RICS insight paper

Measuring social value in infrastructure projects: insights from the public sector

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Forewords

Over the past 10 years, methods for measuring the benefits of infrastructure and the reasons for investing in major programmes has shifted – no longer is the economic argument good enough to be the sole reason for approving or denying the go-ahead for a piece of infrastructure.

In recent years, we have seen a much greater focus placed on social value and the societal benefits that large projects afford; something that has gained traction in the political priority list and was evident when the **Public Services (Social Value) Act** was introduced into UK law in 2012. As an industry, we need to go beyond analysing the economic impacts of infrastructure to measuring and understanding the social impacts so that we can make better policy decisions. This includes understanding how infrastructure projects impact on the environment and biodiversity, cultural heritage, access to housing, mental and physical health, crime and safety, inclusivity and distribution of opportunities, and social capital.

New thinking is continuing to emerge – particularly in the UK and Europe – around inclusive growth that is linked to social value, centred around three primary pillars: economic prosperity, wellbeing and quality of life. At Jacobs we are aiming to progress this further by embedding social value measurement tools into the heart of major procurements and public sector programmes. Our partnership with Simetrica, the global leaders in social value measurement, wrote the technical guidelines on social value measurement in the UK for the **Organisation for Economic Co-operation and Development** (OECD) and many other governments across the world. Through these guidelines, social value has become mandatory in policy evaluation in the UK and increasingly so in other countries.

But it is important to bear in mind that social value and inclusive growth are delivered at the local as well as the national and international level, and that regional and local policies are key to addressing the spatial differences in income and wellbeing. Ultimately, it will be the local communities that judge whether a scheme has truly delivered the value that was intended.

A critical driver is the political element. Politics and politicians can set the framework for delivering social value and inclusive growth – and for enabling it to thrive. As we look ahead to a post-COVID-19 world, the tremendous potential to use social value to assess and understand societal problems and the options that are best able to address them has never been greater. And the results can help direct stimulus spending on infrastructure projects that deliver greater social returns, inclusive growth and a tangible legacy.

This exciting new insight paper on social value by RICS and Simetrica-Jacobs sets out how we should define social value in infrastructure and how we can deliver and measure it in a robust way; a very timely and important addition to the debate.

Steve Demetriou

Jacobs

Chair & Chief Executive Officer

Construction plays a huge part in the global economy, it has an even greater impact as an enabler of wider societal benefits. The inherent social value generated by the construction of infrastructure projects is understood. Peoples lives are enhanced if they can drink clean water, travel safely and quickly to work, or use sustainable energy to power their homes, but until recently infrastructure projects have been assessed primarily on an economic cost benefit analysis.

This is changing, and the changes we are seeing in the UK may point the direction of travel globally. For instance, the publication of the UK government's **Industrial Strategy: building a Britain fit for the future** in 2017 – with its 'leveling-up' agenda – put social value much more centre-stage, an approach that was embraced in the **2018 Industry Strategy: Construction Sector Deal**.

The current issue – whether within the UK or gloally – is not the need to maximise the social value created by infrastructure projects, but how to measure this in a systematic way. Without consistency in measurement it is impossible to determine the best option to take forward, compare current schemes against historic benchmarks or assess whether an infrastructure project delivered the social value that was promised when the business case was set out.

With its clear explanation of what social value is and its review of current practice of how social value can be measured, both in the UK and internationally, this paper considers how the social value created by infrastructure should be evaluated in order to maximise the positive impact that infrastructure construction should have on people's lives.

The publication of this paper is very timely. This standardisation of approach resonates with the 2020 **Construction Industry Roadmap to Recovery Plan**, produced by the Construction Leadership Council and BEIS, following the COVID-19 pandemic. This plan sets out a roadmap for the reinvention of the industry – with a value based approach to project procurement as one of its key themes. Consistency of metrics and data capture for social value also feeds directly into the recently published **Value Toolkit**, produced by the Construction Innovation Hub – to which RICS has been a key contributor.

The paper considers how the focus on social value may affect the role of RICS professionals and concludes that we will have a significant role to play in helping clients understand and set social value strategy. It is important that RICS professionals continuously expand their knowledge base and understand new approaches and language, wherever they operate. I recommend that all RICS professionals read and consider this paper as part of that learning journey.

Ann Bentley FRICS

Member of the UK Construction Leadership Council and Global Board Director, Rider Levett Bucknall

Glossary

Instrumental value	A characteristic of something that does not have value in and of itself, but rather affects things that are intrinsically valuable. For example, vaccination may be considered instrumentally valuable because it affects health or wellbeing, which may be considered intrinsically valuable.
Intrinsic value	A property of something that has value (or is good) in and of itself. Goods that are sometimes considered intrinsically valuable include wellbeing, happiness, justice, freedom and knowledge.
Non-use value	The value an individual gets from a good, even if they have never and will never use that good. Non-use value is split into: • existence value: the value an individual gets from the good's existence • altruistic value: the value an individual gains from the good's use by others and • bequest value: the value an individual gets from the good's potential use by future generations. An example of non-use value is an individual who has never visited the great barrier reef but gets value just from knowing that it exists and that others can use it.
Quality Adjust Life Year (QALY) *(definition from the National Institute for Health and Care Excellence)*	A measure of the state of health of a person or group in which the benefits, in terms of length of life, are adjusted to reflect the quality of life. One QALY is equal to one year of life in perfect health. QALYs are calculated by estimating the years of life remaining for a patient following a particular treatment or intervention and weighting each year with a quality-of-life score (on a 0 to 1 scale). It is often measured in terms of the person's ability to carry out the activities of daily life, and freedom from pain and mental disturbance.
Social value	The social value of an outcome refers to the effect it has on quality of life. It is sometimes measured in monetary units.
Use value	The value an individual gets from using a good either directly (e.g. enjoying walking through a local park) or indirectly (e.g. an increase in air quality in the local area due to the park).

Welfarism	Is a normative ethical theory that states that the effect an action has on individuals' wellbeing is what is of importance when considering the rightness or wrongness of that action (i.e. its value).

Abbreviations

BCR	Benefit-cost ratio
CBA	Cost-benefit analysis
CEA	Cost-effectiveness analysis
CUA	Cost-utility analysis
CER	Cost-effectiveness ratio
CV	Contingent valuation
DCE	Discrete choice experiment
MCA	Multi-criteria analysis
OECD	Organisation for Economic Co-operation and Development
SROI	Social return on investment
SVM	Social value measurement
SWV	Subjective wellbeing valuation
VfM	Value for money
WTA	Willing to accept/willingness to accept
WTP	Willing to pay/willingness to pay

1 Introduction

This insight paper provides an introduction to social value measurement (SVM) in the public sector and its application to infrastructure projects. There are many elements involved in measuring social value, but the focus of this paper is on the core measurement frameworks that are considered best practice by government bodies, such as cost-benefit analysis. The paper also addresses the topic of valuing the broader societal effects of infrastructure projects (including environmental impacts).

This is a brief introduction to the subject and is intended to set out the foundations for consistent and robust SVM for the infrastructure sector by demonstrating and discussing the main best practice methods and techniques that have been developed in the public sector ('public sector' refers to central governments and multilateral and international organisations). It should be noted that the best practice in the public sector is a reflection of trends and best practice in academia and hence represents frontier knowledge in the area of social value measurement.

The focus of this insight paper and its recommendations is based on the UK government's **The Green Book: Central Government Guidance on Appraisal and Evaluation** and OECD guidelines, noting that these are also reflected in policy manuals in the US, Australia, New Zealand, Canada and the European Union and hence are applicable globally.

SVM is a highly technical field and requires good understanding in economics, mathematics, statistical analysis, ethics, survey design and data collection. This paper is an introduction for those in the infrastructure sector interested in or tasked with managing or performing SVM.

In theory, social value can be measured in monetary or non-monetary terms (e.g. on a scale of 0-100). A common non-monetary method is the Quality Adjusted Life Year (QALY) method used in health assessments. However, the general trend among policy analysts and practitioners, and increasingly reflected in international guidelines, is to monetise social value and therefore the focus of this paper is on monetary methods for social value measurement, but it also refers to the QALY method used in health, as health is one of the key outcome areas for infrastructure projects.

1.1 Background

Over the past 10 years, social value has been given increasing prominence in governments such as the UK, Canada, New Zealand and Australia, as well as in international organisations such as the OECD. The growth of the social value agenda in the public sector can be most clearly seen in the UK government. In the wake of the 2007 financial crisis and the following recession, there was growing discontent in the UK public that the economic system wasn't working as it should. This led to the 2010 coalition government setting up the **National Wellbeing Programme** to 'measure our progress not just by our standard of living, but by our quality of life'. Subsequently the **Public Service (Social Value) Act 2012** was passed. This mandated local government to consider social value in the procurement of services. A review conducted in 2014 found that there were positive effects overall, but that there had been a mixed uptake, recommending further work by government to raise awareness of the Act and how to implement it. Following this, in 2015, Manchester City Council **adopted a 20%**

weighting on social value in its procurement process, ensuring social value was embedded in all tenders and signposting the growing social value agenda.

More recently, the UK government published an updated version of the Green Book with social value at its heart, stating:

'Economic appraisal is based on the principles of welfare economics – that is, how the government can improve social welfare or wellbeing, referred to in the Green Book as social value.' – HMT Green Book (2018).

In the same year, in response to the bankruptcy and liquidation of Carillion, the UK government strengthened its position on social value, calling for an explicit evaluation of social value rather than just consideration (Cabinet Office Minister, David Lidlington CBE MP, **Speech given to industry leaders at the Business Services Association (BSA)**, November 2018). Following this the government launched the **Civil Society Strategy** tasked with setting out how the government can help organisations and individuals deliver social value.

Increased regulation as well as public demand for more socially-responsible companies has meant private firms now have to deliver and demonstrate social value. This is particularly true in the infrastructure sector, where the local procurement process plays a major role. In order to meet the demands of the UK government's social value agenda, private infrastructure firms have begun to develop ways of measuring their social impact. Processes such as social return on investment have been increasingly adopted and tools such as the **Social Value Assessment Tool** and **HACT's Social Value Bank** are being used. However, approaches to social value measurement in the infrastructure sector lack consistency, leading to difficulties in communicating and delivering social value (Raiden et al., 2019[1]).

2 Overview of social value

2.1 Defining social value

Social value refers to all of the impacts that an intervention, policy or project has on society and the value that these impacts have, both positive and negative. The term ‘project’ is used as a broad catch-all term to cover all types of assets that organisations deliver in infrastructure. The social value of a project is the net value generated to society (net of negative impacts). This includes impacts on the infrastructure industry itself, such as benefits to businesses and employees, as well as benefits to wider society. It is vital to note that the term ‘social’ refers to the aggregation of the individuals that make up society and not – as it is often framed – to a type of impact. It is often claimed, for example, that things like health and crime are ‘social impacts’, whereas GDP growth rates and inflation are ‘economic impacts’, and pollution is an ‘environmental impact’. Social value actually captures all types of impact: on the economy, the environment and society more widely because they all affect people in society. Therefore economic, environmental and wider societal impacts should all be included in social value.

This insight paper focuses on the wider societal and environmental benefits/impacts of infrastructure projects. This is because traditionally, infrastructure projects have been assessed in terms of economic impact and the impetus now is to consider the wider societal and environmental impacts. Together with an assessment of the economic impacts, this will provide an assessment of the social value of infrastructure projects.

The types of outcomes related to the wider societal and environmental impacts of infrastructure projects are shown in Table 1. These are presented as benefits, but it should be noted that infrastructure projects can have negative effects on these outcomes.

Wider societal	Environmental
• Improved mental and physical health	• Reduced carbon emissions
• Improved local environment	• Improved air quality
• Reduced crime	• Reduced noise pollution
• Reduced congestion	• Increased biodiversity
• Improved social relations	• Wildlife protection
• Enhanced skills and knowledge	• Increased renewable energy
• Sustained employment	• Reduced energy use
• Better workplace safety	• Reduced waste
• Fairer distribution of benefits	• Reduced water use

Table 1: Wider societal and environmental impacts associated with infrastructure projects

2.2 Assessing social value

Social value measurement (SVM) in its simplest and most basic form is the practice of assessing the extent to which an intervention or project generates value for society and hence is/was in society's best interests.

Social value and SVM are inherently ethical issues because to go beyond these definitions to develop a framework that can be applied to real-world projects, what 'value' is and what is in society's 'best interests' need to be defined. These are ethical or moral/normative questions.

There are many approaches to measuring and understanding what is of value and in society's interests. The dominant approach in public sector policy appraisal and economics, the one that sits at the heart of the Green Book and OECD guidelines on SVM, states that it is the outcomes and only the outcomes of a project that matter when assessing the worthiness of an action. That is, the social value generated by a project is entirely dependent on the outcomes of the project. Added to this in the Green Book and OECD guidelines is the concept of welfarism, which states that the outcome of ultimate importance is wellbeing or quality of life (referred to as 'quality of life' in this paper to avoid confusion with wellbeing valuation or wellbeing as mental health). In this respect quality of life has intrinsic value (it is valuable in and of itself) and all other outcomes have instrumental value (they are valuable in so far as they improve people's quality of life).

Social value is therefore concerned ultimately with:

- how a project or intervention impacts on society's wellbeing or quality of life
- what is in society's interests and
- defining what has value for society as anything that improves people's quality of life overall.

Understanding social value as impacts on quality of life gives individuals in the infrastructure industry a well-rounded perspective in order to evaluate and design projects and initiatives. For example, the **UN's Sustainable Development Goals** can be understood as a set of metrics that are relevant to people's quality of life, in other words metrics that are relevant to social value. This helps practitioners prioritise which goals to focus on, by understanding which affect quality of life the most and which they are likely to influence, and incorporate other concerns not covered by the SDGs that are relevant to quality of life – such as family and social relationships, sports participation, culture and heritage, and crime – into evaluation and project design.

Given this, for a SVM methodology to be robust, it needs to account for and measure impacts on people's quality of life. There are several methods for doing this.

2.3 Measuring social value

2.3.1 Cost benefit analysis

Cost-benefit analysis (CBA) is currently the preferred best practice method for SVM in the public sector (for reference see the government guidelines given in Appendix B). CBA assesses all of the positive and negative outcomes (benefits and costs) of a project and their impacts on people's quality of life. CBA tells us whether a project will lead/has led to an improvement in social welfare (quality of life). CBA measures benefits and costs in monetary terms such that social value is estimated as a quantitative monetary amount. In CBA, quality of life is measured in terms of people's preferences – how much people are willing to pay for a good/service (what people want) – and their experiences – the amount of money required to give someone the same increase in happiness that a good/service gives (how people feel).

In general, to conduct CBA, evaluators follow the steps below (adapted from Boardman, 2006[2]):

1. Catalogue impacts and select measurement indicators by engaging stakeholders and exploring all relevant resources.
2. Predict impacts quantitatively using all available evidence, recognising positive and negative changes as well as those that are intended and unintended. Do so in a proportional way, determining what information and evidence must be included to give a true and fair picture within budget.
3. Value (monetise) all impacts, both financial and non-financial, using recommended valuation techniques. These represent the social value of different outcomes, based on how they affect stakeholders' quality of life.
4. Compute the net present value of the project, perform sensitivity analysis to test how changing model inputs and assumptions affects the results and make a recommendation, demonstrating the basis on which the analysis may be considered accurate and honest, and clearly presenting all findings.
5. Verify the result – ensure appropriate independent assurance.

Other approaches for SVM also exist and can be applied in specific circumstances. In practice these approaches follow similar steps but are generally less comprehensive and therefore easier to carry out. Figure 1 illustrates the main approaches to SVM. These include cost-effectiveness analysis (CEA), cost-utility analysis (CUA), multi-criteria analysis (MCA) and social return on investment (SROI). CEA and CUA, like CBA, also have a long history in research, policy making and academia.

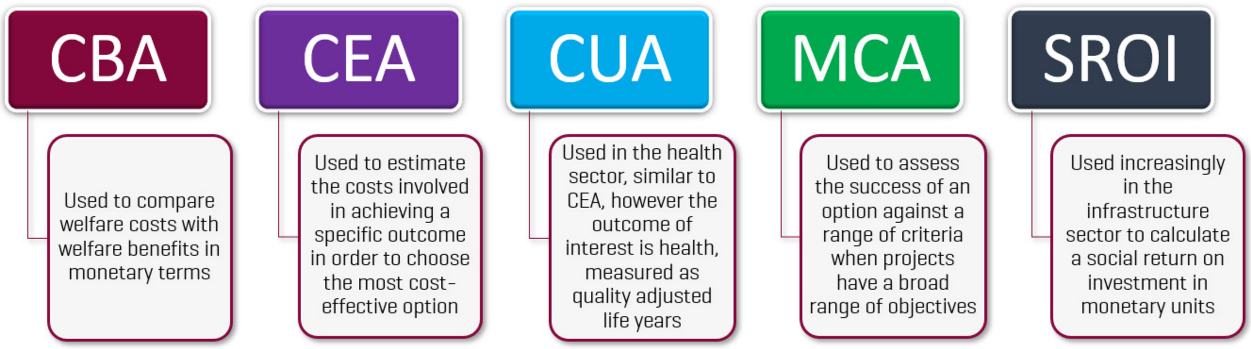


Figure 1: The main approaches to SVM

It should be noted that although use of SROI is growing in the infrastructure sector, it is not considered best practice in the public sector or in academia. This is because it does not define social value in a consistently measurable way, such as impacts on people's wellbeing or quality of life, so the results can be misleading (Fujiwara, 2015[3]). There are also other issues such as lack of rigour in statistical techniques that hamper SROI as an approach.

Many of the methods described in this paper were originally developed in environmental economics and health economics but are applied across all policy areas including publicly financed infrastructure. For example, in the United States of America, the *Flood Control Act* of 1936 mandated that the US Army Corps of Engineers use cost-benefit analysis to evaluate plans for federally funded water resource projects. The **Principles, Requirements and Guidelines for Water and Related Land Resources Implementation Studies** provides specific instructions on how to apply cost-benefit analysis and perform social value studies for water resources projects. Similarly, in the UK, the Department for Transport offers **Transport analysis guidance** for conducting an appraisal of transportation projects. The guidance explains using cost-benefit analysis for an appraisal in line with HM Treasury's Green Book.

3 Social value of infrastructure

The infrastructure sector is responsible for the design, construction, operation, maintenance and repurposing of our economic and social infrastructure assets, and adding social value through all of these activities. Historically, the evaluation of these activities has focused on economic impacts, including:

- increased economic activity
- enhanced productivity
- stimulating business activity
- changes in usable amenities and
- improved connectivity and opportunity.

However, the infrastructure sector has also had negative impacts on social value, particularly on those things that have not been historically evaluated such as wider societal impacts (for example, increased noise and air pollution for local residents living near roads). This has led to attempts to include these impacts in evaluation through SVM. Generally, a social value study for an infrastructure sector project will follow these steps (Raiden et al., 2019[1]; Nicholls et al., 2012[7]):

1. Identify and document the objectives of social value study.
2. Develop a framework and boundary for the study that connects the outcomes with the projects and constructed assets.
3. Identify stakeholders and develop a stakeholder analysis plan.
4. Collect data and stakeholder input, set relevant measures, list expected outcomes and impacts, and establish appropriate measurement required to evidence the results.
5. Measure and assess the impact; validate and value.
6. Monitor progress and delivery during implementation, assess the impact and any variations, manage and engage with project team and stakeholders.
7. Report outcomes, evaluate during and after implementation, validate and benchmark, learn from past examples and recommend future improvements.

These steps are largely in line with those for CBA. However, there are a wide range of approaches to SVM studies and this has led to inconsistency in the interpretation and calculation of their results. While measuring social value is the essential technical step and the main focus of this paper, it is necessary to keep in mind the importance of the development of the other steps of the study outlined above. For example, an essential element of a social value study is understanding the impact on the people who are directly or indirectly affected by the infrastructure project. An emerging best practice is for teams conducting social value studies to have an expert with stakeholder management and engagement skills involved, to ensure that people in various stakeholder groups feel connected, valued and heard.

3.1 Defining the social value of infrastructure projects

The infrastructure sector has a significant impact on the communities in which it builds and operates economic and social infrastructure assets.

Due to rising societal pressures, the realities of climate change and the current political environment there is a renewed interest in delivering and assessing the social value of the sector as a whole and the constructed assets it delivers and operates. The linkage of the sector and its activities to social value has been intuitively established, but most of its processes and practices are dominated by economic considerations alone.

The role of massive infrastructure spending in boosting employment, creating growth and stimulating the overall economy in periods of economic stagnation has been well established. In the infrastructure sector, the idea of social value has been driven by procurement, recent legislations, philanthropy and corporate social responsibility (Loosemore & Lim, 2017[8]). Therefore, the industry has seen the social dimension of its activities as a way of ensuring community involvement, promoting ethical and responsible business practices, and enhancing the interests of the direct workforce and the citizens of the immediate community. In turn government and public see the sector not just as delivering constructed assets, but as a force that can have a multiplier effect in both economic and social terms.

A significant effort has been expended in the sector to ensure procurement practices that have social, economic, and environmental considerations. For example, the **ISO 20400:2017 Sustainable procurement** guidance has helped the industry responsibly and ethically consider purchasing decisions up and down the supply chain.

Over the past 10 years, the discussion has been expanded to encompass the economic, environmental and social aspects of activities in the sector. Using this as a backdrop the UK Cabinet Office in 2012 defined social value as the net economic, environmental and social impact on stakeholders, aligning with the definition set out in Section 2.1 capturing all impacts that affect societal wellbeing. This situation led to opportunities and challenges for the sector. The expanded worldview sharpens the focus on the sector and could help alleviate the image problem that it suffers from. But in the interim, it poses a challenge in that the industry should clearly set out what this definition of social value means for the infrastructure sector and how to deliver and assess it. A comprehensive interpretation makes delivery and assessment difficult, and a narrow interpretation causes the economic dimension to overshadow the analysis presented by project teams.

While interpreting social value for the infrastructure sector, it is important to ensure consideration of:

- the full impact of infrastructure, encompassing economic, environmental and social dimensions
- the entire supply chain and project delivery network
- the whole life cycle of the asset, or the system or network of related assets
- issues of additionality, i.e. benefits over and above what would accrue due to business as usual
- individuals, local communities as well as society as a whole
- project size, type, locations and design

- the procurement approach used
- the importance of delivery and assessment
- the importance of measurable outputs and outcomes and
- the unique needs of the delivery and assessment of social value to each asset, or system or network of assets.

Wolfe (2019)[5] defines eight key areas by which the social value of infrastructure sector projects and assets can be addressed (see Figure 2).

Figure 2: Eight key areas of social value of infrastructure (Adapted from Wolfe, R. (2019), 'A valuable contribution to society', RICS Construction Journal, February/ March 2019[5])

More recently, there have been several private sector initiatives that have tried to address this gap, but these remain largely at a subsector level and are not consistently applied throughout the sector. For example, the UK rail industry, through its **Rail Safety and Standards Board Limited (RSSB)**, has developed the **Common Social Impact Framework (CSIF)** to plan, measure, report and in some instances value the impact of activities underway or delivered. Additionally, the private building sector has recently launched the **National Themes, Outcomes and Measures (TOMs)** framework that establishes the minimum standard to account for social value on real estate projects during design, construction and operation phases. However, neither framework provides a clear interpretation of social value or consistent approach to quantitively assessing it.

3.2 Social value of projects, assets, networks and systems

Infrastructure sector is mostly a project-driven sector, i.e. most of its activities are defined by projects. Completion of these projects typically results in a physical asset such as a transit station, a bus station, or a school, situated in the community. Each project and the resulting asset are unique, but they rarely function independently of other related assets, e.g. a bus station is linked to a bus lane in the local road network for deploying effective bus routes, serving citizens and optimising resource usage. Therefore when delivering and assessing social value it is crucial to duly consider the project that leads to the asset, the asset itself, the network the asset is a part of, and finally the system to which all of these belong (as shown in Figure 3). It is crucial to consider how the project, the asset, the network, and the system impact the stakeholders who experience change as a result of its establishment.

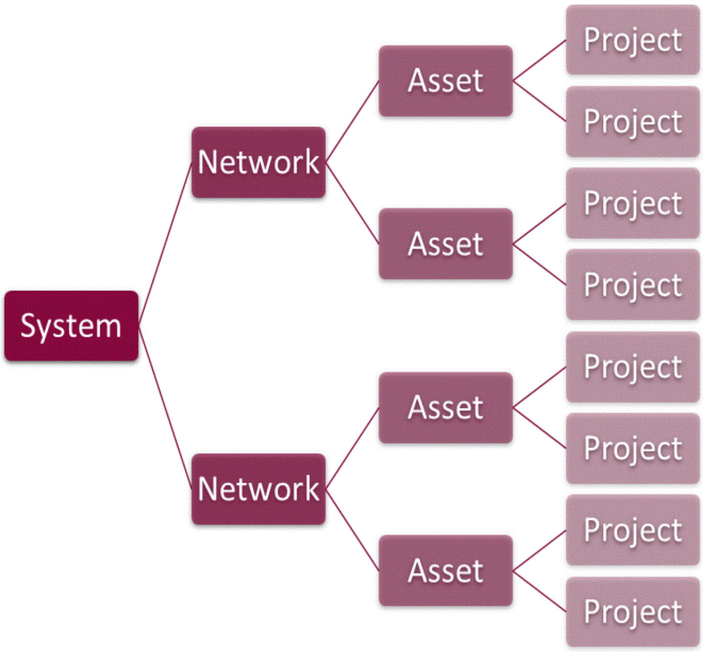


Figure 3: Hierarchical levels for social value consideration for the infrastructure sector

To understand social value from the worldview of end-users and stakeholders it is vital to address each level individually:

- At a project level, it is essential to account for the project size, type, location, delivery network and team, supply chain, procurement regime, project sponsor and the timelines of the project.
- At project completion, the constructed asset becomes operational, and several additional considerations such as renewal, operation, service, performance, and maintenance are considered. Measuring delivery of benefits and operational performance indicators for the asset are needed to document social value.
- Completed assets often integrate into existing networks and systems. System-level measures assess how interconnected assets and networks support the delivery of the broader economic, social and environmental objectives.

3.3 Social value and life cycle considerations

In the infrastructure sector, social value is created over the entire life of projects and the life of the assets that these projects deliver. Incorporating social value into the decision making and considering it an integral part of the processes and practices of the industry is essential. Some projects and assets have strategically connected social value considerations with health, safety, and environment; sustainability; corporate social responsibility and responsible business practices.

Decisions made in the design stage of the project impact the social value generated during the design, construction, and operation phases. Early incorporation of social value into the core processes and practices is necessary.

Figure 4 shows the influence of decision making during the design stages on the social value generated by the projects and the asset over its life. Decisions made upfront and early in the life of the project generally are beneficial and provide the most impact and result in enhanced social value.

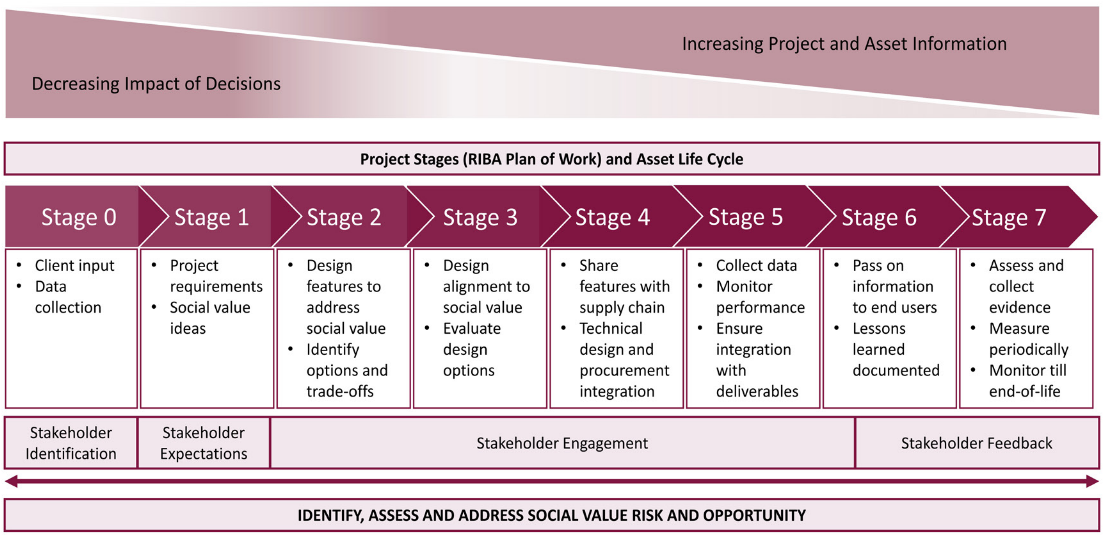


Figure 4: Design evolution and its impact on social value (Source: adapted from Social Value and Design of the Built Environment, Supply Chain Sustainability School, www.supplychainschool.co.uk)

While the list of the possible effects initiated by infrastructure sector projects during their life cycle can be overwhelming, it is possible to categorise them in ways that can guide social value measurement and assessment. The **ISO 26000:2010 Guidance on social responsibility** provides core subjects of social responsibility that may be used to identify some of the activities caused by a project or asset, as shown in Figure 5.

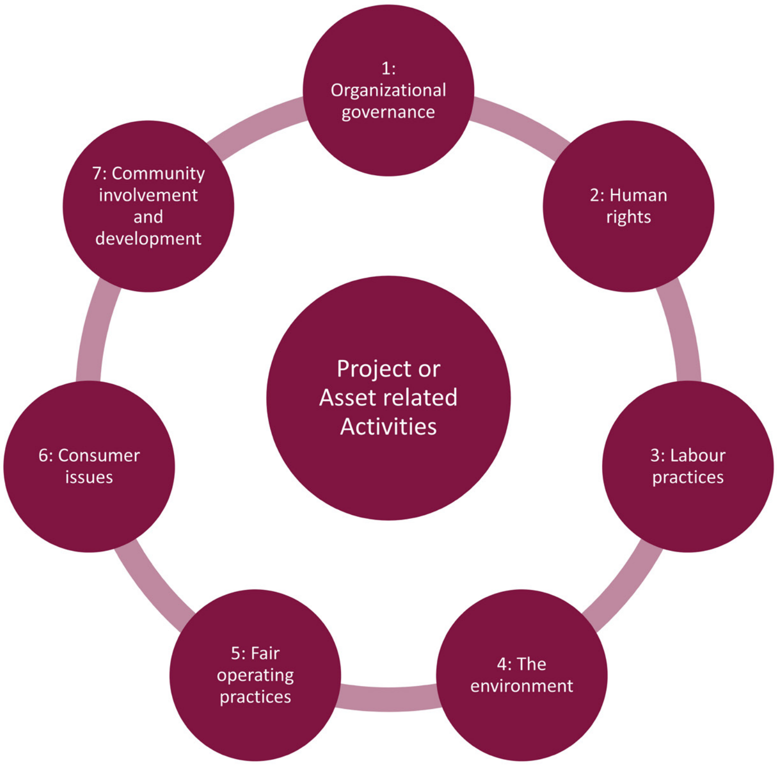


Figure 5: Core subjects provided in ISO 26000:2010

ISO 26000:2010 only includes some of the factors that are relevant in an infrastructure project as it is written for corporate bodies to devise systems for better stakeholder relationships. Actual subjects may vary for different stakeholders depending on the scale, scope and reach of the projects, programs, and organisational activities.

3.4 Sector opportunities and challenges

Social value as a concept provides several important opportunities for the infrastructure sector and helps demonstrate broader impacts on society, the economy and the environment. These impacts can be defined and demonstrated project by project and asset by asset. Using the concept of social value alongside sustainability, the sector can evolve and enhance its operational efficiencies. It can also help demonstrate more rigorously the multiplier effect of the sector on society. However, it also presents a set of complex challenges that need be overcome (Wolfe, 2019[5]; Raidén et al., 2019[1]; Higham, 2019[6]):

1. **Awareness and acceptance of social value:** the infrastructure sector lags behind other sectors of the economy in its awareness and acceptance of social value. This varies significantly between the public sector and private sector and has led to slow adoption of the concept of social value. The infrastructure sector can connect the discussion of social value with sustainability in general and UN's Sustainable Development Goals in particular.
2. **Debunking the myth that social value applies only to large projects and big organisations:** the role of small and medium enterprises is crucial as these are the entities that deliver infrastructure projects and operate the assets that result from these projects.

3 **Definition of social value:** the infrastructure sector must come together to develop a robust and universally agreed definition of social value. Social value is an umbrella term that has not been consistently defined and used in the infrastructure sector. There is no agreement within the industry and the definitions are not specific enough, lack direction for practical application and do not provide guidance for objective setting for project teams. There is a need to have a common language that standardises its use in the industry and brings much-needed clarity.

4 **Measurement and assessment frameworks are needed:** these must show how social value is measured and how it is assessed. Social value is a complex topic that is subjective, involving ethical issues. Without a common set of principles for measuring and assessing, progress is difficult.

5 **Transactional procurement regime:** the infrastructure sector still uses a procurement regime that is transactional and consequently, adversarial. In a project-driven sector this procurement process becomes a blocker to the integration of social impact into the decision-making process. Key stakeholders, therefore, have varying perspectives and motivations in implementing social value. There are several initiatives ongoing in the industry to address this issue such as Procuring for Value by the Construction Leadership Council and Project 13 by the Institution of Civil Engineers.

6 **Integrating SVM and assessment into the development process:** local jurisdictions can incorporate social value into the regulatory processes. Clear guidelines and integration with the development process will boost awareness, adoption and implementation.

7 **Knowledge and training:** investment is needed to increase training so that practitioners are well-equipped to manage and integrate collaborative social outcomes on infrastructure projects. With an increasing talent pool, the industry will improve the implementation of the social impact and thereby enhance its image in the community

8 **Limited open data availability and lack of standards:** the infrastructure sector does not have access to data banks that can provide historical information on social impacts. The industry currently does not follow agreed standards for comparing recording and benchmarking social value. Significant opportunity exists in developing standards in this area and deploying data banks. Any standards developed in the area of social value should also consider other existing standards such as the International Construction Measurement Standards (ICMS), International Land Measurement Standards (ILMS), and International Valuation Standards (IVS).

9 **Social value as a core process:** social value should be planned, managed, monitored and assessed as a core success metric like time, cost, quality and safety. With the ongoing digital transformation of the sector, SVM can be integrated with design, planning, modelling and project management tools.

4 Approaches for measuring social value

Table 2 summarises the key approaches used for measuring social value to inform SVM in the infrastructure sector.

Approach	Method	Summary
Cost-benefit analysis	Comprehensive estimation of costs and benefits of a project in monetary terms, reflecting welfare impacts. Options ranked based on net benefit or benefit-cost ratios.	Most strongly endorsed method by international bodies such as OECD and governments. Provides most comprehensive assessment but is also most resource-intensive.
Cost-effectiveness analysis	Effectiveness of projects estimated in terms of costs of delivering a single outcome, e.g. £ per unit of delivery. Options ranked on this basis.	Endorsed as second-best option by various bodies where CBA is not available. However, only evaluates on one success measure, and this is not valued in monetary terms.
Cost-utility analysis	Benefits of projects estimated in terms of health impacts. Uses quality adjusted life years (QALY) to measure health impacts, and ranks projects based on QALYs delivered.	Similar approach to CEA, but success measure is more encompassing because it includes all aspects of health. Policies can be monetised based on defined value of a QALY.
Multi-criteria analysis	Refers to a set of techniques that enables policies to be compared against a set of defined criteria in order to make decisions between them.	Not explicitly designed to measure social value and not a replacement for CBA but may be appropriate for decision-making at early stages in projects.
Social return on investment	A broad framework for measuring social value, enabling monetisation of benefits and costs for comparison across projects.	A relatively new approach that still suffers from key methodological problems. These can be addressed by applying methods such as CBA within it, but care must be taken to ensure social value is defined and measured consistently.

Table 2: Key approaches for measuring social value

4.1 Cost-benefit analysis

4.1.1 Overview

Cost-benefit analysis (CBA) measures the social value of a project by how it affects the wellbeing of individuals in society and it measures this in monetary terms. CBA is currently the internationally-endorsed best practice method for SVM.

CBA involves estimating the benefits and costs of a project in monetary terms. The monetary values are estimated in such a way that they represent changes in people's quality of life, where quality of life refers to welfare as defined in Chapter 3. Under CBA positive financial values represent improvements in people's quality of life and vice-versa. The monetised benefits and costs are then aggregated to the societal level, over the number of years the benefits and costs of the project are expected to continue for. The aggregated costs are subtracted from the aggregated benefits to provide a net benefit figure. The net benefits represent the social value to society of the project, where a positive net benefit demonstrates that on the whole the project improves the quality of life of society and hence has social value. Projects with higher levels of net benefits have higher levels of social value. CBA captures positive and negative quality of life impacts of a project for all stakeholders including:

1 individuals and communities

2 government/taxpayer and

3 businesses.

Environmental impacts are captured through their impact on people's quality of life. In this sense it is a comprehensive assessment of costs, benefits and social value. Broadly speaking there are two types of impact:

a **Financial impacts** are outcomes that have a direct impact on finances and cash. These include impacts on: people's income, tax payments, government spending, government resources, benefit payments, business revenues.

b **Non-financial impacts** are outcomes that are not immediately cashable but are nonetheless important. These include impacts on people's education and health, crime rates, environment and pollution, heritage and culture, community pride and cohesion, social capital.

CBA captures both financial and non-financial impacts. Often it is the non-financial impacts where social value is mostly generated for large infrastructure projects, as shown in the case studies in Appendix A. For this reason, over the past few decades social value methodology has predominantly focused on developing methods for valuing non-financial impacts, and social value as a field is currently most interested in this area.

Within the globally-endorsed guidelines, there are three accepted approaches for valuing non-financial impacts: revealed preference, stated preference, and subjective wellbeing valuation methods. These are discussed in detail in sections 5.2 – 5.4.

Valuation methods estimate costs and benefits at the individual or household level. This means that to understand the full social value these values need to be aggregated by the number of individuals/households affected by the project and by the duration of the project and its impacts, which can be many decades.

Then benefits and costs are discounted to present value terms. This accounts for the time value of money – benefits and costs are worth less in the future than in the present. This is crucial to assessing large infrastructure projects whose impacts last for many years and decades (note that there are other technical issues within CBA related to inflation, risk, and uncertainty of project outcomes and costs. There are set approaches for dealing with these issues (see Green Book, p.23-31, 2018)). Many countries have recommended discount rates.

The final calculations in CBA are as follows:

i **Net benefit calculation:**

Social value = Present value of the total benefits – Present value of the total costs

ii **Benefit-cost ratio (BCR):**

$$\text{Social value} = \frac{\text{(Present value of the total benefits)}}{\text{(Present value of the total costs)}}$$

The BCR is often also termed the Value for Money (VfM) figure and it is common to see BCR and VfM used interchangeably. A project with a positive net benefit figure, which equates to a BCR >1, is deemed to create social value for society. The higher the net benefits or BCR figure, the greater the level of social value.

The Department for Transport's **Transport Appraisal Guidance** is an example of how CBA can be applied to the infrastructure sector to capture social value in practice.

4.1.2 Strengths

- CBA is the oldest method for evaluation of social impact, stretching back to the mid-1800s. The method has been well-researched and fine-tuned making the methods used in CBA robust.
- CBA measures all costs and benefits in terms of impacts on people's quality of life and it measures all areas covering stakeholders. No other method is so comprehensive in its coverage.
- Since all impacts are monetised it means that policies and projects affecting outcomes in different areas such as health, education, employment, defence, transport and so on, can be compared in the same way.

For these reasons, while no method is perfect, CBA is the globally endorsed best practice method for measuring social value in the public sector.

4.1.3 Weaknesses

- CBA is the most resource-intensive method of those discussed here. This is due to the level of data and technical input required to ensure high levels of rigour.
- CBA is often criticised for using monetisation, with the argument that some things cannot be valued in monetary terms. An important counter-argument to this is that the valuation process in CBA is not a process of commodification of outcomes that are inherently intangible, but rather the values represent changes in people's quality of life. Money is used here so that the benefits can be compared against the costs of projects, which are usually in financial terms to begin with. However, there are valid arguments in the notion that not all outcomes can be valued. Health and the environment are well-known cases where aspects like the value of life or of animals may be difficult to value.

4.2 Cost-effectiveness analysis

4.2.1 Overview

Cost-effectiveness analysis (CEA) is a simplified variant of CBA. In CEA the costs of the project are compared against a single outcome. It is a method to compare the costs of different ways of producing a desired outcome. Under this approach policies are ranked based on how cost-efficiently they deliver the outcome. For example, if a policy is concerned with reducing road accidents in an area, CEA would involve comparing different options by the degree to which they can reduce accidents per unit of expenditure. CEA is recommended by both the Green Book (2018) and the Australian government's **Cost-benefit analysis guidance note** as a second-best approach only where CBA is not possible or suitable.

CEA follows many of the steps in CBA. However, the important point to note is that in CEA there is only one success measure (e.g. fatalities prevented, journey times saved, or jobs created) to be evaluated and that measure is not valued.

The aim is to estimate the cost-effectiveness ratio (CER) for the project as follows:

$$CER = \frac{(\text{Present value of the total costs})}{\text{Outcomes}}$$

Where (*Outcomes*) is the total number of the outcome generated by the project (e.g. number of jobs created). The CER is interpreted as the cost incurred to produce an additional outcome. For example, if Project A was evaluated based on the number of local jobs it created, which was 250 over the life of the project, and the total costs were £5m, the CER would be £20,000, which is the cost of producing a job.

While the interpretation of the CER result is easy to understand, its application is trickier. Whereas in CBA the value of the benefits/outcomes that can be compared directly to the costs is known, in CEA it is not. Therefore, whether a given CER result such as the £20,000 above represents good value for money for society is not clear.

One way that the CER result can be used is when comparing projects with the same success measure. For example, a second project, Project B, may have created 100 jobs with £4.5m of investment. This would have a CER of £45,000, which would tell us that Project B is less effective than Project A. A second approach is to set a CER threshold to determine when a project is effective. For example, for job creation projects the minimum CER threshold might be £10,000, in which case neither Project A nor B would be seen as effective.

While CEA is a lot simpler than CBA (the focus only needs to be on one outcome that does not need to be valued), there are a number of significant disadvantages. The main issue is that since focus is only on one single success measure as the outcome, all of the other benefits of the project as well as any potential costs or negative impacts have to be ignored. For example, Projects A and B may have produced a lot of pollution and damaged heritage sites in the process, which would impact on the social value, but this cannot be accounted for in CEA, like they can in CBA. Therefore, it is very unlikely that a CER figure provides an accurate report of social value. The only case where one can be confident that assessing and ranking projects in terms of their CER results is when there is only one outcome related to the projects in question and no negative impacts (or the negative impacts of all of the projects are identical). In this case the ranking of the projects would be the same based on the CER in CEA and on the BCR in CBA. However, this is a rare occurrence in the real world.

4.2.2 Strengths

- CEA is less resource-intensive than CBA and can be conducted relatively quickly. In some cases the costs of conducting a CBA is too prohibitive for small projects, in which case CEA may be more appropriate.
- In cases where an organisation has a single specific goal, CEA can help to achieve this goal most cost-efficiently.

4.2.3 Weaknesses

- CEA does not provide a comprehensive assessment of social value as it focuses only on one outcome, ignoring the negative impacts of a project and other types of benefits. Therefore it does not provide a full assessment of social value.
- The CER result is meaningless unless it is compared to other projects with the same success outcome or against a CER threshold. There is no consensus on what the CER threshold should be and there would need to be a different CER threshold for every type of outcome.
- Since CEA can only compare similar projects it cannot be used to compare infrastructure projects with very different outcomes such as bridges, sports stadiums and shopping malls. Only CBA can do this.
- Since CEA can only be used to perform relative assessments it can only tell us the ranking of projects in terms of their effectiveness and not whether any of the projects create social value and are worthwhile investing in. Again, only CBA can do this.

These disadvantages are the reason why CEA is a second-best approach in most guidelines, typically recommended for small projects or where a rapid assessment is required.

4.3 Cost utility analysis

4.3.1 Overview

Cost-utility analysis (CUA) is variant of CEA used in health or for policies whose main impacts are on health outcomes. CUA uses a measure of health status known as the Quality Adjusted Life Year (QALY). The QALY is measured on a scale of 0 (death) to 1 (perfect health) and most health outcomes can be converted to QALY scores. CUA replicates CEA by using the same steps and processes but by using impacts on QALYs as the single success measure. Policies are compared and ranked based on how many additional QALYs they provide per unit of expenditure.

CUA could be applied to the evaluation of infrastructure projects where health outcomes are important such as building cycle lanes and sports facilities, or where there are significant environmental impacts that lead to changes in health status (e.g. increases or decreases in air pollution and greenhouse gases).

In CUA the aim is to estimate the CUA ratio for the project as follows:

$$\text{CUA ratio} = \frac{(\text{Present value of the total costs})}{\text{QALYs}}$$

This is known as the cost-per-QALY estimate and is interpreted as the cost of producing an additional QALY for the population.

The method used for estimating QALYs is a variant of the stated preference methods used in CBA, discussed in more detail in section 5.3. Any health condition can be assessed in terms of how many QALYs are lost (e.g. for small issues such as a broken finger it may be -0.1, whereas for severe breathing conditions it may be -0.6).

QALYs are estimated using stated preference methods, which means that they provide an assessment of how the condition (or relief from the condition) impacts on people's quality of life. It provides an overall assessment of health-related quality of life covering mobility, pain, mental health, self-care and ability to undertake usual activities. Essentially, CUA attempts to apply the principles of CBA by explicitly measuring changes in people's quality of life but only within the domain of health. Rather than a monetary value CUA produces a quantitative non-monetary measure of value for health.

Health assessments have taken this approach in many countries like the UK, US, Australia and Denmark because of the inherent difficulties people have in placing a monetary value on life and health.

CUA can be used to compare health interventions with impacts on different health outcomes and there is also some consensus on a threshold ratio. In the UK a cost per QALY of under £20,000 has been deemed effective and worthwhile (note that this figure is currently being reviewed and is likely to increase).

4.3.2 Strengths

- CUA is less resource-intensive than CBA and can be conducted relatively quickly since tariffs (QALY values) for many health conditions are available in many countries.
- It is well-documented that valuing health states in monetary terms is problematic, meaning that CBA often cannot be applied. The QALY approach and CUA avoid the issue of monetary valuation for health while still aligning to rigorous methods for measuring QALY values in line with people's changes in quality of life.
- The QALY is a well-understood and researched metric that relies on best practice estimation approaches.

4.3.3 Weaknesses

- CUA is more limited than CBA as it only allows comparisons to be made between policies that impact on health and not those that affect other outcomes.
- Application of CUA to infrastructure projects is limited – it can only be applied where the main/only outcomes of the project are health outcomes.

4.4 Other methods

There are a number of other methods that have been used to measure social value. Two fairly prominent methods are multi-criteria analysis (MCA) and social return on investment (SROI).

MCA is an umbrella term that refers to a set of techniques which enable the performance of policies to be compared against a set of defined criteria in order to make decisions between them. Although it is not explicitly designed to measure social value, it can be used to measure some aspects of social value where the success criteria are social outcomes. The Green Book does not recommend MCA methods as a replacement for CBA, rather it recommends it as a possible approach at the earlier stage of policy appraisal (the long-list stage, which considers a large number of initial high-level ideas for a given policy) to narrow down options.

The first step of a typical MCA is to identify the objectives that a policy is meant to achieve. Then, a set of measurable criteria are determined so that the extent to which the objectives are met can be understood. These criteria are typically decided by experts within an organisation. Weights are also assigned to each of the criteria reflecting their importance in achieving the objectives. These are also decided based on the judgements of experts. Policies are then 'scored' based on the extent to which they meet the criteria. The overall performance of different policies can then be compared based on their overall scores.

MCA can be a useful tool for decision-making early in the process of options appraisal, where different sources of information, both quantitative and qualitative, need to be combined, however its use in SVM is limited because the way in which success against the target criteria is scored does not necessarily need to take account of social value. While applications of MCA in infrastructure are quite common, they should not be seen as social value assessments.

SROI is an approach that aims to provide a framework for measuring social value. SROI typically involves measuring the impact of policies, valuing these in monetary terms, and then aggregating them to the societal level. It is therefore closely linked to the approach of CBA, though there are significant differences in the philosophy and implementation. As a relatively new approach, it has some methodological problems as discussed in Fujiwara (2015)[3] and Pathik & Pratik (2014)[4], and is therefore not currently an approach recommended in the public sector by bodies such as the UK government and the OECD, and is not used in major policy and investment decisions.

SROI starts by establishing the scope of the project and identifying the key stakeholders. It then identifies the outcomes that policies are expected to deliver and measures the change, either actual or expected, in those outcomes. These changes are then monetised. A number of methods are recommended in the SROI guidance for monetisation, including some of the Green Book methods, but also a number of methods that are not recommended in CBA such as simple cost savings approaches. After all the benefits and costs are monetised, SROI then converts this into a ratio reflecting the return on investment. This is similar to the BCR in CBA.

SROI closely follows the structure and approach in CBA but suffers from several problems as set out in Fujiwara (2015)[3]. A key problem is that social value does not have a robust underlying definition, meaning that social impacts are defined and measured inconsistently across projects, sometimes referred to as quality of life impacts, sometimes as investment costs, sometimes as economic impacts, and so on. The return on investment ratios are therefore difficult to interpret. Secondly, SROI does not account for all of the types of impact that make up social value. For example, benefits for businesses are excluded and SROI does not account for non-use value (the value for people who do not directly use or benefit from the scheme). Thirdly, many of the valuation methods used in SROI do not comply with best practice and subsequently run into a number of problems such as double-counting of benefits or over/understating values. Finally, the methods used to estimate impacts on outcomes are often problematic. SROI tends to rely on very small sample sizes that are not representative of the wider population and from which it is impossible to conduct statistical tests of significance. It also heavily uses non-statistical methods for measuring impact such as qualitative surveys and anecdotal evidence. Measuring counterfactual outcomes (necessary to understand cause and effect) is therefore either ignored or done in a light-touch way. Global best practice statistical methodology does not endorse such methods as this means that the impacts of policies are not accurately estimated.

SROI needs to address these technical issues for it to be used and applied in a consistent and robust way. As it stands, SROI and methods like MCA are not typically recommended in best practice guidance as methods for measuring social value.

5 Valuing non-financial impacts

5.1 Introduction

The three key methods for understanding the social value of non-financial impacts are revealed preference, stated preference, and subjective wellbeing valuation methods. Other terminology that is often used to refer to non-financial impacts is non-market goods. Market goods and services are traded in markets and so already have a market price. Non-market goods and services – the focus of this paper – are goods that are not traded in markets and so there is no price associated with them. Analysts use valuation techniques to estimate the social value of these types of goods and services.

The total value of a good or service is made up of its use and non-use value. Use value is the value an individual gets from using a good either directly (e.g. enjoying walking through a local park) or indirectly (e.g. an increase in air quality in the local area due to the park). It also includes the value individuals get from having the option to use a good (e.g. knowing that there is a park that you could go to in the future may benefit you now). Non-use value is split into:

- existence value, the value an individual gets from the good's existence
- altruistic value, the value an individual gains from the good's use by others and
- bequest value, the value an individual gets from the good's potential use by future generations.

Non-use value is a key issue in the appraisal of infrastructure projects that impact on the environment (we care about (and value) the existence of nature) or on heritage assets (we care about (and value) the existence of historical landmarks and heritage sites even if we don't actually ever visit them).

Table 3 summarises the best practice methods for estimating the value of non-market goods.

Approach	Method	Summary
Travel cost method (revealed preference)	Estimates use value for recreational sites using travel cost data for visitors to the site and its alternatives.	It is considered the most robust valuation method, along with the hedonic pricing method. However, it does not capture non-use value and is very data intensive.
Hedonic pricing method (revealed preference)	Estimates use value for non-market goods that contribute to the local environment and working conditions using housing and labour force data.	It is considered the most robust valuation method, along with the travel cost method. However, it does not capture non-use value and relies on a number of market assumptions.

Approach	Method	Summary
Contingent valuation (stated preference)	Estimates total value (use and non-use) using bespoke surveys and is often used to value intangible goods.	A flexible method that captures both use and non-use value. However, due to potential survey biasing, it is considered less robust than revealed preference methods.
Discrete choice experiment (stated preference)	Estimates total value (use and non-use) for the individual attributes of multi-attribute goods using bespoke surveys.	A flexible method that captures both use and non-use value. However, due to potential survey biasing, less robust than revealed preference methods.
Subjective wellbeing valuation	Estimates use value for a wide variety of societal and environmental goods using national wellbeing datasets.	A flexible approach that does not suffer from survey biases and is cheaper than stated preference techniques. However, it is less well established as it is relatively new.
Benefit transfer	Adjusts previous results from studies using the methods above and applies them to a new context. The data and type of value will depend on the original study/studies.	The easiest and most cost-effective valuation technique. However, it is the least robust and relies on there being appropriate values already estimated in previous studies.

Table 3: Approaches for estimating the value of non-market goods

5.2 Revealed preference methods

Revealed preference methods are a category of non-market valuation techniques that estimate value using evidence from observed market behaviour. They use statistical techniques to analyse how non-market goods are indirectly traded in related markets and use this to estimate the goods implied value. There are two main revealed preference methods, the hedonic pricing method and the travel cost method, both of which have relevance for infrastructure projects.

5.2.1 Hedonic pricing method

The hedonic pricing method estimates the use value of a non-market good by analysing how it affects prices for related market goods. The intuition is that the value of a related market good is made up of a list of different attributes, including the non-market good of interest, and that each attribute has an implicit price. This implicit price represents the value of the attribute as part of the market good.

Application

In order to apply the hedonic pricing method in practice, analysts will identify market goods whose prices are affected by the non-market good of interest, the two most common examples are:

1. Housing market: this may be used to value non-market goods that contribute to the local environment such as parks, noise and air pollution, and crime.
2. Labour market: this is generally used to value non-market goods that contribute to working conditions such as reduced risk of injury and death.

Once the relevant markets have been identified, analysts will gather price data for these markets and information on the market good's attributes including their relation to the non-market good of interest. They will then apply statistical techniques to filter out the impact of other factors on house prices and wages so that we can observe the impact due to the non-market good, which is taken to be its value.

The housing market method is applicable to infrastructure projects. For example, to estimate the value of a local school an analyst may investigate how house prices in that area depend on how far away the house is from its nearest school. Using statistical analysis, the analyst would filter out other effects on the price of the house such as size, number of bathrooms, etc. and differences in the standard of the schools. This ensures that similar houses and similar schools are compared. The analyst would use the average difference in price between houses that are close to a school compared to those which are not to calculate the value of the school above any fees or costs.

Strengths

- The hedonic pricing method values are taken to be an accurate representation of individuals' actual preferences, as it is based on actual behaviour.
- It is cost effective as it can be conducted without expensive primary research (provided sufficient market data is available such as house prices).
- It is a well-developed method with decades of academic research.

Weaknesses

- The hedonic pricing method only captures direct use value and does not capture non-use value.
- It relies on a number of assumptions that may not hold in practice: for example that the market is in equilibrium, consumers have perfect information and free mobility, i.e. for the housing market, individuals are able to adjust the different levels of each attribute of interest by moving property, with no transaction costs.
- It only captures marginal value, i.e. the value of a small increase in the provision of some good.

5.2.2 Travel cost method

The travel cost method estimates the use value of non-market goods, typically sites used for recreation, by analysing how much it costs individuals to access them. The intuition is that although these sites do not always have an explicit price, it still costs consumers – in terms of travel costs and the opportunity cost of time – to access them. These costs are used as a proxy for the value of the non-market good to an individual.

Application

To apply the travel cost method, analysts will collect data on:

- the attributes of the site of interest and other substitute sites
- the cost of travel for individuals to these sites
- the number of visits to the site over a set time period
- background socioeconomic and demographic information on the individuals.

This may be done in-person or in secondary datasets that track travel behaviours. Using this data analysts will then estimate the individual level demand curves for the site using statistical techniques, which represent their willingness to pay for visiting the site. Finally, to derive estimates of the total use value of the site, individuals' values given by their demand curves will be aggregated by either visitation or population totals.

For example, this method could be used to value a sports stadium. Data would be collected on the sports stadium and alternative local sporting venues concerning their size, the sport played, prestige, etc. Then data would be collected from visitors to the sites on the cost involved and time taken to travel to the stadium for some event. This data would be used to construct the demand curve for a visit to the sports stadium, i.e. how much are individuals willing to pay above the price of a ticket to visit the stadium. This is additional value that the sports stadium provides to those visiting the stadium.

Strengths

- The travel cost method is based on actual behaviour that is taken to be an accurate representation of people's preferences and value.
- It is cost effective if the data required is available.
- It is a well-developed method with decades of academic research.

Weaknesses

- The travel cost method requires reliable estimates of the value of time to estimate the cost of travel. This is difficult and is often done using assumptions based on a fraction of an individual's wage or using generic values that have been previously estimated.
- It is a data-intensive method.
- It requires that individuals make single purpose trips, i.e. when visiting the site of interest, the individual does not visit another site nearby or engage in another activity. Otherwise the value of the trip will be divided between the different purposes for it.
- It only captures use value and does not capture option value or non-use value.

5.3 Stated preference methods

Stated preference methods are a category of non-market valuation techniques that estimate value using primary surveys in which respondents state their value of a non-market good either explicitly or implicitly. There are two main stated preference methods: the contingent valuation (CV) method and choice modelling methods such as discrete choice experiments (DCE). Both are highly relevant for infrastructure projects.

5.3.1 Contingent valuation method

The contingent valuation (CV method) estimates value using surveys that directly ask how much respondents would be willing to pay (WTP) or accept (WTA) for a positive or negative change in the provision of a non-market good. Whether WTP or WTA is appropriate will depend on the context of the provision of the non-market good and is often based on what is the status quo and individuals' rights.

Application

To conduct a CV study, analysts will design a survey that presents a hypothetical market for the good of interest where it can be traded. Surveys may be conducted face-to-face or online depending on budget. CV surveys generally consist of five parts:

i Information is provided about the good or service as it currently stands. For example, a highly congested road.

ii Respondents are asked a set of questions concerning their attitude and perception of the good/service in its current status.

iii Respondents are then presented with a contingent valuation scenario. The scenario sets out the change in the good/service, how it will be provided and how it will be financed. These factors are chosen to reflect the real-life context for the provision of the good. For example, adding new lanes to the road or a flyover to reduce congestion.

iv Once the respondent has been presented with the scenario, they are asked how much they are willing to pay or accept for the good/service in the scenario presented. There are various ways of paying (known as the payment vehicle). These include taxes, road tolls, entry fees, donations. The valuation question can be directed at users and non-users.

v At the end of the survey respondents are asked to give their background socioeconomic and demographic characteristics to understand how the value of the good varies with these characteristics and to ensure the sample is representative of the population of interest. This data is also used to test the validity of the responses.

For example, this method could be applied to new green energy sources such as a dam. Analysts would design a survey in which local residents would be asked to state how much they would be willing to pay in increased utility bills for clean energy from the dam. The total value of the dam would then be calculated by adding up all of the local residents WTP amounts.

Strengths

- The CV method can be flexibly applied to most non-market goods (with the exception of goods that respondents may find hard to conceptually pay for such as a feeling of belonging to a neighbourhood or preserving wildlife).
- It can calculate both use and non-use value.
- It is a well-developed method with decades of academic research.

Weaknesses

- CV surveys are subject to a number of potential biases that may result in respondents' stated WTP being different from the amount they would actually be willing to pay. These include:

  - Hypothetical bias: due to the hypothetical nature of the survey respondents tend to overstate their actual WTP.
  - Strategic bias: respondents may attempt to 'game' a study by over (or under) stating their value of a good in order to influence policy.
  - Information and framing effects: the type of information and how it is presented can lead to respondents over or understating their true value.

  To minimise these biases, a number of best practice solutions have been developed. These include using oath and cheap talk scripts (describing to participants, before making a decision, the propensity of respondents like themselves to exaggerate stated WTP) to reduce this bias as well as feedback on how believable the respondents found the survey and whether they took their responses seriously. Surveys will present information clearly, using multimedia if possible. Involuntary payment mechanism such as taxes or utility bills should be used to reduce strategic bias. Analysts will also include reminders of respondents' contextual factors such as their budget constraints and situation as well as other substitute goods for the good being valued.

  Analysts will conduct validity tests to ensure the reliability of the values to ensure:

  - content validity (testing the comprehensiveness, realism and neutrality of survey and respondents understanding of and reaction to the survey through piloting the survey)
  - convergent validity (benchmarking the results of the study against other valuations for similar goods) and
  - theoretical validity (testing that the values follow economic theory and common sense, for example WTP should be higher for people with more income).

- CV can be expensive as it requires analysts to design and distribute bespoke surveys.

5.3.2 Discrete choice experiments

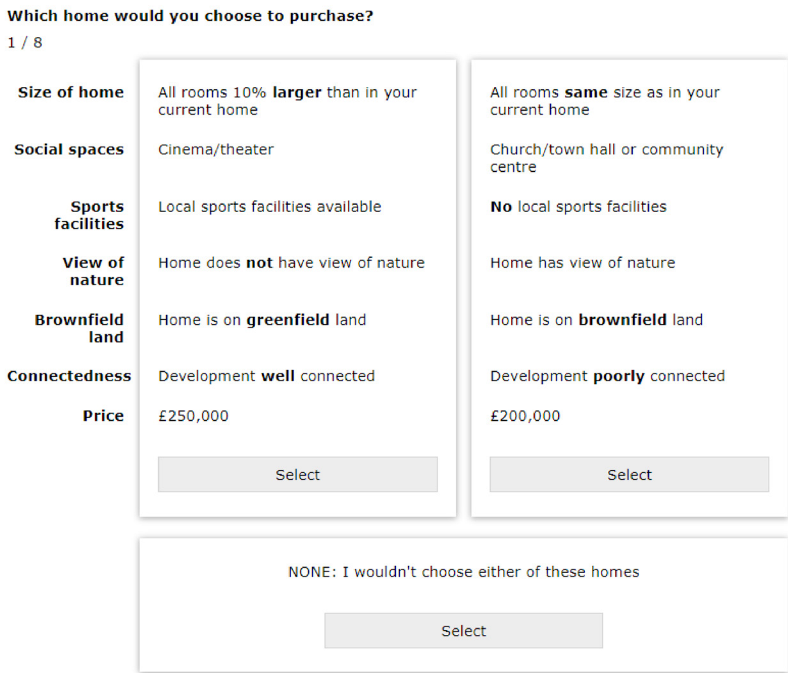
District choice experiment (DCE) methods estimate the value of non-market goods with multiple attributes, providing values for the good as a whole as well as for its different attributes. It does this by analysing responses from a DCE survey in which respondents make choices where they trade off the good's attributes with its monetary cost. The value for each attribute is given by the amount of money they are willing to trade off to have the attribute.

Application

In order to conduct a DCE, analysts design a DCE survey. This will have a similar structure to that of a CV survey, first asking a set of attitude and perception questions about the good and its attributes followed by a presentation of the contextual information for the valuation scenario. The survey should also end with questions on a set of background socioeconomic and demographic factors.

The key difference between CV and DCE surveys is the design of the fourth step (the WTP/WTA question). In a DCE survey goods/services are presented as a bundle of key attributes (e.g. for estimating the value of housing attributes this could be number of rooms, size, garage, garden, access to local services, etc). These levels should be feasible, realistic and span the range over which analysts wish to value the attribute. Analysts will then design options in which the levels of the attributes vary. These options are used to construct choice sets that are presented to the respondents. Each choice set will contain two or more options and the respondent must choose their most preferred one (for example see Figure 6).

The design of the choice sets and options is generally done using specialist statistical software to ensure the design is efficient (maximising accuracy of the valuation).



Which home would you choose to purchase?

1 / 8

Size of home	All rooms 10% **larger** than in your current home	All rooms **same** size as in your current home
Social spaces	Cinema/theater	Church/town hall or community centre
Sports facilities	Local sports facilities available	**No** local sports facilities
View of nature	Home does **not** have view of nature	Home has view of nature
Brownfield land	Home is on **greenfield** land	Home is on **brownfield** land
Connectedness	Development **well** connected	Development **poorly** connected
Price	£250,000	£200,000
	Select	Select

NONE: I wouldn't choose either of these homes

Select

Figure 6: Example choice card: valuing the attributes of new housing developments

Respondents are then asked to choose their preferred option. Once the data on the respondents' choices are collected, analysts will examine how the respondents have traded off the cost or price of the good and each attribute and calculate their implicit price or value. DCEs should be designed to minimise survey bias as in CV and be subjected to the same validity tests to ensure their results are reliable.

Strengths

- DCE, like CV, is very flexible and can calculate both use and non-use values.
- It provides a more detailed valuation, through the valuation of individual attributes, than other methods and can be used to estimate the value of the attributes of the good/service as well as the whole good/service (aggregate value of all of the attributes). CV is typically only used to value the whole good/service.
- It has the potential to reduce the likelihood of strategic biases and in some cases provide respondents with more realistic choices than a CV survey.
- It is a well-developed method with decades of academic research.

Weaknesses

- A discrete choice experiment has the same potential biases that apply to the CV method.
- It is expensive, requiring even more time and resources to design and conduct than CV studies.

5.4 Subjective wellbeing valuation

Subjective wellbeing valuation (SWV) uses the same principles as revealed and stated preference techniques, but with different data. Rather than estimating the value of a good in terms of how it satisfies an individual's preferences, it estimates the value of a good in terms of how it affects people's subjective, self-reported wellbeing. There are many measures of wellbeing such as 'how happy do you feel', but the SWV method typically uses self-reported life satisfaction as the measure of wellbeing (e.g. overall, how satisfied are you with your life nowadays (on a scale of 0 to 10, where 0 is 'not at all' and 10 is 'completely')?).

Application

In order to conduct SWV, analysts will collect data on individuals' self-reported life satisfaction, the level of exposure to or use of the good of interest and socioeconomic and demographic characteristics. This may be done conducting bespoke surveys or found in secondary datasets such as national wellbeing statistics. They will then use statistical techniques to estimate the causal impact of the non-market good on life satisfaction and the causal impact of income or money on life satisfaction. The value of the non-market good is calculated as the change in income required to give the same change in life satisfaction as a change in the non-market good. It is key that the statistical analysis controls for the impact of all other factors on people's wellbeing so that analysts can single out the impact and value of the non-market good.

Strengths

- SWV does not suffer from the potential survey biases in stated preference methods.
- It can be used to value a range of different non-market goods.
- It is cost effective as it can be conducted with national datasets that include subjective wellbeing measures.

Weaknesses

- SWV is a relatively new method and is not as well developed as the preference-based valuation techniques.
- It can be difficult to calculate the casual impact of the non-market good and income on wellbeing.
- It should not be used to assess the impact of a one-off event or infrequent events that do not significantly impact on life satisfaction.
- In general, the method only calculates use value, as there is little or no variation for individuals for goods that are not used.

5.5 Benefit transfer method

While revealed preference, stated preference and subjective wellbeing valuation provide the three core methods for valuing non-market goods, it is often more practical for analysts to transfer or extrapolate values from one study to another to reduce costs and time. The benefit transfer method does this by adjusting previously estimated values for a similar non-market good in one context and applying them to a new context of interest. This method can be applied to values produced by any valuation technique, but the validity of the new value will depend on the robustness of the original value it is based on and its applicability to the new context of interest.

Application

There are four levels of complexity with a benefit transfer, with the more complex approaches being more robust but also harder to carry out in practice. The most basic and least robust method is the unadjusted transfer. In this method analysts simply use a previously calculated value for the same good in a different context as a proxy of the value of the good of interest. It does not adjust the value for differences in contextual factors or differences in the good itself.

A more complex method, but still relatively easy to carry out in practice, is the income-adjusted transfer. In this method analysts adjust previously calculated values for the effect of income. Respondents will give higher WTPs if their incomes are higher. The original value can be adjusted using the relationship between income and WTP to suit the income distribution of the new population of interest. However, this approach does not adjust the value for differences in other contextual factors or the non-market good.

In order to give a more robust valuation, analysts may conduct a value function transfer. In this method analysts adjust previous values for a full range of contextual factors and differences in the good of interest that might affect its value, for example the UK Department of Transport has **estimated values for travel time savings** that can be adjusted for different income levels, different modes of transport and different transport purposes. These values may be used to value time savings due to roads, rail and other transport infrastructure projects. In general, this method will only be possible if the original value has estimated how these different contextual factors affect the value of the good.

The most complex and robust method is the meta-analytic value function transfer. In this method analysts estimate a value function from a range of different studies using statistical techniques. Analysts then apply the value function to the new context of interest to estimate the value of the good. The value function therefore does not come from a single study but from a collection of studies.

The key challenge for benefit transfer methods is the errors transferred from the original primary studies (measurement errors) and errors generated by the transfer process itself (generalisation errors). Analysts should be aware of these risks and ensure that only robust context-appropriate values are used. The more complex methods, meta-analytic value function transfer and value function transfer, will reduce generalisation errors.

This approach should only be used if primary research is not required, there are reliable previous values to use for the transfer and there is a clear way to apply the values to the new context of interest.

Strengths

- Benefit transfer is relatively simple to apply in practice.
- It is the most cost-effective way of providing values for non-market goods.

Weaknesses

- The results are generally taken to be less reliable than the other methods.
- It requires previous values that are appropriate for the new context and good of interest.

5.6 Summary

Analysts have a range of options when considering how to value non-market goods. They should take into account both reliability and proportionality when choosing which method to use. The time and resources spent on valuation should be proportional to the size of the project and the need for precise estimates. When reporting to public agencies, analysts should use standard approved values for non-market goods (if the agency has published any). In practice, if these are unavailable, the hierarchy shown in Figure 7 should generally be used.

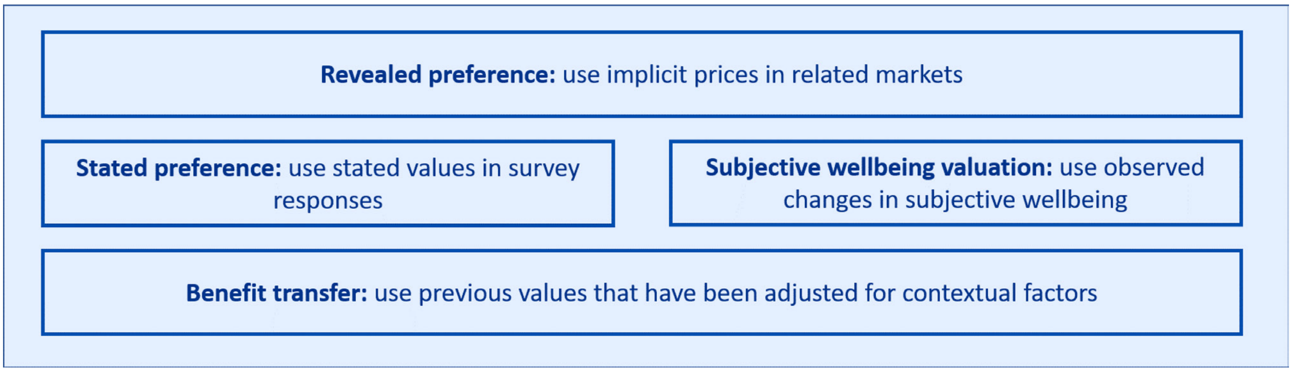


Figure 7: Hierarchy of methods used to value non-market goods (adapted from HMT Green Book (2018))

1. If revealed preference data is available, analysts should use the appropriate revealed preference technique to value their good of interest. For local and environmental goods and personal health and safety outcomes the hedonic pricing method should be used and for locations that involve recreational use the travel cost method may be the best approach.

2. If there is no data available or the good of interest does not affect related markets, analysts should use one of the two stated preference techniques. These techniques should also be used if analysts are interested in non-use value, even if the data is available for one of the revealed preference techniques. Alternatively, analysts may use the subjective wellbeing method when valuing outcomes and issues that have a large effect on wellbeing (e.g. unemployment, health) or that are experienced frequently (e.g. frequent sports and exercise). It can offer a more cost-effective solution to valuing some goods and may also be useful if analysts are valuing goods that are not well suited to stated preference techniques.

3. Benefit transfers should be used if there are appropriate existing values and none of the above methods are feasible or there is not enough budget to conduct a bespoke valuation.

In practice, for any infrastructure project, in order to value its wider societal and environmental impacts, analysts should first establish the key outcomes associated with their project. Then they should follow the process set out above, in consultation with non-market valuation experts, to decide which valuation approach is most appropriate for each of the chosen outcomes. Once calculated, the values can be used to estimate the monetary equivalent value of changes in key outcomes caused by the project.

For example, an analyst is interested in the social value of a bypass.

Key outcome: noise reduction as the bypass reduces traffic noise for 100 residents in the local area from 50db to less than 45db.

From the Department for Transport's TAG, this reduction in noise is valued at £17.92 per resident in terms of amenity and health benefits. Therefore, the road provides residents with £17.92 * 100 = £1,792 of social value each year.

In addition to the bypass, the project delivered a local community centre that reduced social isolation in the area for 50 residents. As there is no existing value for social isolation and revealed preference techniques cannot be easily applied, the analyst could commission a bespoke subjective wellbeing valuation study to produce a value for improvements social isolation. This value could then be multiplied by the 50 residents to calculate social value. It could also be used on other projects that improve social isolation, reducing the burden on analysts to calculate bespoke values in the future.

6 Role of chartered surveyors and the profession

The infrastructure sector employs chartered surveyors from various specialisms including land, valuation, construction and quantity surveying, project management and infrastructure pathways. As the demand for measuring and assessing social value on the sector increases, these professionals will be required to develop relevant skills and competencies. However, until an established robust best practice emerges, social value assessments will continue to be inconsistent.

Global professional bodies such as RICS can play an essential role in this area by collaborating to create international standards, a body of knowledge, training, data products, and thought leadership in the field of social value.

The UK Green Building Council (UKGBC), in **Social value in new development: An introductory guide for local authorities and development teams** provide a recommended approach to creating a social value strategy (see Figure 8) for local authorities and development teams. The high-level approach consists of four major steps. While step three specifically pertains to SVM, it is clear from this approach that chartered surveyors can lead and manage the overall strategy and provide a link to important activities that ascertain the project environment, local context and stakeholder management. They should ensure that an expert with a background in SVM is engaged in step 3.

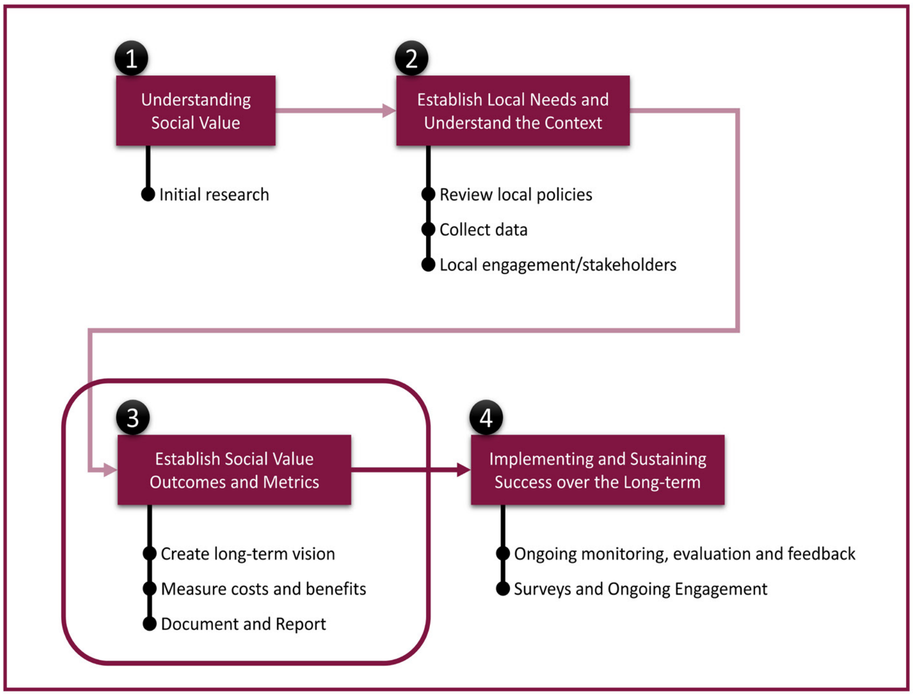


Figure 8: Recommended approach to creating social value strategy (source: adapted from UKGBC)

In 2019, G20's Global Infrastructure Hub (GIHUB) developed the **Framework for Inclusive Infrastructure** with a focus on developing infrastructure that 'enhances positive outcomes in social inclusivity and ensures no individual, community, or social group is left behind or prevented from benefiting from improved infrastructure'. The framework is primarily designed for governments, but it acts as a useful guide for the private sector and community of professionals. As shown in Figure 9 the framework consists of six actions areas and related practices that can be considered for the systematic implementation of inclusivity in infrastructure at the policy and project levels.

Figure 9: Global Infrastructure Hub's Framework for Inclusive Infrastructure (source: GIHUB)

Broadly the framework suggests best practices at the project level and at the sector level. For example, at the project level the importance of project data, stakeholder engagement, project management, and use of cost benefit analysis is suggested. At the sector level, issues pertaining to policy, standards, governance, capacity building, and standards are highlighted. This type of framework helps to identify practices in the area of social value that are relevant to the surveyors and to the profession.

The currently used international valuation standards contains best practice guidance for those undertaking asset valuations. The valuation measures set out in this guidance, namely the market approach, income approach and cost approach, all measure economic value. In order to capture total social value, similar guidelines could be produced for wider societal and environmental benefit. The valuation techniques developed in the public sector can inform this, and given appropriate training, professionals should be able to conduct social value evaluations alongside standard asset valuations.

7 Conclusion

As the infrastructure sector continues to shift its focus from economic value to more holistic social value, projects are being designed, built and assessed in a new way. As investors start considering environmental, social and governance (ESG) factors the conversation in the infrastructure sector is also moving in this direction. Government regulation and consumer demands mean that the industry is being required to deliver and demonstrate social impact in order to win work, to inform resource allocation and for marketing purposes.

Currently, the infrastructure sector does not consistently define or measure social value. The industry lacks a robust set of standards and objectives to guide the delivery and assessment of social value and there is little capacity for social value measurement. This potentially limits the social value that could be created and demonstrated by the industry.

To help address some of these issues, this insight paper has provided a brief overview of how social value measurement has developed in the public sector, providing clarity on what social value is, how to measure it and how to value it as defined in the available best practice guidelines. The variety of methods for evaluating social value ensures that assessments can be proportional to the size of projects, with an appropriate level of detail and rigour. For projects requiring cost benefit analysis, analysts can incorporate a wide range of previously overlooked social outcomes into their assessments using the valuation methods discussed in Chapter 5. By presenting social impacts in monetary terms using robust welfare-based valuation techniques, value can be clearly communicated, understood and compared against costs, helping to inform good evidence-based decision making and reporting to government bodies, to clients and to the public.

Using these insights, the infrastructure sector can develop its approach to social value. In particular it may benefit from:

- defining specifically what social value means for the infrastructure sector and how it links with government programmes such as the Industrial Strategy in the UK
- developing outcomes and measures that are relevant and capture key impacts on the quality of life of society. While a rigid suite of measures may not be practicable, it may be beneficial to create a ‘shopping list’ of easily implementable metrics that create a link between infrastructure outputs and social value
- formally embedding social value in all major projects. Major public projects should be required to publish a social value plan that aligns outcome measures against social value and the Industrial Strategy that are specific to the community in which the project sits
- developing an industry-wide collaborative initiative for incorporating social value into all aspects of the infrastructure sector. An industry leadership initiative should be created to unify, encourage and promote a positive vision for social value and provide practical guidance. This could include items such as guidance on metrics and a social value awards system linked to clear outcomes and

- leveraging social value to improve economically weaker communities' quality of life through new skills development and improved productivity. Adopting a proactive approach to inclusion in the construction sector by linking outcomes of the Industrial Strategy to how benefits are distributed.

In conclusion, social value represents an opportunity for the infrastructure industry to adjust its way of doing business in order to improve its impact on people's quality of life. Going forward, this paper should help readers to develop a greater understanding of evaluating social value in order to take advantage of this opportunity. For the industry as a whole, this paper should aid the process of developing a robust set of standards and guidelines to ensure consistency in evaluations and improve the delivery of social value.

Appendix A Case studies

A1 Case study 1: travel cost method: environmental infrastructure

Background

Royal Botanic Gardens, Kew commissioned consulting company Oxford Economics to calculate the total value Kew Gardens contributes to society. As part of this work, they estimated the social value that Kew Gardens brings to visitors from the UK for the year 2018/2019.

Method

Oxford Economics used the individual travel cost method to estimate the use value of Kew Gardens for its visitors. The report analysed the implied amount visitors were willing to pay to visit the site based on the relationship between frequency of visits, the distance they had to travel and direct travel costs. The study used survey data of visitors to the site. The dataset consisted of 1,098 visitors to Kew Gardens for the years 2017/2018. It recorded a range of factors including how many times they had visited in the past 12 months, the respondents' postcode and information on their socioeconomic profiles. By applying statistical techniques to the dataset, the study calculated how increases in travel cost affected the number of visits – that is, how it affected visitor demand – from which it then estimated the average willingness to pay to visit to Kew Gardens over and above the price paid for admission. The study then combined this with admission cost data to estimate the total demand for all visitors to the site, representing the total visitor use value.

Results

The paper found that Kew Gardens generated a large amount of social value, over and above what visitors paid in admission fees. The average annual value to a visitor, above what they paid for admission, was approximately £30 per visit. Combining this with the admission price and aggregating over the estimated total number of visitors yielded an annual value to visitors of £50.3 million in 2018/2019. This paper highlighted the importance of considering the social value of infrastructure, particularly when considering environmental infrastructure with relatively small economic value, but potentially large social value through their heritage and cultural significance.

A2 Case study 2: hedonic pricing method: social infrastructure

Background

In the United States, 64 stadiums and arenas were built in cities from 1991 to 2006 for the four major sports leagues. Local government often subsidised the construction of the stadiums. To estimate whether the benefits to the public justify the costs of subsides, Feng and Humphreys (2008) studied how much social value two professional sports facilities, Nationwide Arena (NHL) and Crew Stadium (MLS), in Columbus Ohio added to their local residents.

Method

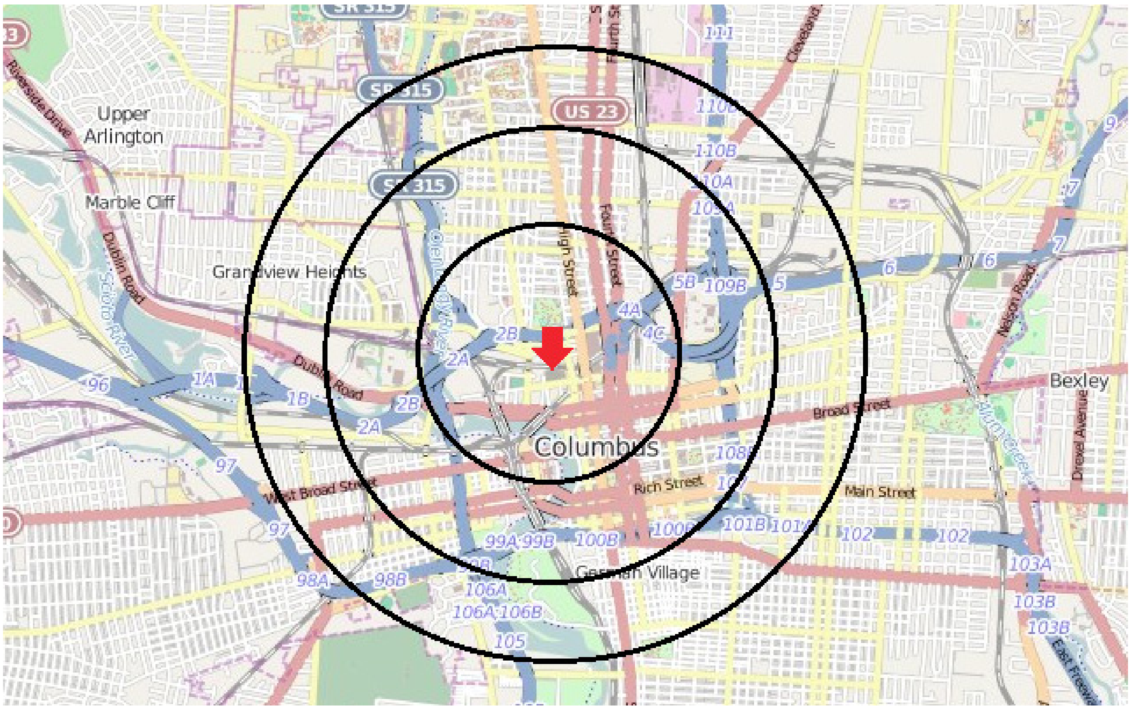


Figure 10: Distance to Nationwide Arena

*© OpenStreetMap data contributors. OpenStreetMap data and maps are licensed under the Creative Commons Attribution-ShareAlike 2.0 license (**CC-BY-SA 2.0**). Adapted by authors.*

The hedonic pricing method was used to estimate the social value of the stadia for local residents. It analysed how distance from the stadium affected the price of a home. The paper used transaction data from the housing market in Columbus, Ohio. The data set consisted of 9,504 housing transactions in the year 2000. It included detailed housing characteristics such as size, number of bedrooms, number of bathrooms and other key determinants of price.

The data was combined with School District, Census Block Group, and Police District data in order to capture neighbourhood characteristics such as school quality, environmental quality and crime rates. The distance between each house and the two facilities was calculated based on the latitude and longitude of the sports facilities and each house in the sample.

Results

The paper found that both facilities generated significant social value for local residents. This was realised through an uplift in price of $2,214 per house for residents in the local area due to proximity to the stadium. Based on data from the 2000 census, the aggregate social value of the Nationwide Arena for those living within one mile of the facility was $222.5 million and, similarly, the aggregate social value of Crew Stadium was $35.7 million. This study helped local governments and cities to understand the importance of social infrastructure in the form of professional sport stadiums for generating social value, enabling decision makers to appropriately weigh the cost and benefits of subsidising their construction.

A3 Case study 3: contingent valuation: transport infrastructure

Background

The A303 road currently intrudes on the Stonehenge World Heritage Site (WHS), cutting through historic features of the WHS such as the Stonehenge Avenue. The UK government has committed to improving the A303 between Amesbury and Berwick Down and, in doing so, reducing the impact of the road on the WHS.

Figure 11: The A303 road

Source: Photograph by Phil Williams. This file is licensed under the **Creative Commons Attribution 2.0 Generic license***.*

Highways England considered a number of options that would divert the A303 away from the Stonehenge monument, either through a tunnel or via a bypass. Typically, in the UK, transport infrastructure appraisals focus on economic impacts but the A303 study was the first time that a major transport scheme looked at the wider social impacts as well. This study valued the impacts of removing the A303 from its current location on noise, heritage preservation and visual amenity, three key social benefits of the scheme.

Method

The study applied contingent valuation surveys to elicit monetary values for a hypothetical change in noise, tranquillity, visual amenity and landscape severance within the Stonehenge WHS, by directly asking individuals about their WTP or WTA compensation for a tunnel to replace the A303 road through the Stonehenge WHS:

'What is the maximum you would be willing to pay per year, to support a tunnel route? This would be via an increase in your overall annual national taxes for the three-year construction period of the tunnel.'

Over 3,500 people completed survey, responses were composed of 432 visitors, 1,001 local residents and 2,102 individuals from the general population. Respondents were given contextual information and asked a set of attitudinal questions about the WHS. The survey recorded respondents' background characteristics to ensure the survey was representative of the UK population.

Results

WTP values were calculated for the new tunnel for individuals who visited the site (average annual value: £23.39), road users (average annual value: £21.51) and the general population (average annual value: £14.41). Some respondents were not in favour of the tunnel scheme and for them they had a negative value for the new road layout with an average WTA of between -£51.90 to -£81.35. The aggregated net benefit of the tunnel (total social value) for the UK population using these estimates was between £1.1bn and £1.4bn. The values elicited comprise:

- **i** the use value derived from changes to the heritage experience and
- **ii** the non-use value that people place on the existence of the altered WHS including bequest value to future generations.

These values were included as part of the value for money (VfM) calculations in the business case for the transport scheme. As the majority of benefits of this project were non-financial, by including the wider social impacts the VfM figure more accurately reflected the value of the project to society. The VfM based on just the economic impacts resulted in a BCR of 0.6. Adding the wider social benefits increased the BCR to 1.15 indicating that the benefits of the project outweigh the costs.

A4 Case study 4: discrete choice experiment: housing infrastructure

Background

With rising concern for the environment and buildings accounting for an increasing percentage of energy usage and waste, there is a growing demand to ensure that buildings are managed and designed in a responsible or 'green' way. With a wide range of different methods available to make a building greener, there is a need to assess each method's value in order to choose those that optimise social benefit through housing infrastructure.

To do so, Chau, Tse and Chung (2010) conducted a study to value the different sustainability measures residential buildings in Hong Kong may take to reduce their environmental impact and increase social value.

Method

The study employed a discrete choice experiment to elicit monetary values for five different categories of green measures (presented in Figure 12).

Respondents from two districts in Hong Kong completed a face-to-face survey generating 480 responses. Respondents were presented with an introductory section assessing their awareness and understanding of green residential developments. This was followed by the valuation scenario in which they were asked to make eight choices based on their most preferred building option (a neither option was also available).

Choice Set 8 (Questionnaire II)

	Scenario 1	Scenario 2
Landscaping & Physical activity	Allow ≥1.5 m^2 of site area for physical walking & biking path	Allow 0.5 m^2–1.5 m^2 of site area for physical walking & biking path
Annual potable water consumption	No saving	10% saving over a conventional building
Annual energy consumption	No saving over a residential apartment in a conventional residential development	Achieve a 20% saving over a residential apartment in a conventional residential development
Indoor noise level	Unacceptable but without causing major health threats	Unacceptable but without causing major health threats
Indoor air quality	Unacceptable but without causing major health threats	Unacceptable but without causing major health threats
Monthly management fee	No extra	$50 extra
Preferred Scenario:	()	()

Figure 12: Example choice card (Taken from Chau, Tse and Chung (2010), 'Table 4')

Results

Based on the respondents' choices, WTP values (HK$) were calculated for each of the green measures. The results are presented in Table 4 for different income groups. This study contributed to an ongoing process of enabling the evaluation of building developments' benefit to society in order to ensure developments are designed to maximise their social value.

Group	Reduction in energy consumption (20%)	Increased landscape and physical activity area	Improved air quality	Reduced noise levels	Reduction in water consumption (20%)
Low income	32.00	9.90	16.80	11.20	14.20
High income	35.10	10.90	18.50	12.30	15.45

Table 4: WTP values (HK$) for each green measure

A5 Case study 5: discrete choice experiment: construction

Background

The **Considerate Construction Scheme (CCS)** scores and rates construction sites based on a number of areas that affect social value such as the environment and community impacts. A higher score indicates that the site has had a beneficial impact on these areas. Morgan Sindall Group, a leading UK construction and regeneration group, commissioned a study to estimate the value of compliance with the CCS in order to demonstrate social value for their projects that attain good CCS scores.

Method

The study employed a discrete choice experiment to elicit monetary values for the five different categories that make up the CCS score (see Figure 13). Through an survey online 2,000 respondents were presented with contextual information about the CCS scoring system. They were then asked a series of eight choice tasks where they were asked to trade off scores in each CCS category with different levels of monetary compensation.

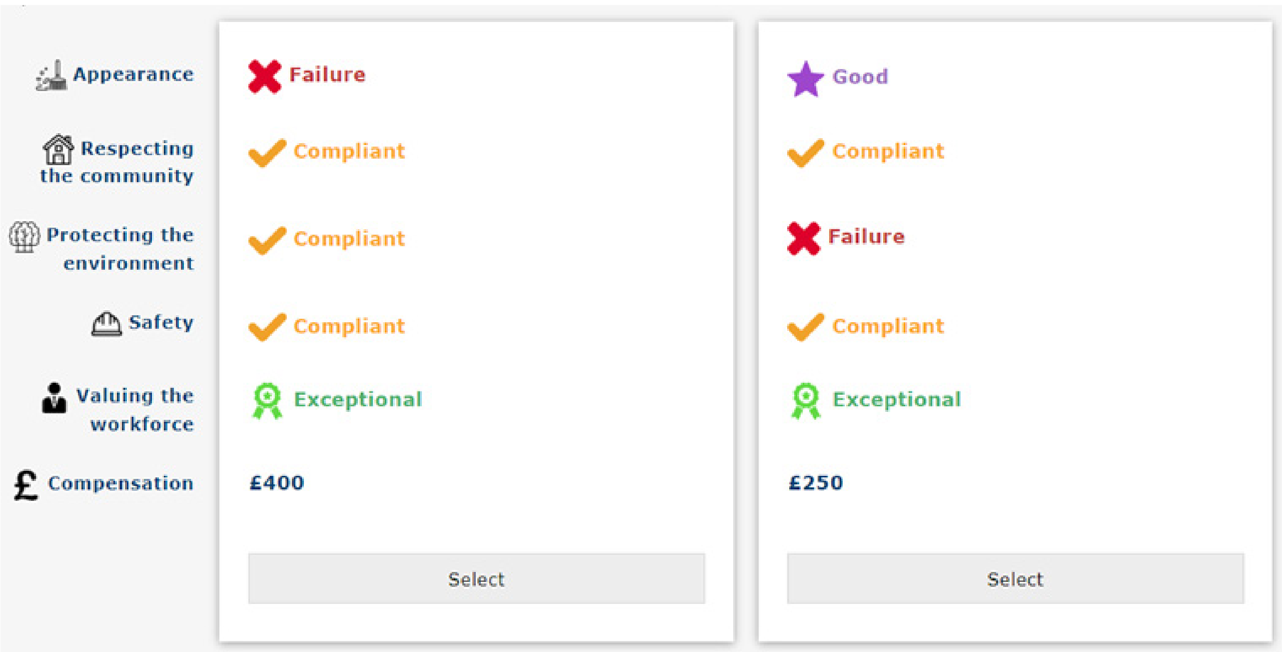


Figure 13: CCS example choice task

Results

Based on the respondents' choices, WTP values were calculated for improved scores in each of the categories presented. The study found that safety was the most highly valued aspect of construction (it had a value of £262 for moving from Failure to Compliant and £44 for Compliant to Excellent), followed by community and environment. The WTP values calculated as part of the study enabled Morgan Sindall to estimate the total social value associated with its developments during the construction phase.

A6 Case study 6: wellbeing valuation: water infrastructure

Background

Ofwat, the economic regulator of the water industry in the UK, set water companies the challenge to innovate the way in which they engage with and measure how their customers value aspects of their business. Anglian Water, the provider of water and wastewater services in the east of England, commissioned Simetrica to assess the impact of flooding and roadworks incidents on the wellbeing of its customers and to estimate the social value of this in monetary terms in order to assist Anglian Water with the development of its future business plan.

Method

The study used the wellbeing valuation approach. Four types of incidents affecting water customers were covered:

- water flooding
- internal (domestic) sewer flooding
- external sewer flooding and
- roadworks.

The study used five years of data (2011-2016) from the Annual Population Survey, which covers a range of socioeconomic questions for UK households. This was merged with data provided by Anglian Water on the time and location of flooding and roadworks incidents. This dataset was then used to estimate the relationship between flooding and roadworks incidents and wellbeing, measured as life satisfaction after controlling for a range of background factors including age, gender and marital status. This was done to better isolate the relationship between the water incidents and wellbeing. The study then assessed the levels of monetary compensation required to fully offset the negative impacts of flooding and roadworks incidents.

Results

The key findings of the analysis were:

- The wellbeing impact per incident of each type of flooding is higher than for roadworks – the social cost of a roadworks incident was estimated at £31,735, compared to the average flooding incident of £390,552.
- The average internal sewer flooding incident has a higher wellbeing impact per property affected (social cost of £166,549) than the average external sewer flooding incident (social cost of £21,754). This was also higher than the average internal water flooding incident (social cost of £54,312).

The findings from this report were used by Anglian Water to help it set targets and incentives for these incidents, and the report was published as part of Anglian Water's business plan submission to Ofwat as evidence to show how it will create social value for water customers.

A7 Case study 7: contingent valuation: social infrastructure

Background

Libraries in England have an important role as providers of a range of services, from book-lending and computer access to children's activities, training courses and meeting spaces. Understanding the social value of libraries is a complex issue due to the wide-ranging services that libraries provide and their inherently non-market nature. To help library service providers understand the value they contribute to society, **Arts Council England** funded a study (Fujiwara, Lawton and Mourato, 2019) to estimate the value of engagement in libraries.

Method

The study applied contingent valuation surveys to elicit monetary values for library services over and above core book-lending and computer/internet services. Among the 1,985 people who completed the survey, 1,200 responses were composed of library users (respondents who indicated that they used their local library in the last 12 months) and 735 of non-users.

The valuation section presented respondents with information on the range of services offered by local libraries and outlined current local government funding arrangements for libraries via the statement:

Funding for the services that local libraries offer comes mainly from local government and is raised through council tax.

The survey then presented respondents with a situation where, due to the current financial crisis and cuts in government funding to local libraries, 'libraries in (the respondent's) local area would no longer be able to offer the extra services, activities and programmes they currently offer unless more funds were raised via council taxes'. Respondents were then asked to state how much they would be willing to pay to support libraries so that they could continue to deliver a full range of services through increased council taxes.

Results

The study found that average willingness to pay to maintain current library services (above the core book-lending and computer/internet services) among library users in England is £19.51/annum and £10.31/annum for non-users. Aggregating this to the whole of England this provides a total annual social value for local libraries, through the services they provide, of £723.4 million.

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We are RICS. Everything we do is designed to effect positive change in the built and natural environments. Through our respected global standards, leading professional progression and our trusted data and insight, we promote and enforce the highest professional standards in the development and management of land, real estate, construction and infrastructure. Our work with others provides a foundation for confident markets, pioneers better places to live and work and is a force for positive social impact.

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