UNDERSTANDING COST BENEFIT ANALYSIS

Decision making using Cost-Benefit analysis

NineSquared

Introduction

Making the best decision possible within a given set of circumstances and knowledge available at the time is critical to maximising progress and positive change within our communities.

Governments make big decisions every day that affect the lives of everyone in the community. This includes funding and budget decisions that affect our collective wealth and well-being.

We believe that great decisions that are well implemented are a fundamental driver of positive progress in government, in business and ultimately in society. Over the last couple of years, big steps have been made by government to implement improvements in evaluation and decision-making frameworks for new and large projects/initiatives. This is important because, over time, all investment decisions start to add up and if some decisions are made for short term and other reasons then any long-term economic costs will ultimately be borne by the community. The long team time between investing in projects and realising benefits means such costs are sometimes not fully appreciated.

Applying the principles and frameworks from economics can help decision makers make great decisions. This short non-technical guide builds on the previously released Cost-Benefit Analysis for Decision Making. It explains how CBAs can be used to inform decision making and provides an overview of the types of questions CBA can answer. We hope that this short guide provides decision makers with an understanding of how CBAs can be used and ultimately how it can help you inform, influence and make great decisions.

About cost-benefit analysis

At its simplest, Cost Benefit Analysis (or CBA) is based on the idea that any new project or policy by the public sector should contribute more to society than it costs.

To assess this, CBA attempts to sum up all of the benefits and all of the costs associated with a new project or policy to see if the benefits are greater than the costs over the life of the project or policy.

Simple enough. However, CBA attempts to sum up not only the financial costs and benefits, things like construction costs and savings that a person might gain from a specific policy setting, but also the social costs and benefits to arrive at an evaluation of the overall impact on social welfare. To do so, CBA considers costs like the reduction in air quality that might result from a project that creates pollution, or perhaps the social benefits of reducing deaths and injuries because a road has been made safer. These costs and benefits cannot typically be observed in the market-place. These social costs have to be estimated using techniques that have been developed by economists over many years.

The focus of this guide is to provide decision makers with the questions that cost-benefit analysis can answer and how the results can inform decision making.

In our experience, cost-benefit analysis is well suited to provide information in five ways that can assist decision makers.

1. Better understanding the economics of a complex process or system to inform strategic opportunities and directions.
2. Providing clarity about the size of an issue or opportunity to understand the value or materiality before spending time and resources addressing it.
3. Providing decision makers with an understanding of the net benefit of a proposed policy or investment decision. That is, does a project or policy have a positive impact for society.
4. Enable decision makers to apply a consistent and rigorous approach to prioritisation of multiple investment opportunities.
5. Allow for actual results of a policy or investment decision to be measured in a way that is consistent with an initial investment or policy to provide decision makers with a better understanding of outcomes and assist in the development of future projects.

1

Better understanding the economics of a complex process and systems using cost-benefit analysis

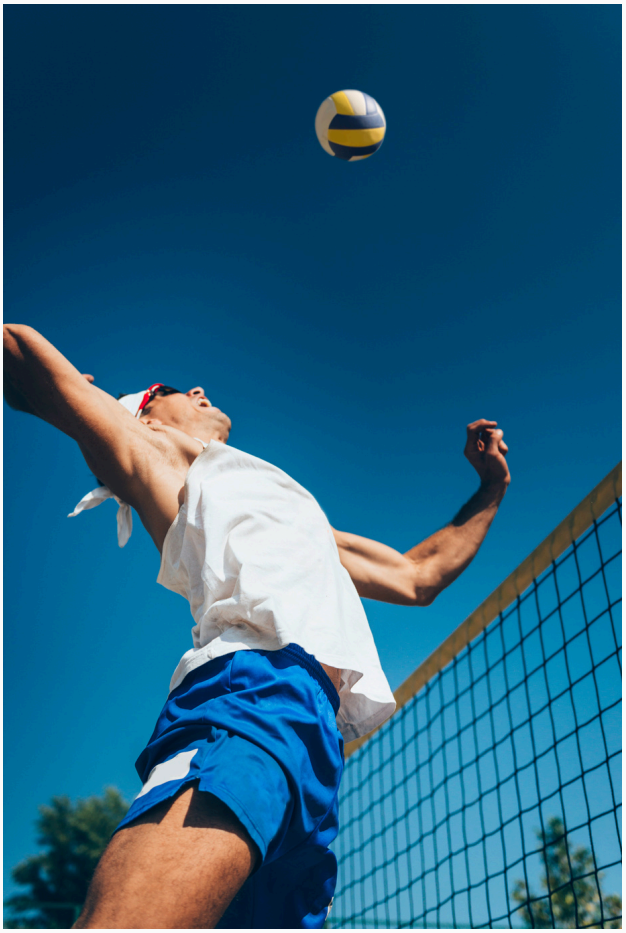
It is not always clear how things work, why things are the way the area, or how a system interacts. Cost-benefit analysis can be used to provide clarity in otherwise complex processes and systems. It helps in understanding a situation or provide context where there are competing priorities.

Long before a problem is identified or a solution has been developed, cost-benefit analysis techniques may be used to deepen an understanding of a situation. This process helps identify causes of problems, potential benefits of improving processes, and the risks of maintaining the status quo.

This analysis is most useful when defining strategic goals or investigating where to next. It is able to be undertaken with limited or anecdotal data, making it particularly useful when developing strategies or early in the project optioneering process.

Case study

Determining the value of sport



The Office of Sport is the lead NSW Government agency for sport and active recreation. The aim of the office is to increase the levels of physical activity of the people of NSW. This is achieved by providing the leadership, policies, programs, funding and infrastructure necessary to enable higher rates of participation in sport and active recreation.

Participation in sport and active recreation has a range of benefits. Economic benefits accrue from spend within the sport and recreation sector. There are also a range of positive social impact from physical activity and sport including reductions in chronic disease, reductions in youth crime, increased educational attainment and a range of other social outcomes.

The Office of Sport have a range of programs and initiatives aimed at increasing participation. To help determine where investment should occur and what that investment should look like, they were seeking the development of an evidence-based framework and user-friendly tool to assist in their investment decision making and policy development.

To support this, the NSW Office of Sport investigated the value of sport and active recreation throughout the state. This assessment reviewed the economic, social and health impacts of sport and active recreation on a local government area (LGA) level using cost-benefit analysis techniques to quantify and monetise impacts. The monetised impacts included the reduction in chronic disease, productivity improvements, mental health impacts, impacts on youth crime, and educational impacts amongst others.

Rankings were assigned to each of the LGAs. These rankings were based on the overall impact and adjusted for population. The population adjusted results provided insights into geographic areas in which sport and active recreation have been successful and areas where extra investment may be warranted.

The outputs of this analysis provided decision makers with an understanding of how sport and active recreation benefits a region through the estimation of economic and social benefits. Knowing this information, allows policy decisions to use an evidence base to identify interventions that are more likely to be successful, as well as highlighting geographies and regions which may need more support.

2

Better definition and sizing of problems and opportunities using cost-benefit

The first formal stage of a project or policy evaluation is to define the problems and opportunities. Problems typically reflect costs to be avoided, whereas opportunities reflect benefits to be gained. Unlike financial assessments, economic assessments include social, environmental and economic costs and benefits.

This means that cost-benefit analysis techniques are perfect for providing quantitative information to support problem and opportunity statements. For the monetisation process to be successful, an initial understanding of the problems and opportunities is required. Specifically:

- What is the root cause of these problems and opportunities?
- When are these problems and opportunities likely to occur? That is, is it an immediate issue being felt today, or something that is expect to be felt in the future?
- What is the potential magnitude of these problems and opportunities?
- Are there any uncertainties around these problems and opportunities in the future?
- Who is impacted or potentially impacted by these problems and opportunities?

Another very important consideration in this process is having a well-defined base case. Understanding the base case is critical in every cost-benefit analysis as it sets the scene for what is happening. All analysis, whether it be economic or not, should be described in relation to this base case. In doing so, the case for change and the potential improvements from the change become clear.

At its core, the base case is the world without the project, policy or initiative. It is a continuation of business-as-usual activities. It should reflect continued operation of the network or service and include any committed and funding projects. Clearing defining this world helps understand the root cause of issues, rather than just the immediate or surface level issues.

As an outcome of this process, there is a clear understanding of the magnitude and timing of issues. This allows the development of solutions to be tailored to these needs in order to deliver the best value for money possible

RAPID CBS'S

Once all the problems and opportunities are well defined, the development of solutions may be tailored to meet these needs. At an early stage of development, it can be difficult to determine which solutions have the most merit, particularly where the options are of different investment costs.

This is where rapid CBAs come in. This type of analysis allows for a larger number of options to be assessed to provide order of magnitude assessments of benefits and costs. When combined with qualitative measures, such as those from a multi-criteria assessment, a well-rounded understanding of each option is developed.

Despite the name, rapid CBAs can include a wide range of impacts. Of importance, they should focus on factors which differentiate options to allow for comparison. Rather than being named for their rigour, analysis at this stage typically incorporates higher-level inputs. For example, high-level cost estimates rather than detailed risk adjusted costs, or high-level estimates of demand rather than detailed forecasts.

3 Understanding the benefit of a project or policy using cost-benefit analysis

The most common use of cost-benefit analysis is in the project and policy evaluation process. Cost-benefit analysis can be used to undertake a more detailed assessment of the short-listed options, or for providing information to inform an investment decision.

Detailed cost-benefit analysis can be undertaken on projects and policies in much the same way. While the benefits and costs that are measured might be different, the process of understanding the change and assigning monetary values is very similar.

Depending on the project or policy being developed, there are several guidelines which may need to be followed to help understand the process better. As a starting point, the Infrastructure Australia Assessment Framework provides a detailed overview of each stage of the evaluation process, including specific guidance on cost-benefit analysis. Supporting this is state and territory specific guidance, and often there are industry specific guidance which much be followed. Part of the detailed cost-benefit analysis process is ensuring there is an appreciation of which guidance should be followed and how that may change the assessment of impacts.

In the absence of relevant guidance, unit values and parameter values may be sourced from previous studies. These studies may be tailored to undertaking CBAs, or literature from other fields such as academic studies. This technique, called 'benefit transfer', is often used for quantifying and monetising non-market goods.

Case study

Centenary Bridge

Originally constructed as a two-lane arterial road, the Centenary Motorway has not kept pace with increasing demand and contemporary design standards. A key component of the Motorway is the Centenary Bridge. Investment is required to maintain the existing structure due to the high traffic volumes, particularly in peak periods.

This part of the network is operating near capacity in peak periods, with forecast demand exceeding this capacity in the near future. Left unaddressed, travel times will continue to increase, and the integrity of the bridge structure may diminish.

NineSquared was engaged to undertake a Cost Benefit Analysis at both the Preliminary Evaluation and Business Case stages. The Cost Benefit Analysis valued the impacts of travel time, vehicle operating costs, safety and externalities such as emissions against the cost of provision. Whole-of-life cost considerations were taken into account for both the existing structure and each of the proposed solutions.

Key to this assessment was a clear understanding of the base case. Projects of this magnitude are often difficult when defining a world without the project as it is such an integral part of the transport model. This means that the definition of the base case can have material impacts on which benefits are captured and how the network would operate without major works.

As a result of this work, two preferred options were identified and recommended to advance to the business case phase. Since this time, the project advanced to the construction phase.

Case study

Regulatory Impact Statement for the Heavy Vehicle National Law

NineSquared was engaged by the National Transport Commission to develop a Consultation Regulatory Impact Statement (C-RIS) and Decision Regulatory Impact Statement (D-RIS) to help inform three key policy changes to the new Heavy Vehicle National Law. The C-RIS was published on the National Transport Commission website for feedback from jurisdictions, police and industry. The package of legislation and core regulations as recommended in the D-RIS will be presented to ministers in July 2024.

To inform the scope of the regulatory change and to understand the potential impacts on industry and the broader economic, a cost-benefit analysis was undertaken. This assessment quantified and monetised the impacts of the regulatory change, including those relating to heavy vehicle mass and dimensions and changes to fatigue management laws.

Key to this assessment was ongoing engagement with industry and other stakeholders. In doing so, the impacts in the CBA were able to be refined and adjusted. This in-turn allowed for a deeper understanding of the regulatory change, the challenges which may arise and the distribution of impacts across stakeholders.

4 Using cost-benefit analysis to prioritise investment and policy options

Cost-benefit analysis is particularly useful when comparing a range of options, whether this be infrastructure options, policies, strategic directives or a mixture of all. By capturing all benefits and costs over a period of time, the merit of each initiative may be compared. As a result, initiatives may be ruled in or out, or may be placed on a timeline based on their relative importance.

Examples of this process include:

- Comparing initiatives across government portfolios to understand where investment would generate the most economic output
- Prioritising projects along a road corridor to determine the optimal staging profile
- Identification of geographic areas in which projects would have the most efficient economic return.

This process is able to be tailored to provide prioritised outcomes on multiple factors. This includes economic efficiency or total economic benefit, as well as more specific outputs relating to relevant reference groups or the distribution of impacts.

Case study

Inland Freight Route Link Flood Study

The Inland Freight Route (IFR) is an alternative north-south route to the Bruce Highway. It begins in Mungindi (NSW border) and ends at Charters Towers in North Queensland. This corridor has been vulnerable to flooding, particularly during extreme weather events. A range of strategic planning initiatives were undertaken to inform the 10-year Inland Freight Route Investment Strategy. The purpose of this strategy was to identify short-, medium- and long-term priorities for the corridor.

When the IFR was developed, different standards were adopted depending on traffic demands, flood severity and extent, and community expectations. The Inland Freight Route Link Flood Study was developed to inform the Department of Transport and Main Roads (TMR) on the flood immunity and hydrology characteristics of the route.

NineSquared undertook the economic analysis components of the Inland Freight Route Link Flood Study. This included establishing the method, using survey data to inform assumptions, engaging with data holders and various parts of TMR to understand the appropriate approaches, conveying the method to the modelling team and interpreting the results of the analysis. The economic analysis was incorporated into a web-based tool to allow access to various parts of TMR. This tool allowed for scenarios to be run, with economic analysis results provided in real time.

The outputs of this assessment provided TMR with an understanding of the highest priority sections of the Inland Freight Route. Specifically, it prioritised:

- The flood vision standards to help understand the overall strategy for the corridor
- Each individual link along the corridor to identify strategic priorities
- Individual crossings within each link to identify the key contributing factors to success

This project was a Highly Commended Flood Risk Management Project of the Year by Floodplain Management Australia.

5 Analysing outcomes

After an initiative has been delivered, an ex-post evaluation may be undertaken. Rather than using estimates or forecasts, ex-post CBAs use the real costs and benefits which resulted from an initiative. It uses observed data to inform the CBA which allows for an improved understanding of impacts.

This type of analysis provides an opportunity to use evidence to identify:

- The implementation and impact schedule of the initiative
- Cost, outcome and benefit categories
- The relationships between inputs, outputs, outcomes and benefits
- The extent of change in outcomes and benefits
- Estimation of costs and benefits, including quantitative and qualitative.

More practically, it provides a grounded and deeper appreciation for estimating impacts. This allows for improvements to be made in future CBAs, provides a basis for expectation when assessing future initiatives, and establishes an evidence base.

These assessments go hand-in-hand with benefit realisation plans. Ex-post CBAs can utilise the information from the completed benefit realisation plans, or provide additional context to the plans.

Contact

Got questions?
Reach out to us for answers

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