Addendum: Cost-Benefit Analysis

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Forward

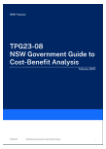
This Addendum (the ICT and Digital CBA Addendum) is part of Digital.NSW's commitment to supporting clusters and agencies in developing business cases for proposed ICT and Digital initiatives that adequately explain and advocate the rationale for proceeding with the initiative.

It supplements NSW Treasury Policy and Guidelines: NSW Government Guide to Cost-Benefit Analysis by providing additional guidance and commentary concerning the development of ICT and Digital business cases.

This Digital CBA Addendum supports NSW clusters and agencies in developing business cases that fully and accurately articulate a proposed initiative's cost and benefits.

Relationship to other documents

This ICT and Digital CBA Addendum should be read in conjunction with other key documents and guidance NSW Treasury provides.



TPG23-08 NSW Government Guide to Cost-Benefit Analysis

https://www.treasury.nsw.gov.au/sites/default/files/2023-03/tpg23-08_nsw-government-guide-to-cost-benefit-analysis_v2.pdf

TPG22-22 NSW Treasury Policy and Guidelines: Evaluation

https://www.treasury.nsw.gov.au/sites/default/files/2023-02/evaluation-tpg22-22.pdf

NSW Government Business Case Guidelines

https://www.treasury.nsw.gov.au/information-public-entities/business-cases

NSW Premier and Cabinet Evaluation Tool Kit

https://www.dpc.nsw.gov.au/tools-and-resources/evaluation-toolkit/

1. Executive Summary

Cost-benefit analysis (CBA) is the preferred method for appraisal of all government decisions' social, environmental, cultural, and economic value.

The NSW Government Guide to Cost-Benefit Analysis (the CBA Guide) is a Treasury Policy and Guidelines paper that sets the high-level framework and principles for conducting CBA for the NSW Government. As such, it is a key component in the framework for appraisal, ex-post economic evaluation and benefits realisation management of public investment.

CBA is the preferred method to evaluate proposed Government initiatives across the following dimensions:

- Economic value
- Cost
- Value for money.

Digital.NSW has worked with Treasury to update and streamline its guidance and collaborate with agencies to fill the evidence gaps and address obstacles in the appraisal and evaluation of proposed ICT and Digital initiatives.

The result is this ICT and Digital CBA Addendum, which provides necessary clarifications and some practical tips which will support clusters and agencies in developing business cases for proposed ICT and Digital initiatives that accurately represent the following:

- Economic value
- Cost
- Value for money.

The Addendum is supported by the 'Cost-Benefit Analysis' Playbook to be published on Digital.NSW. The Playbook consists of a suite of informational guides to help better development of business cases that underpin ICT and Digital investment decisions.

2. CBA Guide and the Digital CBA Addendum

CBA principles and framework apply to all proposed initiatives across Government – not just those involving proposed capital expenditures.

The CBA Guide sets out general principles for undertaking CBA and the reasoning for the approach described. The Guide cannot feasibly cover all specialist areas or topics that are not generally applicable and does not include parameters for specific benefits.

NSW Treasury's CBA Guide establishes the framework for developing a CBA. This Digital CBA Addendum clarifies the application of CBA principles in business cases for proposed ICT and Digital initiatives.

These areas are instead covered through sector-specific CBA guidance, cross-cluster learning, and the resources maintained by the Centre of Evidence and Evaluation (CEE).

For proposed initiatives across NSW Government, a CBA should focus primarily on impacts on the NSW community – households, businesses, workers, and Government.

This ICT and Digital CBA Addendum focuses on the development of specific content in business cases for proposed ICT and Digital initiatives to:

- Explain the proposed initiative's purpose, risks, and intent
- Describe its comparative advantages, costs and weaknesses
- Assess the proponent organisation's capability to deliver the solution.

Ultimately, a CBA facilitates an assessment of whether the benefits of a proposed initiative are likely to exceed its costs and provide a net social benefit.

Further guidance

1. www.Digital.nsw.gov.au/funding/Digital-restart-fund/how-to-prepare-a-business-case
2. NSW Government Guide to Business Case (TPP18-06)
3. NSW Government Guide to Cost-Benefit Analysis (TPG23-08)

3. Key Focus Areas

This ICT and Digital CBA Addendum specifically provides additional guidance in several key focus areas, which were established through consultation with stakeholders, including clusters, program sponsors, Digital and Finance leaders, program evaluators, Treasury and other program owners, economists, and researchers across NSW Government.

Broad consultation with stakeholders identified 6 key focus areas for this Digital CBA Addendum.

These key areas of focus are:

1. Program Logic Map (PLM)
2. Base case and options
3. Analysis Period
   - including amortisation and economic life
4. Identifying, forecasting and valuing benefits and costs
5. Discounting
   - including sensitivity analyses and distribution analyses
6. Risks, uncertainties, and assumptions
   - Relevant considerations for decision-makers.

Each key focus area addresses the following matters from the perspective of the preparer of the CBA:

- What it means
- What must be done
- Tips and pitfalls
- Where to find further guidance.

The information provided here is also available digitally on the 'Cost-Benefit Analysis' Playbook published on Digital.NSW.

Key focus area #1: Program Logic Map (PLM)

Not much guidance in TPG23-08 (NSW Government Guide to Cost-Benefit Analysis) was provided for this key focus area. However, it was stipulated as a mandatory requirement in TPG22-22 (Treasury Policy and Guidelines: Evaluation).

What it means	**The starting point for a CBA is to define the problem to be addressed and specify the intended objectives and outcomes of the proposed initiative.** Program Logic Models (PLM) represent how an initiative would achieve outcomes for its beneficiaries. Please refer to an example of Licensing Program Logic Model provided in Appendix A.
What must be done	A PLM creates an evidenced-based and robust CBA that can eventuate into a relatable post-project/program evaluation for ICT and Digital initiatives. One of the methods for developing PLM is to run a workshop with a qualified facilitator who will guide participants through the process of creating it. The outputs of the PLM workshop are the program logic map and the initiatives map. The program logic map should articulate the service need, targeted benefits and strategic responses. It also identifies the changes required to address the service need while achieving the benefits. The initiatives map then summarises the potential initiatives that may respond to the service need.
Tips and pitfalls	The facilitated workshop process (typically not more than 2 hours) of developing a PLM should lead to identification of a clear path between the investment leads to the intended outcomes. If the workshop takes longer, that will generally indicate weakness inherent in the proposed initiative.
Further guidance	NSW Government Premier and Cabinet Evaluation Toolkit NSW Government Health: Population and Public Health Division – Developing and Using Program Logic: A Guide TC18-03 Program Evaluation: Sets out the overarching requirements for the evaluation of existing and new programs. TPG22-22 NSW Treasury Policy and Guidelines: Evaluation QLD Government Investment Logic Mapping Guide

Key focus area #2: Base case and options

The generic guidance for this key focus area can be found in section 2.2 of the CBA Guidelines TPP 23-08.

What it means	The base case[1] is the projection of costs and benefits 'without' the proposed initiative. **Guided by the PLM, options are potential solutions to the identified problem or service need in the base case scenario.**
What must be done	The most common base case for proposed ICT and Digital initiatives is "Do Nothing". However, this should be distinct from the fact that base case can be a 'Do nothing' scenario or 'Do minimal' and other 'Do something' scenarios. Other initiatives, or programs funded and committed but which have yet to commence, should form part of the base case. The business case must provide a CBA with at least two or more realistic options to achieve the stated objective per the PLM in addition to the base case. Repeated analyses will likely be needed to facilitate the development, refinement, and short-listing of possible options – especially for significant initiatives. Where options have been considered and eliminated before CBA, the business case should document the process (e.g. rapid CBA) used to eliminate them. Options assessed should be clearly articulated, including scope, implementation timetable, cross-agency impacts, capital or operational requirements, and key assumptions driving the costs and benefits.
Tips and pitfalls	The preparer of the CBA should ask: • Is it feasible to "Do nothing" regarding legacy systems? • Might it be preferable to present a base case reflecting incremental changes to ICT, which may allow for a safe continuation of current policy settings? • Have all technology options (from technology upgrades to innovative ICT and Digital solutions) been considered (guided by the PLM) When to use "Do nothing" vs "Do minimum":

[1] The base case is a 'business as usual' situation. It assumes Government policies remain as they are and generally retains the status quo. That is, continuation of current quantity and quality of services including planned maintenance and usage

	• Investing in new technology scenarios would typically have a 'Do nothing' option. For example:
	  ○ Sewage in Sydney's waterways does not have any systematic monitoring (Do nothing);
	  ○ Monitoring using pen and paper and visiting all the waterways (Do something #1);
	  ○ Monitoring by deploying IoT sensors to all of Sydney's waterways (Do something #2).
	• Recurrent Cyber Uplift Program of Work scenario typically has a 'Do minimum' option, as a 'Do nothing' option is inappropriate for this type of work. For example:
	  ○ Maintain existing Cyber uplift status quo (Do minimum);
	  ○ Upgrade Agency Essential 8 maturity from 1 to 3 (Do something #1).
	During the initial Strategic Business Case phase (Gate 0 or Gate 1), an option or options could be selected for trial in a Proof-of-Concept process based on a preliminary analysis (e.g., rapid CBA through a lean business case), with subsequent roll-out informed by an evaluation of the pilot and an updated (detailed) CBA of the complete initiative at a later stage.

Further guidance	VIC Government Real Options Analysis technical supplement version 1 June 2018 Service design and delivery process (Australia) – A guide to Discovery, Alpha, Beta and Live stages of service design and delivery. NSWDRF Seed Funding and Scale Funding Pathways – A guide to Lean Business Case Development

Further guidance

Example Options to be considered when updating legacy systems to meet new regulatory requirements.

Updating Legacy Systems to meet new regulatory requirements

The options available could be:

- Continue with the Legacy system with necessary enhancements (Base Case)
- Developing New System Inhouse using State Digital Assets (Option #1)
- Buying off the shelf (Option #2)
- Buying the Application as a service (Option #3).

Example Options to be considered when implementing New Technology.

Two technologies to meet requirements

Consider an initiative that considers two technologies to fulfil a need: a reference technology and an alternative. The options available could be:

- Do nothing and maintain status quo using old technology (Base Case)
- Develop solution using reference technology (Option #1)
- Develop solution using alternative technology (Option #2)
- Develop solution using reference technology and include option to switch to alternative technology (Option #3)

If at any time during delivery, the alternative becomes more feasible in achieving the stated objectives, the initiative may, but does not have to, switch from the default or reference technology to the alternative:

- The option cost is the cost of retaining the flexibility to switch to the alternative technology.
- The ability to switch to an alternative strategy is the type of action allowed.
- Switching to alternative technology is exercising an option and incurs an 'exercise price' to implement.
- The exercise trigger is the circumstances leading to the alternative becoming more favourable than the reference strategy.

The outcome has an improved real-life total net benefit as opposed to developing the reference technology only. The optimal switch point could not have been determined prior to the commencement of delivery.

Key questions when generating options

The following questions may be helpful when generating options:

Variations in scale or scope	Could the investment be smaller or bigger, combined with other initiatives, provide different service quality, re-purpose existing assets, have a different design life, or entail a different delivery model or method of procurement?
Demand-side measures	Could existing services be better rationed using behavioural nudges and pricing or be delivered using State Digital Assets?
Supply-side measures	Could private businesses, workers or markets be incentivised or supported to deliver a solution? Public Private Partnerships?
Alternative time paths	Could the investment/solution be deferred or undertaken in discrete stages, such as using Seed Funding pathways in Digital Restart Fund (see Appendix E: Glossary)?

Do nothing

The question that needs to be asked here is whether doing nothing (i.e. continuing the current quantity and quality of services) is a realistic default Base Case option, considering planned maintenance, usage, upgrades from expected growth/ usage and remediation activities.

In the case of legacy systems, the "Do Nothing" Base Case may involve deferral of replacement, with ongoing maintenance and eventual replacement with a new asset of comparable standard to that being replaced. It also assesses whether factors such as system security considerations or ongoing support cessation give no choice but to "Do Something".

"How to work with 'uncertainty' in your options"

There are many types of 'uncertainty' in ICT and Digital initiatives due to rapid technological changes (for example, connectivity 4G, 5G to 6G in less than 5 years, increasing usage of 3D printing, and growth of autonomous vehicles).

These drivers of uncertainty may arise after Government has committed to a particular investment, where they can change the market conditions and investment environment.

Uncertainties differ from risks in that if they have not been considered in framing a proposed initiative, they cannot be effectively mitigated or ameliorated after committing to the initiative.

They can impact the initiative's ability to achieve the intended benefits, therefore influencing the preferred investment strategy. "Real options analysis" can assist in understanding how to work with 'uncertainties' in your options.

"Real options analysis"

Is an investment evaluation and decision-making framework that recognises uncertainty and the value of managerial flexibility to enable investors to respond to it favourably in advance.

It is a way to support the Government in developing **adaptable ICT and Digital investment strategies and better meet communities' evolving needs** by allowing practitioners to consider alternative future states when developing a business case.

The alternative delivery trajectories or investment strategies that would suit different conditions and can help visualise the most appropriate courses of action to take in each scenario. TPG 23-08 NSW Government Guide to Cost-Benefit Analysis Appendix 4.3 provides further information on how to use a decision tree analysis in analysing sequential risks over the lifetime of the project.

Key focus area #3: Analysis Period

The generic guidance for this key focus area can be found in Appendix 3.1 of the CBA Guidelines TPP 23-08.

What it means	The impact of proposed initiatives should be assessed over the useful lifetime of the assets that are intended to be generated and/ or consumed in each option under consideration. The total analysis period must be long enough to capture all the potential costs and benefits (including replacement costs).
What must be done	CBA should specify which years in the analysis period cover development or implementation, and which cover the operational phases. This is required to accurately represent the Total Cost of Operation (TCO)[2] over the lifetime of the benefit-generating activity. **The analysis period for ICT and Digital business cases should be from 2 to a maximum of 5 years** depending on the nature, complexities involved, and cost of any asset built, or services provided – after that period, relevant assets will typically be unusable or need significant upgrades due to technological changes[3].
Tips and pitfalls	Because of the uncertainty in forecasting costs and benefits over long periods, caution must be exercised when adopting long evaluation periods. The longer an analysis period, the more difficult it becomes to forecast costs and benefits in both the base case and the options. CBAs often apply simple growth rates to benefit and cost streams in the long term (e.g., after 10 years, assume X% growth per year based on population). CBA results are also less sensitive to changes in the size of costs and benefits in later years due to cumulative discounting. Assets with shorter lives may be associated with greater flexibility, lower risk and lower capital costs. The greater frequency of replacement means the benefits of improved technology can be incorporated more quickly. This may facilitate adjustments to the quantity and type of services required. Where an asset is forecast to reach the end of its useful life before the end of the analysis period and is expected to have a residual value ("value in exchange"), this may be counted as a benefit in the CBA. Supporting information on the effective life of assets may be found using guidance from agency corporate finance teams.

[2] https://www.gartner.com/en/information-technology/glossary/total-cost-of-ownership-tco

[3] In some operating technology assets (eg, OPAL, X-ray machines), significant life may remain at the end of the appraisal period. Therefore, benefits continue to accrue. Consequently, the appraisal period should consider and allow for flexibility in initiatives to match the asset life.

Further guidance

Total Cost of Ownership (TCO)

A comprehensive assessment of IT or other costs across enterprise boundaries over time. For IT, TCO includes hardware, software acquisition, Managed Service Agreement (contract), management and support, upgrades due to growth and remediation, communications, end-user expenses and the opportunity cost of downtime, training, and other productivity losses.

Key TCO elements are to include:

- Ongoing licence fees (annual fees)
- Reimplementation of customisations after each product upgrade,
- Recurrent costs to manage, support and upgrade new systems
- Lifecycle capital maintenance cost for the upgrade and replacement of specific assets
- Initial implementation costs.

TCO elements are essential in an ICT or Digital initiative where implementation costs form only part of the overall lifetime costs of a solution.

Key focus area #4: Identifying, forecasting, and measuring benefits and costs

The generic guidance for this key focus area can be found in section 2.3 to section 2.5 of the CBA Guidelines TPP 23-08 and section 5.2.2 of the Business Case Guidelines TPP18-06.

What it means	After the base case and options are established, the next step is to identify the full range of costs and benefits attributable to each option over the life of the initiative. Common cost categories include (see Appendix C further information): • Capital costs • Recurrent costs • Regulatory costs • Ancillary costs • Costs to the broader community (i.e. negative externalities) Common benefit categories include (see Appendix D further information): • Savings or avoided costs • Government revenue • Consumer surplus • Producer surplus • Labour surplus • Benefits to the broader community (i.e. positive externalities). • Qualitative Benefits When it comes to measuring and quantifying benefits, CBA preparers **must relate back to outcomes the proposed initiative is trying to achieve, consistent with the demand by NSW Government for outcome-oriented performance information.** The following framework below may assist CBA preparers in the identification of measurements The Centre for Evidence and Evaluation in NSW Treasury and agencies have worked together to promote and support evidence-building practices. Practices include an employment calculator, evaluation workbooks, and resources to continuously improve CBAs and capture diverse outcomes, particularly in the environmental and social domains.
What must be done	**Benefits identification** The CBA should use the Program Logic Model to illustrate the causal chain from activities to intended outcomes. The Program Logic Model has a significant role to play in the estimation of costs and benefits as well.

Benefits is an increase in welfare associated with an initiative's outcomes (including economic, social, environmental, or cultural outcomes). Benefits need to be first be understood as changes in condition, i.e., outcomes.

In CBA, benefits are a measure of the value of the outcomes of an initiative to the NSW community – they may be monetary or non-monetary (methods exist to monetise non-market benefits).

Benefits should be valued based on market prices as they usually reflect the best alternative uses that the goods or services could be put to (the 'opportunity cost'). In short, goods, services, and non-market outcomes should be quantified at the dollar amounts those individuals or businesses are determining end-users' or customers' 'willingness to pay' or 'willingness to accept' the outcomes of an initiative.

Qualitative benefits

In some cases, quantification may not be feasible.

The CBA Guide specifies that:

"When it is not feasible to quantify an important outcome, it should be described qualitatively, and the quantitative CBA result should be clear about which outcomes are included or excluded."

Benefits or disbenefits that cannot be quantified should be described qualitatively, including their likely significance.

Cost quantification

Each initiative has its own complexities, but previous similar initiatives with their cost and time data can be used as the starting point for the quantification of costs (cost estimates).

Cost estimates usually at a high level during the problem identification stage, e.g., ballpark estimate, because most of the features can be interpreted in various ways, especially at the beginning when the initiative's details are only on paper.

More accurate cost estimates may result from the following:

- More definitive specification and design
- Better information about conditions of approval
- More detailed scoping of delivery.
- Proof of Concept

Cost estimation techniques used in ICT and Digital initiatives generally fall within the following categories:

- Expert estimation. Cost estimates are based on expert judgement. Techniques such as specific company templates or delivery management software and group estimation techniques (e.g. Wideband Delphi) fall into this category.
- Formal estimation. Cost estimates are based on formulas derived from historical data. Analogy-based techniques (e.g. ANGEL, Weighted Micro Function Points), parametric models (e.g.

	COCOMO) and size-based estimation models (e.g. function point analysis, use case analysis, user story-based analysis) fall into this category. • Combination of expert and formal estimation. Cost estimates are based on a combination of estimation techniques. This includes mechanical combination techniques (e.g., the average of a WBS estimate and analogy-based estimate) and judgemental combination (e.g., expert judgement based on estimates from a parametric model and group estimation). In addition to technology costs, the people cost of delivery must factor in necessary activities, including: • Architecture planning • Bug fixing • Delivery management • Governance • Security and Privacy **Externalities** Externalities can be estimated by drawing on market data where it is available. For example, the valuation of greenhouse gas emissions is typically examined as part of an Environmental Impact Assessment or attestation to the NSW Cybersecurity Maturity Index could be used for cyber security initiatives. When a proposed initiative involves costs and benefits for which there is no readily available market data, a range of other techniques can be applied to quantify these items. For example, externalities (or generally non-market evaluations) may be estimated using non-market valuation techniques such as stated preference surveys or revealed preference valuation methods. **Assumptions** In all cases, all assumptions need to be outlined clearly supported by evidence. It can also be useful to show the low and high points in an estimated range.
Tips and pitfalls	A CBA can be refined over time as the business case is refined with more detailed information. **CBA vs Financial Appraisal (FAP)** Both CBA and FAP are required as part of a Business Case. The role of the FAP is to evaluate the impact on the finances of the government entity undertaking the project. Whereas the role of the CBA is to evaluate the value for money more broadly, in addressing the investment objectives.

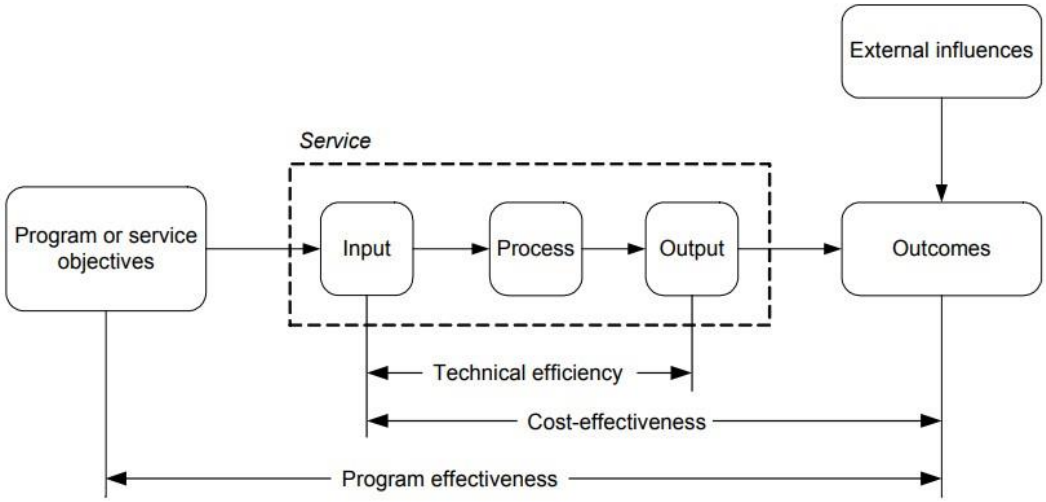
	The building blocks of a CBA and a FAP has some common elements. For example, both the CBA and FAP rely on quantification of future streams of costs and benefits that are discounted to obtain NPVs. However, a CBA and FAP differ in their scope, the bases for valuation of costs and benefits, and the discount rate used. A FAP calculates the net financial value from a policy change or project by analysing the direct cash flows for government. Whereas a CBA monetises the total economic impact across all stakeholders. For example, FAP focus on 'financial benefit'[4] and 'cashable benefit'[5] as part of the benefit valuation, such benefit classification should not be used by CBA. Methodological and practical differences between a FAP and a CBA are outlined in Table 2, Appendix 2 of the NSW Government Guide to Business Case (TPP18-06). **Cost estimates** Cost estimates are often sensitive to design and technology, which may change as the initiative matures, and to physical conditions encountered. For example: In the Health sector, estimating costs and benefits at the planning stage usually results in under-qualifying the cost of large pieces of ICT equipment (such as investing in a linear accelerator with a bunker to treat cancer patients or building an application modularly). Typically, these could be addressed through factoring in the unknowns by adding % contingency to the cost of projects. **Depreciation** Depreciation is an accounting method that allocates the cost of a capital asset over the years of its estimated useful life. In CBA, however, capital costs are recorded in the period when they will be incurred. Therefore, depreciation should not be included as a cost in a CBA because this would double count the up-front capital cost.
Further guidance	NSW Government Benefits Realisation Management Framework Treasury Outcomes value database - generic DCS Connectivity Outcomes value database

[4] Financial benefit is defined as "A benefit type with a positive change which is contributed by one or many measures and is quantified with tangible financial measures". Source: https://www.nsw.gov.au/sites/default/files/2020-11/brmf%20glossary.pdf

[5] Cashable benefit is defined as "Cash realising benefits are changes that will directly reduce an organisation's budget either through savings or through additional revenue". Source: https://www.nsw.gov.au/sites/default/files/2020-11/brmf%20glossary.pdf

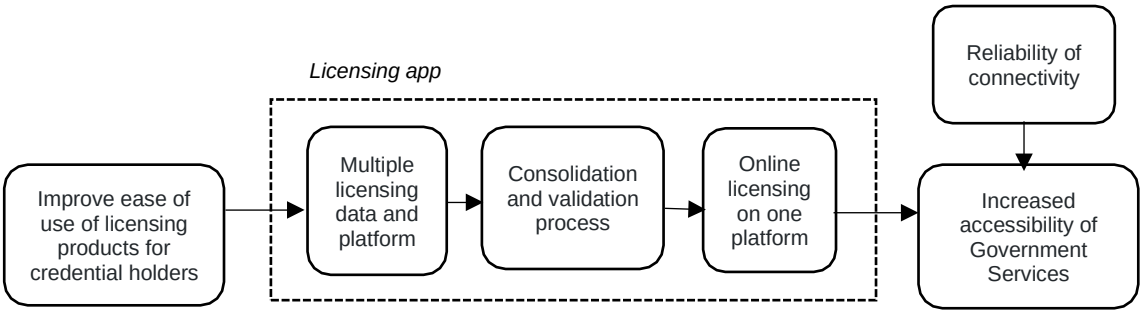
Further guidance

For example, Illustration of the influence of factors external to a service that distinguishes between program efficiency and program effectiveness when estimating benefits in a program of work[6]:



Source: SCRGSP (2006)

For example: Applying the above concept on Modernising Licensing Program



[6] Steering Committee for the Review of Government Service Provision (SCRGSP), 2006, Report on Government Services 2006, May, Commonwealth of Australia.

Key focus area #5: Discounting

The generic guidance in relation to this key focus area can be found in Appendix 6 of the CBA Guidelines TPP 23-08.

What it means	Costs and benefits identified in a CBA are typically realised over a number of years. The monetary amounts attributed to future costs and benefits need to be converted and expressed in today's dollars to enable comparison. This analysis is referred to as 'discounting'. The net overall financial impact of a proposed initiative is usually measured in two ways once the financial amounts attributed to future benefits and costs have been discounted: • Net present value (NPV) • Benefit-cost ratio (BCR) These two values are known as 'quantitative assessment tools', and each provides slightly different information. Refer to Appendix B for CBA examples from the Licensing Program. If it is not possible to quantify all costs and benefits, the CBA must **outline whether the non-quantified costs and benefits are considered materially relative to the direction of impacts / likely significance of the quantified impacts.**
What must be done	**Discount rate** In many initiatives, most of the costs are incurred upfront, while financial and/ or social benefits accrue over an extended period. Because a dollar today does not have the same value as a dollar in the future, a CBA should clearly define the discount rate used and the year at which the financial value of all the costs and benefits are expressed (the base year). The discount rate here refers to the one that has been adjusted for inflation, to show the real cost and purchasing power of money that is invested. And not nominal discount rate which is project specific and reflects price of the money taking into account current market conditions. The CBA Guide recommends that the social discount rate used in the central estimate of an economic appraisal or evaluation is 5 percent. All future costs and benefits should be reduced or 'discounted' by this rate. **Sensitivity analysis** As a range of assumptions are used in a CBA, sensitivity analysis should be performed to test uncertainty around predicted impacts and their appropriate financial value.

	Sensitivity analysis involves altering some of the critical assumptions (such as estimates of savings and costs, demand, and pricing) to recalculate the estimated NPVs under different assumptions. At its simplest, sensitivity analysis involves documenting the best- and worst-case scenarios. Other common approaches to sensitivity analysis include worst/ best case, partial, and Monte Carlo sensitivity analysis. Sensitivity analysis of the proposed initiative to variations on the discount rate should be undertaken using a lower bound of 3 percent and an upper bound of 7 percent.
Tips and pitfalls	The base year is typically the year to which forecasts are discounted. So the CBA results are incremental, real, present value terms as per the base case. For initiatives that involve a relatively short service/ asset life, **it is best to adopt a higher discount rate (7 percent).** A higher discount rate is also used when benefits are more easily monetised (for example: Digitalisation of transactions, therefore reducing time for users). A discount rate represents the confidence that future income streams will equal what is projected today. In other words, it is a measure of risk. A higher discount rate relative to a lower discount rate generally means more risk is associated with the investment opportunity. Therefore, future discount cashflows should be more significant if they are less likely to be realised.
Further guidance	Digital Restart Fund promotes tranche funding releases for initiatives undergoing scale funding pathways. It is advisable to consider how tranche funding may have an impact on the overall benefits of a proposed initiative.

Further guidance

For example, this is an example from the Licencing program for their tranche funding releases where benefits were built over a time period:

Product Team 1	Product Team 2	Product Team 3	Product Team 4
This team will demonstrate how different licence schemes sharing similar processes and requirements can be delivered quickly through a single project	This team will complete two MVP licence schemes and identify the effort required to continue developing MVP schemes into full licence products	This team will familiarise themselves with licence patterns through the Conveyancer licence, ensuring the successful delivery of similar licences	This team will establish an approach to notification licence types, enabling the fast delivery of other licences of this type throughout this Program
Licences to deliver:	*Licences to deliver:*	*Licences to deliver:*	*Licences to deliver:*
• Paintball – Individuals • Paintball – International • Paintball – Markers • Paintball Venues	• Asbestos and Demolition • Licensed Asbestos Assessor	• Conveyancer	• Asbestos Notifications
Citizen Impacted	*Citizen Impacted*	*Citizen Impacted*	*Citizen Impacted*
25000	50000	100000	500000

Key focus area #6: Risks, Uncertainties and Assumptions

The generic guidance for this key focus area can be found in Appendix 4 of the CBA Guidelines TPP 23-08.

What it means	It is useful to outline the limitations of the method used and the assumptions made for the analyses. This will help to qualify the results and alert decision-makers to where there may be some weaknesses. ICT and Digital initiatives have a complex risk profile due to their abstract nature, complexity, and unique cost structures. Risks are often difficult to identify and quantify, and it can be a long period of time before it is apparent that a particular risk has materialised.
What must be done	Some of the key areas of consideration for agencies in identifying assumptions and costing risks in a business case include: • The analysis of assumptions and uncertainties are considered in terms of their strength, relevance and evidence of transferability • All key risks associated with a proposed initiative are specified • A level of confidence is provided that solution prerequisites will be in place and associated risks are included where appropriate • Risks associated with baseline assumptions not holding true are identified and evaluated. • Detail is not confused with accuracy – risk registers don't need to be long but need to be focused on major risks that have the potential to affect the success of the initiative • Risk management is not treated as an administrative function – it is a key tool to identify and mitigate major factors that could negatively influence the outcomes (increase costs/timeframes or reduced benefits) of the initiative
Tips and pitfalls	Some other common pitfalls that arise are highlighted below: **Downplaying or ignoring non-financial costs and benefits** Some costs and benefits resist financial quantification. Although CBA places emphasis on quantifying costs and benefits in financial terms, it is important that the business case is not biased in favour of financial impacts. CBA preparers should take care to ensure that financial impacts do not overshadow other important factors in decision-making. For example, the business case for an initiative that is advocated despite its financial benefits falling significantly short of its financial costs should explain clearly: • The nature of the non-financial benefits

- Why these benefits would tip the balance.

4. Summary and Conclusion

Summary

It is important that a CBA identifies and describes all costs and benefits – which should be quantified as much as possible.

When financial measurements are uncertain, sensitivity analysis should be used to test how varying the financial value assigned would affect the overall viability of the initiative.

If the impacts cannot be assigned a financial value, they should still be quantified in non-financial terms.

Where it is impossible to monetise benefits, consider other supplementary methods to assess value for money (e.g., cost-effectiveness analysis[7]).

Conclusion

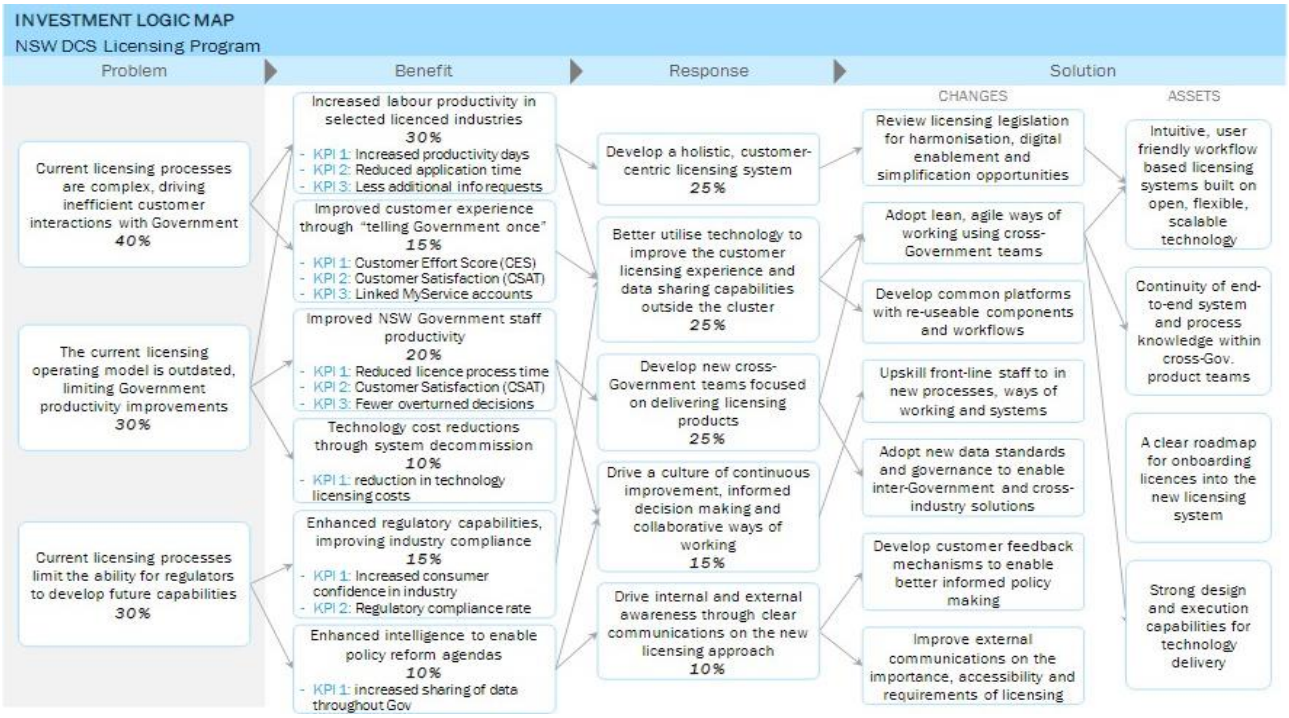
Whilst this Addendum addresses many areas of concern, CBA should not be just considered as one size fits all approach, given there are a range of initiatives of different sizes and complexities.

Hence the CBA Guide, along with this Addendum, should be applied cautiously on a case-by-case basis. Further guidance can always be obtained from Digital.NSW and/ or Treasury.

If you have any questions about this Addendum, please email ICT Assurance at ICTassurance@customerservice.nsw.gov.au

[7] Cost-effectiveness analysis is a form of economic analysis that compares the relative costs and outcomes of different courses of action. Cost-effectiveness analysis is distinct from cost–benefit analysis, which assigns a monetary value to the measure of effect.

5. Appendix A: Example of Program Logic Model



6. Appendix B: Example of Cost Benefit Analysis

Licensing Program

Financial CBA

Option		Financial Cost-Benefit Analysis 10 year		NPV		Benefit-Cost Ratio (BCR)
		Total Costs ($)	Total Benefits ($)	*5 year*	*10 year*	*10 year*
1	Base Case – Current Approach	($295m)	$83m	($86m)	($114m)	0.35
2	Licensing Program	($484m)	$621m	($109m)	$30m	1.48

7. Appendix C: Common Cost Categories and Examples

Common cost categories and examples

Item	Description
Capital	Examples of capital costs include: • Capital costs of new assets, including hardware like Servers and Infrastructure (based on vendor quotes). • Capital costs of asset replacements. If any, the book value of the asset intended to be replaced or those components made redundant due to the initiative should be duly considered as costs to this initiative as part of invest business case. • Major periodic maintenance or refurbishment which covers costs of periodical enhancements and upgrades/ refreshes driven by growth and remediation activities over the estimated life of the asset. • Software which includes Application, Middleware and Operating System Licences. This should also include any upgrades required over the business case period. • Vendor Costs – Application Development, Consultants, Infrastructure Support, Testing and other Business user services • Internal Labour – Any inhouse development labour, including Delivery Managers, delivery resources, testers, and Subject Matter Experts • Automated testing costs. • Costs associated with migration of old assets, which become an integral part of new asset post any enhancements, should also be considered as costs • Labour on-costs (e.g., superannuation, workers' compensation, long service leave and other statutory or contractual obligations of an employer that comprise part of labour-related expenses) are incremental, unavoidable costs that are added to direct labour costs and included in cost and/or savings estimates. • Overheads such as supervision, transport costs, administrative costs, printing, and stationery, are also included in costs if they differ between options and the base case. Material overhead costs

	associated with purchasing, storing, and transporting materials needed for the initiative will also be relevant. • Delivery management, including planning costs, usually average about 10-15% of the budget[8]
Recurrent	This includes the cost of running and maintaining the initiative over the life of the relevant asset(s) as established for business case purposes. Examples of recurrent costs include: • Application Licence Maintenance • Application Support • Operating Software Support • Server, Databases and Infrastructure Support and Maintenance • Internal and External resources are essentially agency salaries and wages and labour on-costs. We need to include the market or opportunity costs. Market prices usually reflect the opportunity cost of resources. • Accommodation expenses • Ongoing Operating and maintenance costs, including subcontracted external labour or rented capital. • The costs of running the old systems whilst the new systems are being implemented should also form part of the total costs until decommissioned, in which case run and maintenance costs saved could be benefits (refer Benefits).
Ancillary	Examples of ancillary costs include: • Transaction costs like Data Migration • Costs of remediation • Relocation, temporary accommodation, and other disruption costs. For example, disruption to businesses during implementation may not be part of the initiative but will need to be incurred to enable it to proceed.
Costs to the broader community	Third-party costs on the community or groups within it. Examples of third-party (externality) costs include noise, congestion, pollution, carbon emissions and reduction in visual amenity. • Average time (21 mins) taken for commuters to find a parking spot in Sydney metro

[8] https://www.nsw.gov.au/grants-and-funding/resources-for-regions-round-9/resources-for-regions-round-9-%20frequently-asked-%20questions#:~:text=project%20management%20and%20administration%20costs,funding%20from%20the%20NSW%20%20Government

	• Average access costs incurred by parents visiting their children in hospital $200/ week • Average time connectivity… • Social benefits Including improved quality of life, improved decision-making and more integrated delivery, so increasing business opportunities. • Social benefits from an initiative are assessed in terms of their: • 'Reach' In the context of the target group • 'Consequence' The expected impact on the target social group.
Contingency[9]	Allowance for contingency is made to provide against costs that may arise if risks eventuate and for estimation inaccuracy. The level of contingency will vary depending on the nature of the initiative. Contingency is estimated using the same techniques as other costs, such as expert estimation, formal estimation techniques (Monte Carlo) or a combination of both. Contingency estimates should be based on clearly stated assumptions and reviewed by appropriately qualified personnel.

[9] Further information about the level of contingency can be found here: https://www.pmi.org/learning/library/contingency-are-covered-6099

8. Appendix D: Common Benefit Categories and Examples

Common benefit categories and examples

Item	Description
Savings or avoided costs	Expected reductions in public or private expenditure due to an initiative. This could be due to improved efficiency or reduced need for future services (.) Examples would be: • Reduced costs due to operational efficiencies e.g., reduced processing and maintenance costs and higher completion rate • Avoided costs due to reduced need for future services e.g., avoided cyber security breaches response costs, new system implementation could result in reduced need for upgrades and refreshes related to legacy systems in future, fewer outages, fewer incidents, reduction in human error
Government revenue	Incremental extra revenue to the NSW Government from non-NSW parties resulting from the initiative that would not be realised in the base case. Examples would be: • User charges from non-NSW parties • Asset sales.
Consumer surplus	When a consumer receives a good or service at a lower price than the maximum, they are willing to pay. Initiatives that improve a service may increase consumer surplus. For example, improved employee productivity, time savings to navigate a website, reduced emergency response time, improved user satisfaction, increased digital take-up, improved green or public space.
Producer surplus	When the price that a producer receives for a good or service is greater than the cost of production. For example, Technology may lead to an increase in the efficiency of the production process which results in increased supply and with decreasing cost of production from using advanced systems, the demand from existing and new customers could increase.

Benefits to the broader community (positive externalities)	These are beneficial third-party effects on groups other than the direct recipient of the service. For example, public transport can generate lower pollution levels than cars and reduce congestion or digital connectivity for schools in regional and rural areas could benefit the broader community after school hours. The following categories will eventually get translated into an effect on the economy, social standing, and/ or environment: • Learning and development • Versatile working • Improved access to service • Increased competition • New gig economy • Improved connectivity
Qualitative benefit	Impacts that cannot be reliably quantified should still be accounted for qualitatively. A list of significant qualitative factors should be recorded in the CBA to inform decision makers, including the direction of the impacts and their likely significance. Currently, CEE needs more information to confirm that the values are robust enough for resource allocation decisions (for example: value of leisure time for each customer segment - value of waiting time for the patient in hospital and the customer waiting for Driving Licence in Service NSW would be drastically different). The following categories will eventually get translated into an effect on the economy, social standing, and/ or environment: • Enhanced user experience • Improved accessibility • Improved security • New economic opportunities • Innovation • Increase in recycling • Improved education outcome • Improved Lifestyle, healthcare and wellbeing • Social connectivity • Improve business continuity • Maintaining Government reputation and trust in the community.

9. Appendix E: Glossary

Seed Funding Pathways: Digital Restart Fund

The seed funding stream within Digital Restart Fund is limited to $5 million for an initiative, but initiatives will be assessed on the work to be done in the seed phase and the funding required, which may be less or slightly over the $5m threshold.

The seed funding stream is intended to fund initiatives to validate the problem statement and establish the appropriate strategic approach through enabling initial discovery and proof of concepts. A full Business Case (BC) is required to be submitted for scale pathway projects.

Lean Business Case (LBC)

Lean Business Case (LBC), introduced by Digital Restart Fund, refers to a way to clearly explain the value of a proposed initiative, how it is planned to be delivered, and its compliance with Government policies. They do not need a complete CBA due to its low-value investment threshold (<$5 million). The assessment of the LBC is conducted against five strategic criteria; deliverability, viability, affordability, social impact and strategic priorities.

Typically, the proposed cost of an initiative in a lean business case is less than $5 million.

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