TRANSPORT FOR THE South East

TRANSPORTEAST

ENGLAND'S ECONOMIC HEARTLAND

Supported by

MOTT MACDONALD

ARUP

Bus Back Better Support Programme

Support Package 2 – **Data Analysis, monitoring and evaluation**

Q & A

Please post questions in the chat as we run through the webinar and we will answer at the end of the session.

Please raise your hand if you wish to ask a question.

Today's presenters

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Bus Back Better Support Programme

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Project Outputs

Improved delivery of BSIPs and EPs, and support to LTAs who have not received government funding in the current round. This will include:

- Enhanced evidence base through research papers on prioritised knowledge gaps.
- Knowledge sharing within and between STBs and their constituent members and between the public and private sectors.
- Better resourced LTAs through prioritised third-party support, provided in targeted areas.

Project Outcomes

These outputs will seek results in outcomes aligned to the National Bus Strategy including:

- Increased patronage.
- Enhanced accessibility and social inclusion.
- Reduced carbon emissions and improved public health.
- More commercially sustainable bus networks.

Bus Back Better Support Programme

- Support Package 1: Fares and Ticketing
- **Support Package 2: Data Analysis, Monitoring and Evaluation**
- Support Package 3: Low Cost and Quick Win Solutions
- Support Package 4: Building a Strong Case
- Support Package 5: Infrastructure and Road Space
- Support Package 6: Demand Responsive Transport
- Support Package 7: Rural Hubs and Integration
- Support Package 8: Funding Mechanisms
- Support Package 9: Collaborative Working
- Support Package 10: Marketing
- Support Package 11: Alternative Fuels and Low Emission Vehicles

Contents

Support Package Objectives

This support package will provide you with help to:

1. **Understand which data metrics to use in different circumstances**
2. **Know the best ways of accessing the right data sets**
3. **Understand when qualitative data should be used**
4. **Set relevant SMART objectives to enable success to be evaluated**
5. **Improve the quality of future BSIP submissions**

Introduction

Purpose of the webinar

This webinar aims to provide an overview of data-driven methods help identify areas of opportunity for improving the bus service in priority areas and evaluate outcomes from interventions. This includes considering the number of users, customer satisfaction, service performance, journey purpose and non-user surveys.

- **Number of users** which is essential to monitor the number of users by day/service/journey to understand fully current travel patterns and emerging trends;
- **Customer satisfaction** which are important to find out what users think about the service;
- **Service performance** to understand if journey times are consistent;
- **Journey purpose** to identify why people are using the bus, particularly new users; and
- **Non-user surveys** to identify why people won't use the bus which is important to generate new users.

Q & A

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Key Performance Indicators

Key performance indicators

Overview

The aim of Bus Back Better is to improve bus services, which will in turn attract and retain more users. This will generate more revenue that can then be used to improve services further.

What is a key performance indicator (KPI)?

KPIs help set a performance objective to which regular monitoring will be compared. Changes in the performance of a bus service will be assessed against this benchmark to determine whether it has improved over time, and whether the outcomes of improvement schemes are having their desired effects.

The most important bus-related KPIs, know as the 'three Ps' are:

- **Patronage**: the number of people using the bus over a given period. Increasing in patronage is the aim of Bus Back Better.
- **Punctuality:** the proportion of journeys operated that arrive on time. Punctual services are more attractive to both existing and potential bus users.
- **Passenger satisfaction:** customer's views on the various aspects of the bus service, including punctuality, pricing, comfort and others. The user experience can either appeal or deter customers of a bus service.

The three Ps are high-level KPIs to be tracked at the Local Authority Level. However, these can be supplemented with more specific indicators as outlined in the next page.

Key performance indicators

Additional performance indicators

KPIs	**Total passenger journeys**	**On-time performance**	**Overall passenger satisfaction**
Additional performance indicators	Passenger journeys per head of population	Bus speed as a proportion of general traffic speed	Satisfaction with value for money
	Service patronage	Average delays at stop	Journey time satisfaction
	Bus stop boardings		Non-user surveys

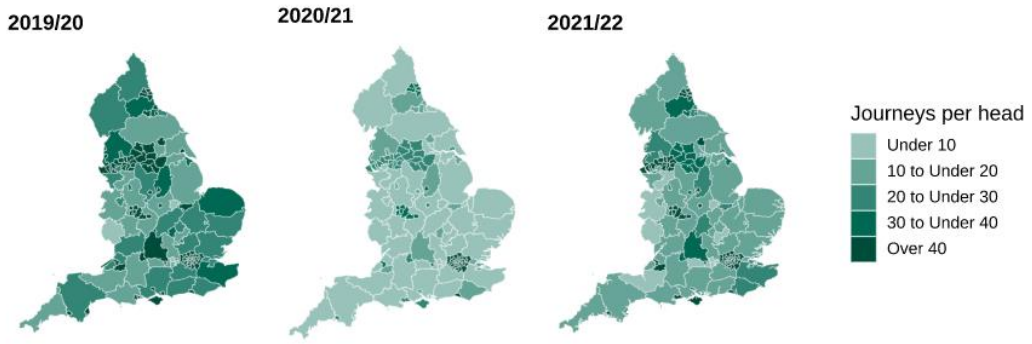
Key performance indicators

How to use KPIs

KPI goals should align with strategic objectives as defined by local, regional, and national policy.

A KPI should also be:

- **Specific:** the KPI should assess a single aspect of the bus service
- **Measurable:** data should be easily accessible to be able to track the KPI over time
- **Achievable:** the goal should be realistic
- **Relevant:** the KPI should be related to a strategic objective
- **Time bound:** KPIs should be measured at least annually to match data releases and to allow for changes in the bus network have an effect



Patronage as an example KPI:

- **Specific**: Journeys per local authority is the measurement of all bus boardings in a local authority over a given year
- **Measurable:** Patronage data is provided by the DfT and is publicly accessible
- **Achievable:** the objective is to increase patronage by X%
- **Relevant:** the aim of Bus Back Better is to attract and retain bus users, and patronage measures bus users
- **Time bound:** Patronage is measured by the DfT annually, so objectives can be reviewed over this time period

Q & A

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Data range and availability

Data range and availability

Overview

Identifying suitable KPIs, as well as designing a monitoring and evaluation strategy, requires understanding of available data sources.

Most datasets are collected automatically via electronic monitoring, but some are still collected from field and passenger surveys.

The aim of the data gathering stage is to:

- Understand issues that constrain bus services from realising their full potential
- Enable bus users to plan routes, understand costs, and predict bus arrival times.
- Improve the bus service to meet KPIs

Data range and availability

Where does all this data come from?

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Automatic Vehicle Location (AVL)

Electronic Ticket Machines (ETM)

Manual methods

Data range and availability

Key data sources and supplementary data sources

Key sources

Department for Transport

High level bus statistics data tables, released annually

Analyse Bus Open Data (ABOD)

Processes and analyses real time and timetable information from the Bus Open Data Service

Transport Focus

Data on customer profile and satisfaction

Supplementary sources

Local bus operators

Patronage figures, real time data, complaints data, and commercial information

Bus Open Data Service (BODS)

Standard format real time data, ticketing, and timetable information

Other

Surveys by Local Authorities

Stakeholder feedback

Previous studies

Census data

Q & A

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Methods for baseline and forecasting patronage

Overview of methods

Spreadsheet based model	A standalone tool which contains information about base year bus patronage data and applies scenario assumptions / elasticises to predict how this will change in the future.
Regional or national highway model	A regional or district public transport and demand model, which could include highway information model to create a 'model network'.
ABM	An agent based model which models individual users of the transport network based on their activities taking place over the course of a day and respective travel choices.

Spreadsheet based model

Advantages

- Simple, assessing elements of bus strategy without a full assignment model
- Can easily apply assumptions / elasticities to existing patronage data
- No specific modelling software required

Disadvantages

- Limited functionality – unable to assess multiple scheme elements
- Not suitable for Mass Transit assessment
- Small scale with limited scope for change
- Limited on assignments

Accessibility and application

- Accessible to all spreadsheet users except for licensed model (e.g. MBM)
- Simple spreadsheet models can be undertaken internally with in-house training
- More complex spreadsheet models may need specialist expertise.

£ Relatively cheap to develop

<6 months to develop and implement

Example: UTG Metropolitan Bus Model

- Aggregate at regional level
- Bespoke spreadsheet
- Data source: ticket sales data
- Annual demand only
- Assess impact of a high level exogenous factors
- Exclusive to UTG members or external organisations at a cost

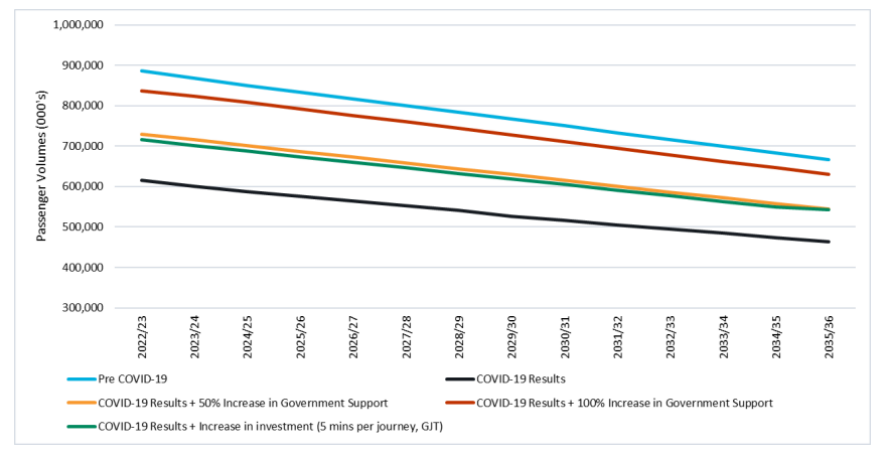
- Demographics
- Public funding
- Wider economy i.e. GDP

INPUTS

URBAN TRANSPORT GROUP

- Patronage
- Operator behaviour
- Fares
- Mileage
- Public funding

OUTPUTS



Source: Continuing COVID Funding Support for Urban Public Transport "Figure A.4 Prepared by Steer with outputs from the UTG – Metropolitan Bus Model, 2022."

Regional transport model

Advantages

- Good to high-level network coverage and representation of district / region
- Can provide localised demand forecasts
- Testing for demand model convergence (between the demand and the assignment) is straightforward

Disadvantages

- Can have a lot of 'noise'
- Some modes i.e. park and ride may be difficult to represent
- Level of detail of network across the whole model may differ
- Calibration could be complex

Accessibility and application

- Most models are accessible at a cost
- Suggest to commissioning the analyses to consultancies

Moderate to high expense to develop

1-2 years to develop and implement

Example: PRISM, West Midlands

- Coverage area: 7 Metropolitan districts of the West Midlands
- Separate highway and Public Transport (PT) assignment models linked together with a demand model.
- Simple functionality can be added and updated in the model.
- Mode share data available as an output.

INPUTS

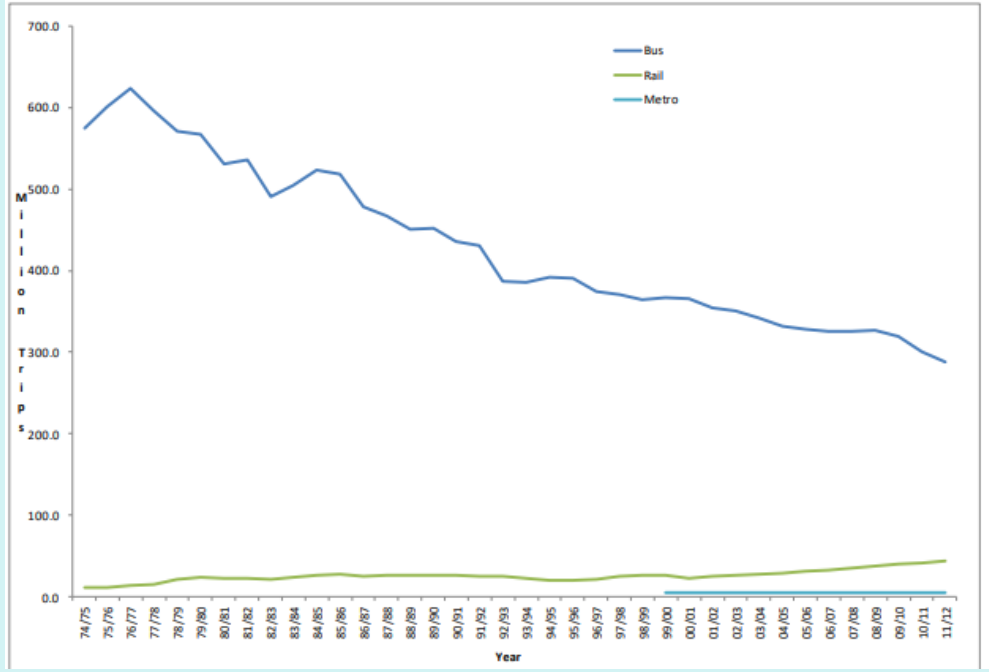
- Base year matrices
- PT fares
- Demographics
- Planning data targets

OUTPUTS

- Vehicle kilometrage
- Delays (journey time/speeds)
- Trips
- Mode share

Below: Example of demand trend output from the model

Figure 4.1: Annual West Midlands Public Transport Demand Trends (Million trips per annum)



Agent Based Model

Advantages

- More detailed modelling of traveller behaviour at the individual level
- More detailed representation of interventions on decision making, including equity
- Can assess mode shift across different modes
- Can assess new technologies including autonomous vehicles and MaaS
- Can be used for areas without buses in the baseline year
- Modular development – early insights developing over time

Disadvantages

- Emerging guidance within TAG that sets out how ABM models should be developed
- Not suitable for Green Book business cases
- Can require significant additional data

Accessibility and application

- Limited access via the developer
- Requires knowledge of ABMs and technical skills of big data analyses.
- Suggest to commissioning the analyses to consultancies

Cost varies but typically more expensive

<6 months to develop and implement

Example: Suffolk ABM (Arup)

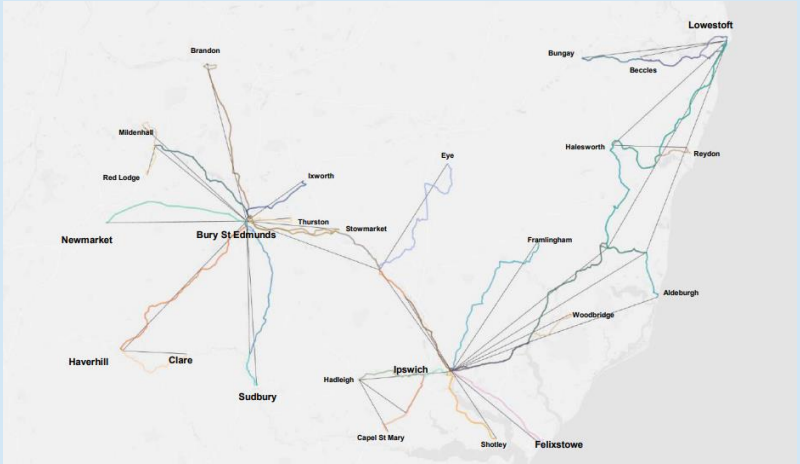
INPUTS

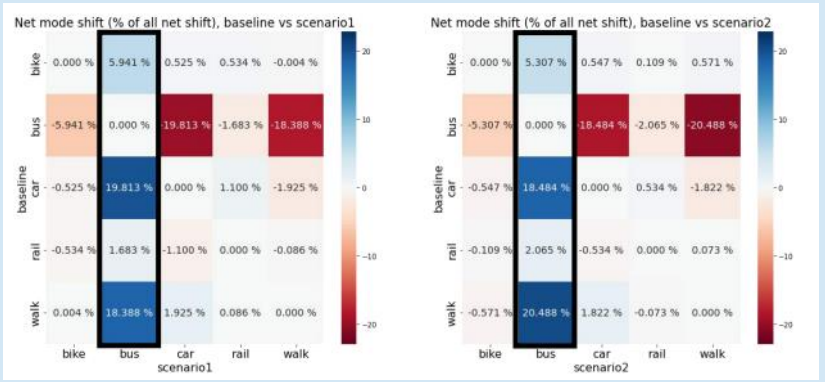
- Network data
- PT schedule (GTFS)
- Activities / agent assumptions

OUTPUTS

- Mode share / shift
- Bus ridership
- Trip purposes
- Demographics

Bus strategy scenario design





Example tabular output

Q & A

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Monitoring performance

Monitoring performance

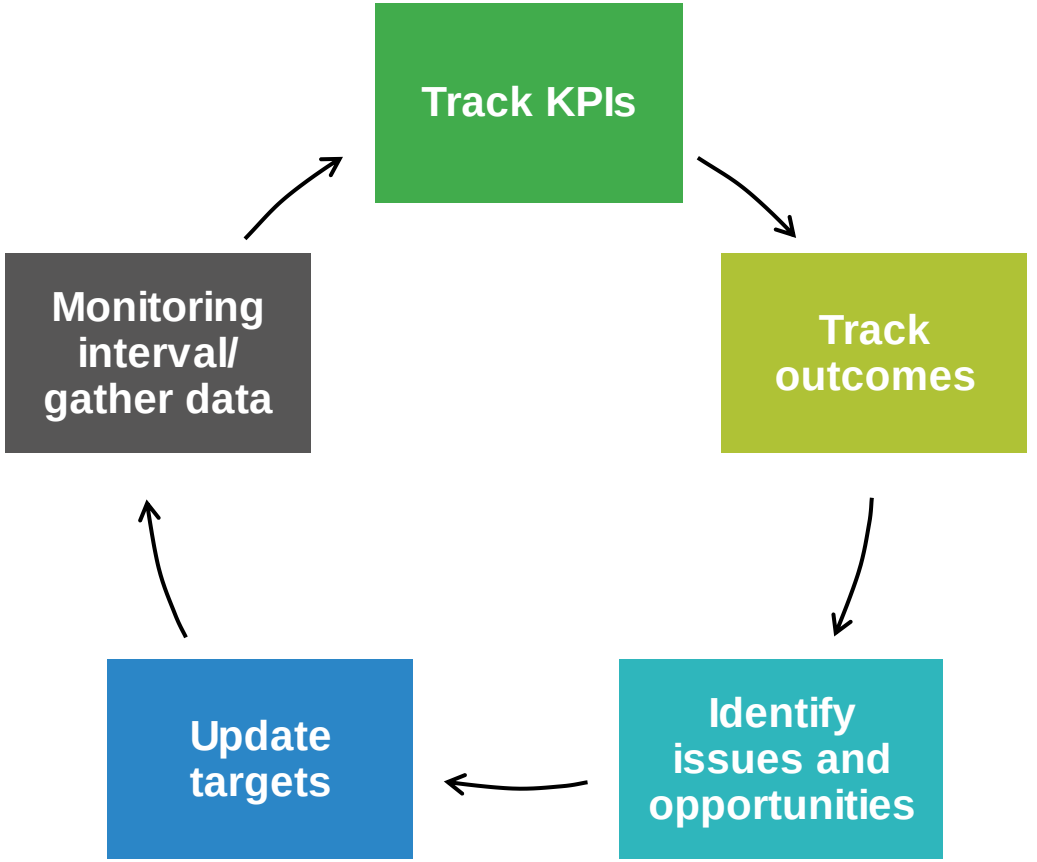
Overview

Monitoring seeks to check progress against KPIs and can be defined as the formal reporting and evidencing that schemes are successfully delivered, milestones met and changes in outcomes tracked over time.

Monitoring is a multifaceted activity and includes:

- **Gathering of data** over set monitoring periods
- **Tracking of KPIs** – using this data to track Patronage, Punctuality and Passenger Satisfaction over time
- **Tracking outcomes** – identifying what has worked, what has improved, and perhaps what has not delivered a positive outcome over time
- Identifying where there are **issues and opportunities** in the delivery of a scheme that can be actioned to better meet the desired outcomes
- **Updating KPI targets** to align to new objectives

Monitoring Process



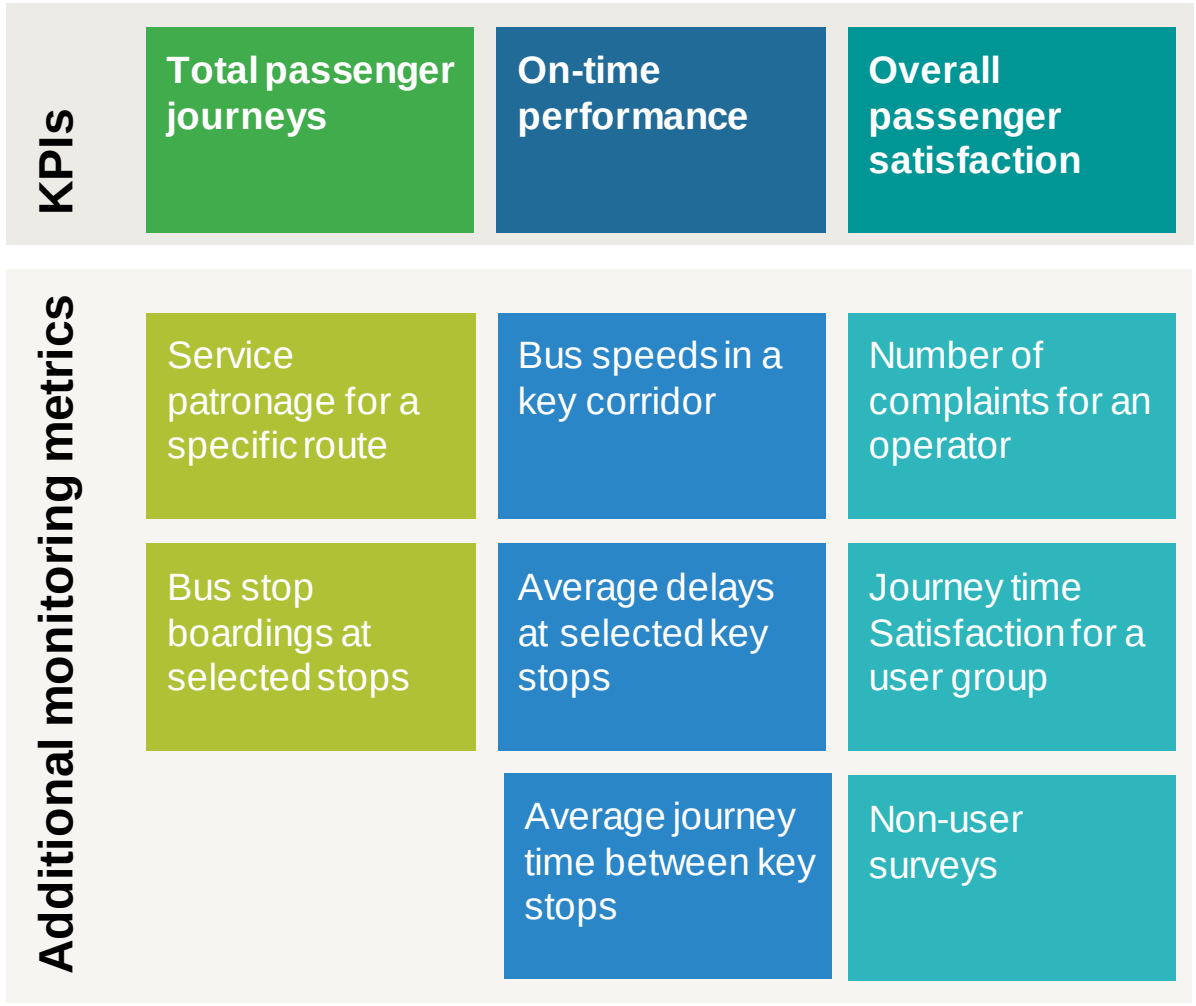
Monitoring performance

Performance indicators

After setting objectives, determining KPIs and then gathering data, the monitoring stage can begin.

Monitoring of KPIs should take place annually to align with when patronage and passenger satisfaction data is released

Monitoring should include additional performance metrics that can help **isolate local impacts**. If a high-level objective is to focus on growing the user base, additional data such as non-user surveys, and individual service patronage may be useful in identifying potential barriers to growth.



Monitoring performance

The process

What are the objectives?

- These are determined before selecting KPIs
- Need to identify more 'local' objectives ie. increase patronage in suburban areas by 10%

What is the geographical scale of monitoring?

- KPI monitoring is done at the LA level
- Identifying specific issues may require looking into specific areas or bus services

What additional data do I need?

- Do I need to collect additional data to answer key question?
- Does my LA have other data I can use?

What does the data tell me?

- Existing issues
- Opportunity areas
- Forecast future outcomes

Develop improvement scheme

Evaluate Scheme

Set new objectives

Evaluation

Evaluation process

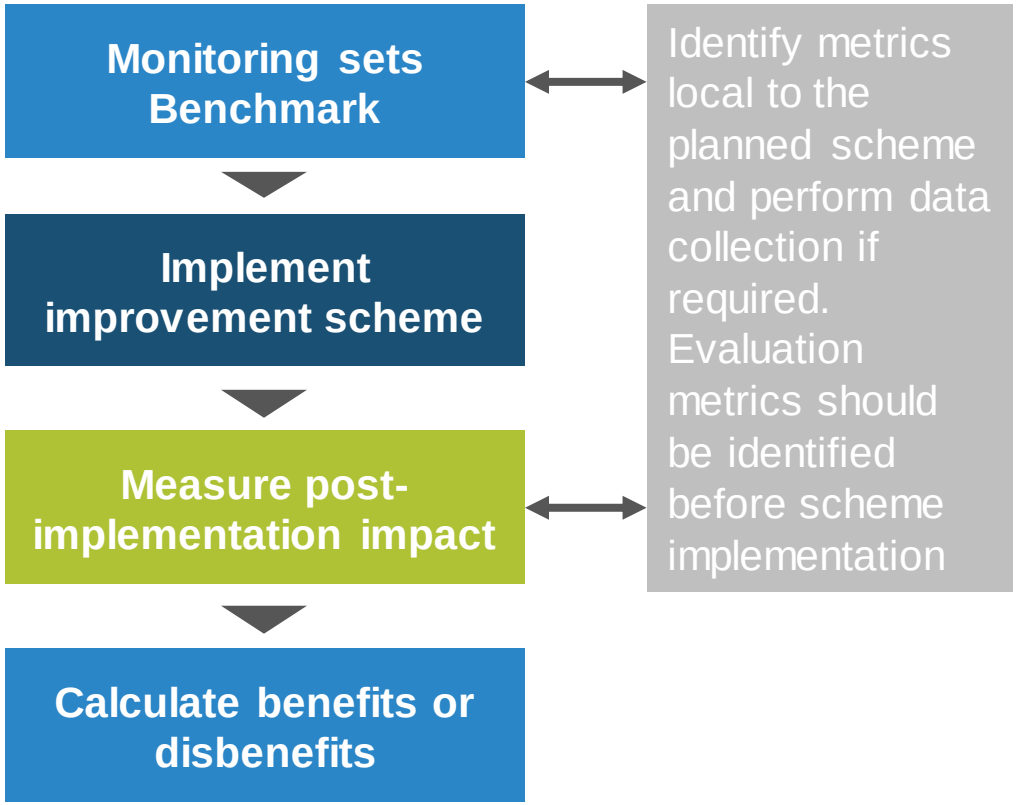
Overview

- Evaluation is the assessment of the effectiveness and efficiency of the intervention after implementation.

- It is used to measure the outcomes and impacts of the intervention to test whether the benefits have been realised and if any unanticipated impacts have occurred.

A risk is that:

- The change in key indicators may be very small compared to the baseline, resulting in an inability to identify significant changes
- Evaluation must therefore take into account the local impact during, pre-, and post-implementation



Why is evaluation important?

SMART objectives to ensure goals are obtainable

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The TAGE Unit E-1 evaluation outlines best practice evaluation methods – in conjunction with the Treasury's Magenta Book.

Improve the service

Mystery traveller & customer satisfaction surveys measure journey aspects such as the ease of boarding and smoothness of ride.

Monitor targets

Evaluating the performance of bus routes against established targets, taking action with operators where operational difficulties lead to delays.

Help set future goals

Evaluating performance will help LTAs / operators to set goals and make changes in order to improve their programmes accordingly

Direct contact with passengers

For examples TfL's London Buses Customer Services department responds to thousands of service suggestions and complaints from passengers every week. The details of all complaints are recorded and actioned.

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Next steps

Completed

Toolkit

Webinar

Coming Up

Technical note & FAQ document

Support Package materials made available online

Please send any additional questions to ariana.ragusa@mottmac.com by COB 7th April 2023