted.

Probability analysis provides decision makers not only with the NPV of an option, but also with an indication, given the uncertainties identified, of the likelihood that the NPV will be realized.

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.

Although software is widely available for probability analysis work, it should be emphasized that, as for threshold analysis, there is no escaping the fact that human judgments are needed on the likelihood of circumstances.

6.4.7 Double-check calculations

Since the cost-benefit analysis is an important part of the decision-making process, verify calculations thoroughly. Check figures on spreadsheets both before and during the sensitivity analysis. Include techniques and assumptions in the notes accompanying the analysis of each option.

6.5 Use a multi-criteria approach

The cost-benefit analysis is expressed in terms of revenue, income, or some other financial measurement. Please note, however, that a business case can and should include factors that may not be easy to express in financial terms. For instance, operational measures might include some form of customer-oriented measurement, some measurement of efficiency or productivity, and some measurement of the ability to innovate, learn, and change with the environment.

It is possible to assign weights and scores to various criteria. Once values for all the factors being evaluated have been determined, weight the score for each factor according to its importance to the organization's business goals. Table 1 shows how one organization assigned financial, operational and technical scores, which it used to assess various options.

Table 1: A Weighted Approach²

Comparing IT Investments	
Criteria	Weight
Financial measures (NPV)	+40
Operational measures	
– Level-of-service improvement	+20
– Program objectives	+20
– Management information	+5
– Organization risk	-10
Technical measures	
– Corporate IT architecture	+15
– Technical risks	-5

² This figure is a variation of a model presented in *Assessing the Value of Information Technology*, published by NCR Corporation.

A weight of 40 per cent was assigned to NPV analysis, and 20 per cent each to how well the proposed investments would improve levels of service and program objectives respectively. A 5-per-cent weight was assigned to the project if it contributed to providing critical information needed by senior management, and up to 10 per cent could be subtracted according to the level of organizational risk involved. On the technical side, a 15-per-cent weight was given to how well the proposed investment contributed to overall corporate IT architecture and a negative weight of 5 per cent was assigned to the technical risk associated with the project.

6.5.1 Comparing various options

Use similar models to compare the various options. To identify the risks associated with the business case's values, assumptions and parameters, apply sensitivity analysis to one factor at a time.

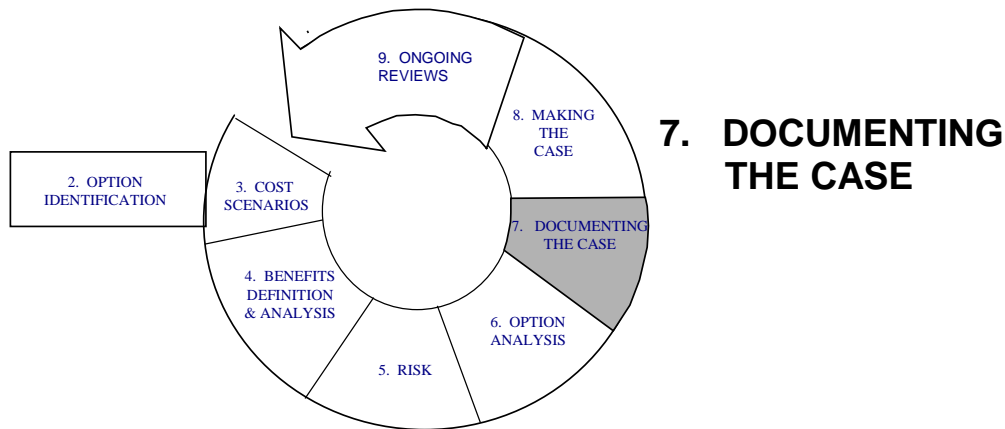
Auditors can review any quantitative measure that is used, verify its rigor and check the validity of the assumptions and the integrity of the conclusions.

SUMMARY

Begin the evaluation with a good understanding of the organization's goals and business processes.

Use a number of possible investment criteria to evaluate the various options.

Conduct a cost-benefit analysis and use a multi-criteria approach to compare the options.



7.1 Introduction

Once the analysis has been completed and an option has been recommended for approval, assemble the findings into a concise report that can be used to make informed decisions. The report should be consistent with other documentation used for making decisions. It should also address the various topics identified in this guide, including an analysis of options, costs, benefits, risks, sensitivity analysis, assumptions and a recommendation.

This chapter shows how to prepare the business case documentation to demonstrate the relevance and financial viability of an IT investment option.

7.2 Identify the audience

Early in the process, identify the audience for the cost-benefit analysis and for the report. Who are the decision makers? In practice, there may be several audiences at various levels or for different parts of the process.

The report must be tailored to the audience's needs, concerns, expectations and level of understanding. This could result in several differently tailored executive summaries with corresponding graphics and charts, or in an integrated report with several different orientations.

7.3 Present the context

Neither the analysis nor the options exist in a vacuum; they are part of a larger picture. This context, whether one person's vision or a formal blueprint, should be identified, and the relationship of the investment, options and recommendations to this context should be clearly established. If the options or recommendations deviate from — or change — the blueprint or vision, explain why.

7.4 Prepare the contents of the report

7.4.1 The executive summary

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

- the recommendation, along with any relevant qualifications;
- a clear link to the business objectives and, where the investment is significant, to the department's business plan;
- a brief description of each option analyzed, together with its net present value (or other statement of value to the organization);
- any other highly significant information pertinent to the recommendation, such as risks and constraints; and
- an explanation of which option was chosen and why.

7.4.2 The body of the report

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

- information on assumptions, parameters used and constraints identified;
- cost-benefit tables for each option considered, together with explanatory notes;
- information on non-quantifiable benefits; and
- the assessments of the risks of each option, the results of the sensitivity analyses, and the overall conclusions that can be drawn from this information.

Also include supporting information 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 and compare options will make the report more readable for the decision makers.

7.4.3 Support

Identify all stakeholders. A section describing the level of support offered by each of the stakeholders would be effective.

7.4.4 Funding

The costs presented in the cost-benefit analysis 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. A separate funding statement should show how the recommended option will affect the budget.

7.4.5 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.

7.4.6 Logical framework approach

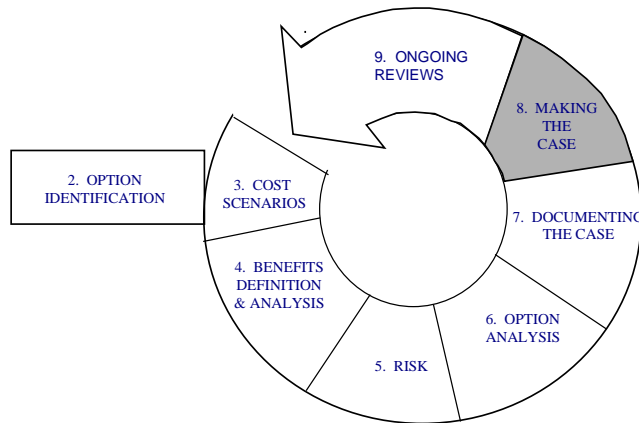
The logical framework approach (LFA) provides a common language for discussing IT investments in a portfolio. The LFA can help organizations present and track each IT investment. It structures information surrounding an investment so that it is realistic, measurable and internally consistent.

As a result, the LFA helps an organization state clearly, explicitly and concisely why an investment is being made, what the risks are, how investment activities and outcomes are related to the organization's ultimate goals and purposes, and what the investment will achieve once it is completed. This process leads to a concise summary of the major elements of the investment and their interrelationship. It also links the project plan for the investment to the business case, ensuring that project activities are contributing to the results projected in the business case.

Although the LFA can be used to document and analyze the various options, it is normally prepared after one option has been selected and approved. Details on this technique are provided in Appendix A.

SUMMARY

A business case is a detailed investment proposal. When writing a business case consider the needs of the target audience and provide all relevant information in an easy to understand format.



8. MAKING THE CASE

8.1 Introduction

Even the best analysis and documentation will be useless unless the decision makers buy in and give the necessary approvals. This chapter provides suggestions that will help ensure that the analyst's recommendations get a fair hearing.

8.2 Find a champion

Find a champion who can galvanize support for the business case, as well as for the subsequent implementation. The champion should be a person in a senior management position; very large projects should have an assistant deputy minister in this role. Avoid starting a project without a champion. The project sponsor may make good a champion, as might anyone involved in the investment analysis and proposal process.

8.3 Promote, market and sell

The investment proposal will compete for the attention of decision makers and the organization as a whole. This attention is crucial. Consequently, the proposal itself must be promoted, marketed and sold. Market with an eye towards the organization's culture and the target audience. Word of mouth is an important, but often overlooked, way of delivering limited information to a finite group.

8.4 Model, pilot and test market

A business case must convince decision makers that the analysis, conclusions and recommendations are valid. To do this, use theoretical or practical models, pilot projects, and test marketing. Remember, seeing is believing and a demonstration is worth a thousand pictures.

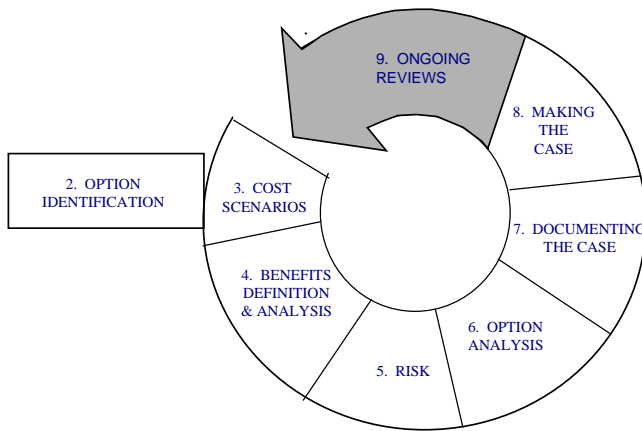
Furthermore, the model or pilot allows the assessment of any ongoing changes to the environment or to the assumptions. One can then answer the ‘what if’ scenarios that inevitably surface during the decision-making process. At the same time, there is a basis for re-assessment and revision in the investment’s

These tools can be improved over time so that the product or output is no more and no less than what is needed to convince people.

SUMMARY

To ensure that the business case gets a fair hearing:

- find a champion to galvanize support;
- promote the proposal to decision makers; and
- use a model, pilot or test market to demonstrate the proposal.



9. ONGOING REVIEWS

9.1 Introduction

This chapter outlines a process for conducting ongoing reviews during the lifecycle of the IT project. Reviews help to verify that the IT investment decision remains valid, and that all costs and benefits resulting from that decision are understood, controlled and realized. The investment analysis contained in the business case defines the goals of the implementation project and serves as a standard against which to measure the project's prospects for success at review time.

9.2 Types of reviews

The following types of reviews can be conducted:

- Independent reviews. These are conducted by an independent party at major checkpoints to identify environmental changes, overrun of time and cost targets or other problems. Funding should also be set aside for unscheduled independent reviews to be undertaken whenever there are significant changes in the project environment or serious concerns about the project.
- Internal peer reviews. Departments engaged in several projects simultaneously have several project managers and other managers in the systems development, maintenance and operations groups. This body of expertise can be drawn upon to conduct periodic peer reviews of projects. These semi-formal reviews allow the project manager to present performance and progress data, to discuss upcoming challenges and to identify any horizontal issues. The object of the peer review is for the group to verify that the project is still on course and to provide

expert advice, counsel and assistance to the project manager. In this way, the combined skills and experience of all these managers is applied to the project.

- External peer reviews. Departments may also draw upon similar people in other departments or organizations to provide a different perspective and to bring a wide range of expertise to bear on project strategies, plans and issues.
- Project team sanity checks. Another source of early warning for project problems is the project team members. These people are the most intimately aware of difficulties or planned activities that may pose particular challenges. The project manager should plan regular sessions where team members can review the continued relevance of the project, project performance and concerns about actual or potential problems in a non-incriminating way.
- Oversight reviews. These reviews, under a senior steering committee, should be planned to take place at each checkpoint to reconfirm that the project is aligned with departmental priorities and directions and to advise senior management on project progress.
- Investment reviews. The departmental auditor can also review the performance of projects and, upon completion, the performance of the investment. At an investment review, the auditor reviews and verifies the effect of the investment to ascertain that the investment was justified. This activity is more than a traditional compliance audit; it is a review of process and of results.

9.3 Plan and manage reviews

An IT project must have checkpoints at which it can be reviewed and management can decide on the future of the project and any appropriate corrective action. Although project reviews can be carried out any time after the investment decision is made, they are most effective during the project's early stages. These early reviews allow rapid response to the consequences of decisions. By comparing the results expected in the business case with actual results at different times, it can be determined whether any key factors are missing in the analysis, what assumptions are no longer valid, what conditions in the environment have changed and whether risks are being managed.

Project reviews done during the course of the project may lead to a re-examination of the analysis used to justify the decision. These reviews give management the opportunity to assess the investment's full impact and to reduce, if necessary, the potential costs — in money, time and credibility — of an 'out-of-control' investment. The results of a project review may indicate that an IT project should be terminated.

In addition to project progress reviews, an IT investment should also be subject to complete investment reviews. At least three investment reviews should be planned.

9.3.1 Plan for scheduled reviews

The reviews should start as soon as money is spent on the investment. Major project reviews should be scheduled to coincide with the release of funds allocated to the project. In this approach, the project sponsor releases only the funds needed to reach the next scheduled review. The performance of the project is reviewed at each scheduled checkpoint or when the released funds run out. After review, departmental management can decide to proceed with the project as planned, modify the project or its funding, or even terminate the project, limiting the loss to the amount previously released.

Investment reviews can be scheduled to coincide with project reviews during investment implementation.

- The first investment review should be conducted no later than the midpoint of the project schedule, when the deliverables are under development.
- The second should be conducted after the end of the implementation project, when the deliverables have just started to be used in production.
- A final review should be conducted after the IT investment has been in production for between six months and a year.
- The exact dates for these reviews should, ideally, be determined by the timing of the investment deliverables. This timing should be clearly indicated in the investment plan.

9.3.2 Plan for unscheduled reviews

In addition to scheduled reviews, the project should be reviewed and the business case revisited whenever:

- there is a departmental re-organization;
- new legislation affects the target business function;
- a major deliverable is missed;
- the project environment changes; or
- the relevant technology undergoes a major change.

9.4 Select review participants

Anyone crucial to the success of the investments should be key and active participants in the review from the outset. Certain people have specific roles to play in a project review, as described below.

9.4.1 Clients

Clients ensure that the investment will deliver the desired results; they are responsible for the investment. Clients should demand regular project reviews and play an active role in the review process. Moreover, clients are the only parties who can change the parameters of the investment.

9.4.2 Sponsor

As the funding authority, the sponsor needs confirmation that the money is being spent properly. As such, the sponsor should be on the review committee. In some cases, the client is also the sponsor.

9.4.3 Internal and external peers

Project managers and IT managers who are not involved in the project provide a body of expertise that can be used to evaluate the progress of the project. Peers may be drawn from within the department or from other departments or organizations.

9.4.4 Independent reviewers

Independent experts may be contracted to take an impartial look at the project environment and to evaluate progress at major checkpoints.

9.4.5 Auditor

An auditor conducts periodic investment reviews. The auditor reviews the investment to determine whether it is meeting the goals outlined in the business case.

9.5 Manage reviews efficiently

The approved IT investment analysis should form the basis for criteria used in all reviews. The project schedule of deliverables, based on the investment analysis, establishes the timing criteria for project reviews.

After each review, the reviewers should report on the likelihood of a successful implementation of the IT, and should make any associated recommendations to the client and the sponsor.

After each review, the sponsor should say whether the investment will stop or continue. An investment may be stopped, even temporarily, for any of the following reasons:

- There is no agreement on how to conduct the review.
- The review showed that most of the expected results were not achieved.
- There had been changes to the approved IT investment analysis, and it was not clear that the client had been made aware of the full implications of the changes.
- Changes to the approved IT investment analysis had been accepted, but there was no additional funding for the changes or the client had not accepted the new risks.

For the final investment review, the client should demonstrate to the auditor that the investment achieved the expected results, and the auditor should report on the investment's level of success.

SUMMARY

Project reviews make it possible to examine the progress of an IT investment implementation. Decide early in the process who should participate in reviews. Also determine what deliverables will be produced, and when, so that a schedule for the reviews can be prepared. Reviews should be scheduled to coincide with the release of funds and projects should be structured to avoid penalties for early termination. It is important to monitor the investment from the moment the first dollar is spent until the final deliverable is in production.

10. APPENDICES

10.1 Appendix A – Logical Framework Analysis

The logical framework analysis (LFA) is a simple, dynamic technique for planning, communicating and controlling the major elements of a project. The LFA can be modified at any time during the project, as long as the client accepts the new conditions and the sponsor continues to fund the changes; therefore, all the documentation pertaining to the changes should be kept. All the information needed to complete the LFA can be acquired by performing the analysis described in this guide.

The LFA can be used for any kind and size of project. The analysis is done on a single page, which focuses everyone's attention on the essential elements of the project and forms the basis for criteria used in each project review. The LFA captures all the major inputs, outputs, effects and goals of the project. It uses objective results indicators with some means of verification and takes into consideration the critical conditions beyond the direct control of the IT project.

The LFA is organized in a matrix that presents vital information about the project in a logical order.

Objectives (column 1)

The first column consists of the following narrative summaries describing the project objectives in descending order.

1. Write a narrative summary describing the intended *goal* of the project and of the reasons why the IT investment is needed.

The *goal* is the larger purpose that this project is intended to further. Usually this is a program or sector objective, which one should be able to find in the department's *Business Plan* or *Long Term Capital Plan*.

2. Write a narrative summary describing the *purpose* that the project must meet if it is to achieve the *goal*.

The *purpose* of the project should be evident after the completion of the problem or opportunity statement outlined in Chapter 2 and should remain consistent throughout the options analysis discussed in Chapter 6. The *purpose* describes the desired effect the project should have.

3. Write a narrative summary describing the *outputs* that the project will produce to meet the objectives.

The *outputs* of the project should be those of the option selected in the process outlined in Chapter 6. The *outputs* are the direct results or deliverables of the project and should lead to the achievement of the *purpose* described in the cell above.

4. Write a narrative summary describing the *inputs* that are required to produce the *outputs*.

The *inputs* are the stakeholder organizations that stand to benefit from the project and that must make a contribution for it to succeed.

Critical Conditions (column 4)

After completing column 1, proceed to column 4, to identify the critical conditions on which the objectives depend.

For each row in the LFA (corresponding to *goal, purpose, outputs* and *inputs*), identify the critical conditions over which no direct control can be exerted and which are required to achieve the objectives outlined in the narrative summaries.

For example, what are the critical conditions that may make it difficult to use some of the *inputs*? What are the critical conditions that may diminish the planned *purpose*? These critical conditions are the major risk factors identified in Chapter 5.

The linkage of critical decisions with identified risk factors, their effects and how they will be managed, will result in the identification of specific goals and actions in the project work plan.

Review Objectives and Critical Conditions

Before completing the remaining columns, review all the objectives and their critical conditions with the client and the sponsor so that all participants have a common understanding of the scope of the project. It is normal for there to be a great deal of disagreement at this stage. It often takes several tries before a consensus is reached.

For a general example, see the sample LFA at the end of this section.

Objectively Verifiable Indicators (column 2)

For each row of the LFA, identify all the *objectively verifiable indicators*. The basic principle of this column is: 'If it can be measured, it can be managed'. Indicators demonstrate results. As performance measures, they can indicate successful accomplishment of objectives or warn of possible failure.

Means of Verification (column 3)

For each row of the LFA, identify which *means of verification* will be used to obtain *objectively verifiable indicators* (e.g. financial reports, time sheets, memos, letters, votes and surveys).

Table 2: Sample Logical Framework Analysis (LFA)

Logical Framework Analysis
Organization: Department of XYZ
Project Manager: J. Bleau Date/Time: October 27, 1997

Objectives	Objectively Verifiable Indicators	Means of Verification	Critical Conditions
<p>Goal:</p> <p>- Improve services to the public.</p>	<p>A realization on the part of Canadians that they are waiting a shorter period of time for someone to answer their call</p> <p>- Excellent if at least 80 per cent of the public realize it.</p> <p>- Very good if between 60 per cent to 79 per cent.</p> <p>- Good if between 40 per cent and 59 per cent.</p> <p>- Acceptable if between 10 per cent and 39 per cent.</p> <p>- Otherwise it is unacceptable.</p>	<p>- Base line survey done before the project is implemented.</p> <p>- Survey done right after the implementation of the outputs of this project.</p> <p>- Survey done one year after the implementation of the outputs.</p>	<p>- One of the federal government's priorities is to improve services to the Canadian public.</p>

Objectives	Objectively Verifiable Indicators	Means of Verification	Critical Conditions
<p>Purpose:</p> <ul style="list-style-type: none"> - Reduce the time people wait for a human to answer when requesting a service by telephone. 	<ul style="list-style-type: none"> - Cost to maintain the system is \$500,000. - Increased cost of long distance calls paid by the government (4,000,000 calls x 20 minutes per call = \$800,000 per year). - Private-sector opportunity. Individuals calling for services during work hours: 4,000,000 calls x 10 minutes of waiting time (each minute equals \$1) is \$40,000,000 per year. - Public-sector opportunity. Operator will have less waiting time in between each call. 3,500 operators x 4 minutes less in waiting time x 5,500 calls each year = \$77,000,000 each year. 	<ul style="list-style-type: none"> - MYOP - Financial statements - Productivity reports 	<ul style="list-style-type: none"> - People know that they can get a prompt response at any time of day to a telephone request for a service.
<p>Outputs:</p> <ul style="list-style-type: none"> - Install a new computerized telephone controller that will re-route the caller to an available operator anywhere in Canada. - Modify the department's systems to enable all the designated operators in Canada to assist any Canadian calling for services. 	<ul style="list-style-type: none"> - Cost at start of project, \$500,000 for the controller. - Cost after three months of development is \$1,200,000 with 1/3 of the activities completed. - Cost after six months is \$1,900,000. - Cost at implementation is \$2,600,000. 	<ul style="list-style-type: none"> - Project charter - Status reports - Project history system - Final project reports - Receipts 	<ul style="list-style-type: none"> - Reliability of the equipment and the software.

Objectives	Objectively Verifiable Indicators	Means of Verification	Critical Conditions
<p>Inputs:</p> <ul style="list-style-type: none"> - Treasury Board of Canada Secretariat - Private industry - Information Technology Branch - Communications Canada 	<p>Resources:</p> <ul style="list-style-type: none"> - \$3,234,000 from the Treasury Board of Canada Secretariat - \$1,666,000 from private industry - 1 project Team of 20 persons: <ul style="list-style-type: none"> 1 project manager 1 quality assurance facilitator 1 electronic engineer 2 communications engineers 3 systems analysts 6 programmers 3 systems users (designated operators) 1 person from production 1 person representing the vendor 1 secretary/clerk 	<ul style="list-style-type: none"> - Invoices - Letters confirming the funding - Accounting reports - Time reports - Time sheets - Contracts 	<ul style="list-style-type: none"> - Availability of the funds. - The private and public sectors work together so that both share the risk and the benefits of the project.

Goals and critical conditions are not under the direct control of the project manager. All other factors can be influenced by his or her actions.

10.2 Appendix B – Bibliography

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