

## Transforming asset management



# Value-based Infrastructure Asset Management

## Introduction

The ISO family of standards on asset management, published in 2014, brought worldwide attention to through-life management of physical assets, shifting the emphasis from minimising cost to realising value.

This requires clearer determination of the value realised from assets and how to make value-based asset management decisions.

CSIC has developed an innovative structured approach to specifically help asset owners and operators make such decisions and provide much-needed clarity on determining the value realised from assets from a multi-stakeholder perspective.

## Taking a value-driven approach

CSIC has developed a structured methodology which applies a systematic approach that identifies the key stakeholders of the assets (e.g. asset owners, maintenance contractor and the end users), their needs and requirements from the asset, and how these requirements are fulfilled by the effective maintenance policies adopted through the asset life cycle. This ensures that the asset continues to provide the best value for money.

## Value mapping tools

The main enabler for the new methodology is the Value Mapping Tool that facilitates easy visualisation of key value elements. The tool provides information regarding key factors that influence the value provided by the asset and also the levers that the asset managers can pull to manage or control the value.

The value map also helps asset managers devise maintenance policies by taking into account the various possibilities and evaluate the best value options. The Value Mapping Tool will be supported by mathematical modelling techniques to determine through-life costs, risks and performance of the assets. This will help the asset management program to maximise the value to the various stakeholders at the best possible cost.

A key benefit of this approach is that it requires asset managers to think systematically about the different ways by which asset value can be managed, and highlights important information necessary to manage the asset.

## Impact

*"Value-based thinking removes the 'do-what-is-absolutely-necessary' mindset, and promotes innovative thinking to improve value rather than simply minimise cost. It allows the organisation to systematically identify risks and build a sound business case for investment and expenditure. This is particularly relevant, even crucial, to infrastructure, where value is generated for many years after the initial investment. Applying CSIC's method to value-based asset management positively shifts emphasis from managing the cost of assets to managing the value generated by assets."*

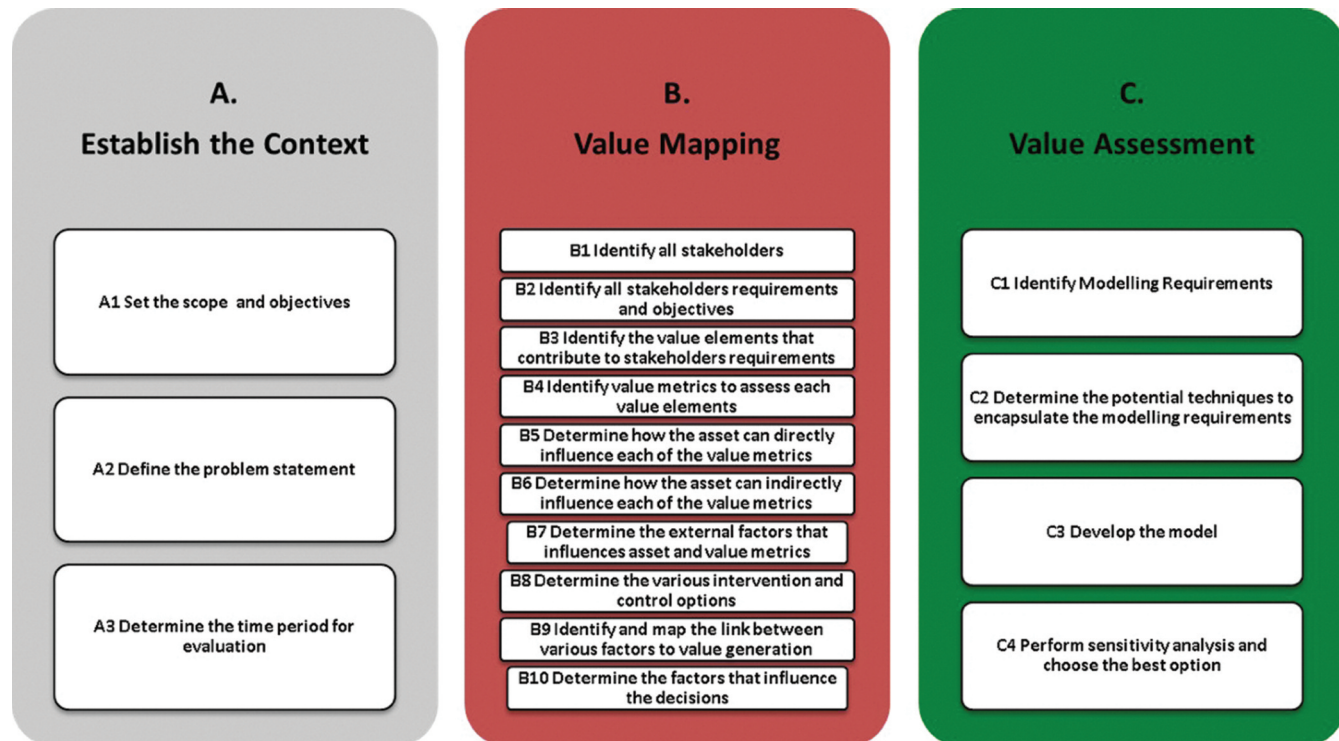
Ajith Parlikad, CSIC Asset Management



## Transforming asset management

### Value-driven decision-making methodology – a three staged approach

The value-driven decision process consists of three stages. The figure below illustrates the various steps involved in these stages to implement whole-life value process.



#### Stage A: Establish the context

Establishing the context is key. Asset management decisions vary widely depending on the type of asset, functionality and the wide-ranging problems to be addressed. For example, strategic asset management decisions will involve developing whole-life valuation for a portfolio of assets to satisfy regulatory compliance, while daily operational decisions may involve determining the optimal intervention type for a particular asset.

#### Stage B: Develop the value map

This stage clarifies the value and impending risks contributed by the asset towards various stakeholders requirements. Each infrastructure asset and the dependent system generate value by providing the necessary functionality. Consequently, any failure or disruption will have an impact on the value created.

A value map is created to aid asset owners in better understanding the dependencies that need to be considered for a particular asset when making asset management decisions. The value map enables organisations to understand the information requirements for asset management decision making. It can also be used to develop innovative ways of managing assets.

#### Stage C: Assess the value

This stage develops an appropriate decision model which calculates the value of the asset and assesses the impact of different decision options on the value generated. This helps the decision maker choose the best decision to maximise value.

CSIC has successfully applied its structured approach and value-driven tools to a number of live asset management projects by collaborating with Industry Partners including:

- Value-based tunnel repair strategy for London Underground with Industry Partner London Underground
- Taking a value-based approach to bridge maintenance prioritisation with Industry Partner Cambridgeshire County Council
- Value-based replacement strategy for highway safety barriers with Surrey County Council

Case studies are available in the Asset Management section on the CSIC website

**CSIC contact: Dr Ajith Parlikad E: [aknp2@cam.ac.uk](mailto:aknp2@cam.ac.uk)**