

# Transport Performance and the Data Clubs Approach

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# Presentation structure

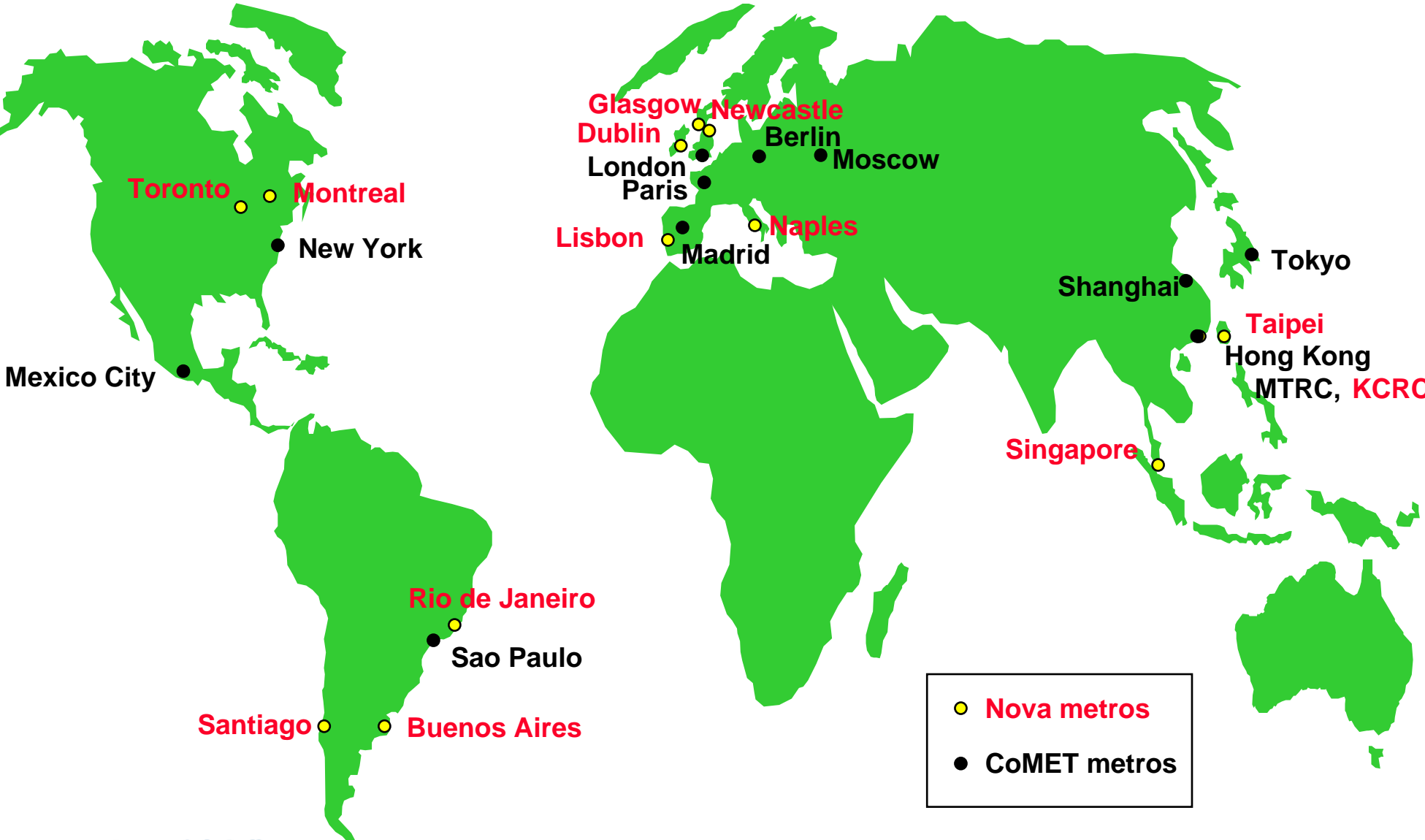
- Introduction and history of public transport benchmarking
- The CoMET, Nova and Bus Benchmarking methodology and framework
- Key Performance Indicators – development and use
- Keys to successful benchmarking

# Imperial College London Benchmarking

## History of benchmarking at Imperial College London

- 1982 - Hamburg/London productivity comparisons
- 1994 - Group of Five heavy metros formed
- 1996 - Community of Metros (CoMET) founded
- 1998 - Success of CoMET leads to formation of Nova Group  
for small to medium-sized metros (now in eighth annual phase)
- 2000 - National railway benchmarking (Germany, Italy, Spain)
- 2003 – UK Strategic Rail Authority Benchmarking
- 2004 - Bus Benchmarking group formed Phase 1: August 2004 – July 2005
- 2005 - Bus Benchmarking group Phase 2: July 2005 -

# Which metros participate in Nova & CoMET ?



## Clear purpose of benchmarking groups has led to their success

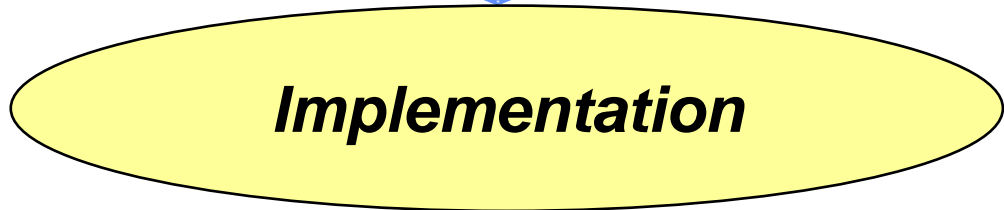
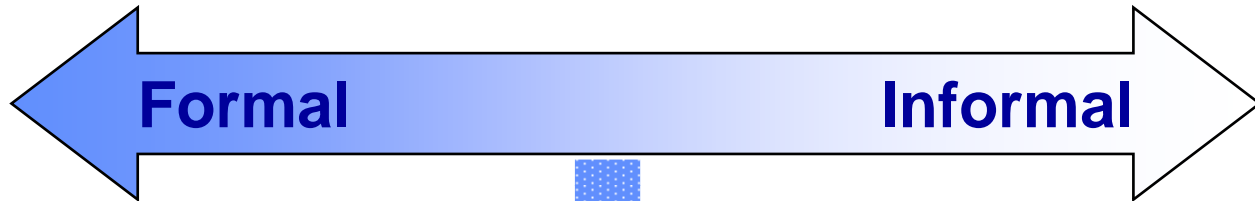
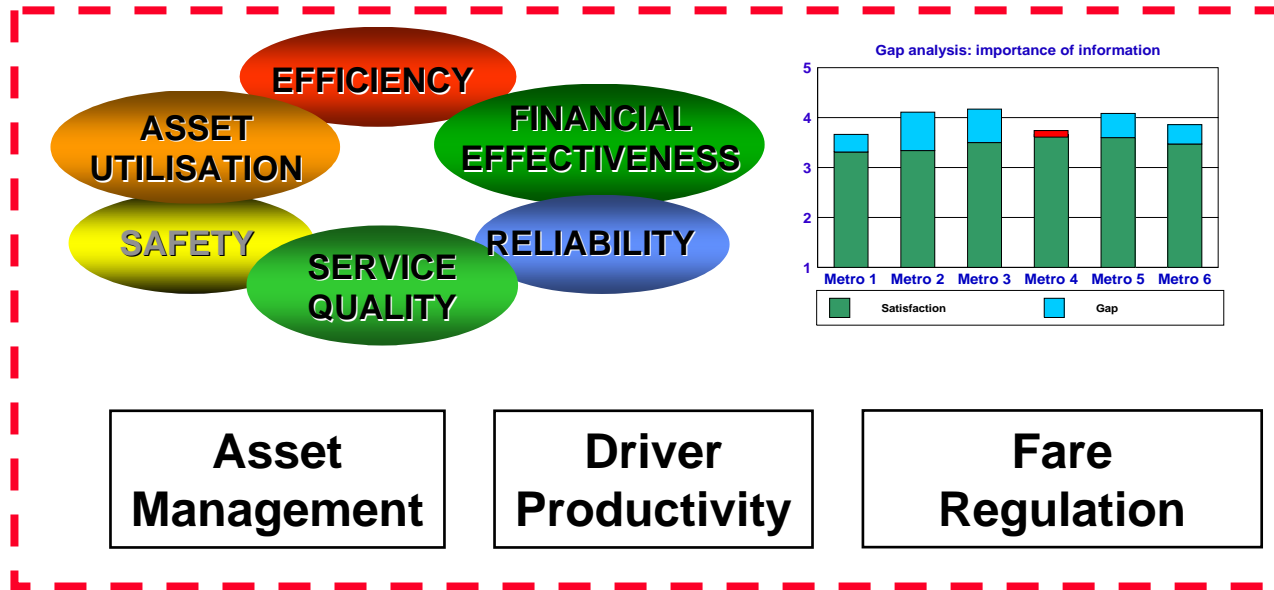
- **Benchmarking is not merely a comparison of data or creation of league tables**
- **Essential to deliver benefits to all participants**
  - A forum to share experiences and exchange information
  - **Stimulates productive questions / identifies lines of inquiry**
  - Identifies best practices in operations and management
  - Focus is on implementable results, performance improvement and strategy
  - Information to support dialogue with government, regulators and other stakeholders.

# Outline of the benchmarking process

- Benchmarking group owned and run by the participants
- Project Management, administration and analysis carried out by Imperial College London
- Annual cycle - long term approach to benchmarking
- President of group rotated on an annual basis
- Confidentiality agreement to allow full data and information exchange within the group but not externally – overcomes political sensitivity
- Complementary to and supported by industry organisations

# How does the benchmarking process work ?

- Key Performance Indicators
- Case studies
- Expert groups
- Networking
- Best Practice



# A system of Metro Key Performance Indicators was developed, covering ALL dimensions of “success”

## Background

- B1 Network Size and Passenger Volumes**
- B2 Operated Capacity km and Passenger Journeys**
- B3 Car km and Network Route km**

## Asset Utilisation

- A1 Capacity km / Route km**
- A2 Passenger km / Capacity km**
- a3 Passenger journeys / Station
- a4 Proportion of cars used in Peak Hour

## Reliability / Service Quality

- R1 Revenue operating car km between incidents**
- R2 Car hours between incidents**
- R3 Car hours / hour train delay**
- r4 Passenger hours delay / passenger Journeys
- r6 Passenger journeys on time / Total passenger journeys
- r7 Trains on time / Total trains

## Efficiency

- E1 Passenger Journeys / Total Staff + Contractor hours**
- E2 Revenue Car km / Total Staff + Contractor hours**
- e3 Revenue Capacity km / Total Staff + Contractor hours
- e4 Number of Scheduled Trains / Year / Driver

## Financial

- F1 Total Commercial Revenue / Operating Cost**
- F2 Total Cost / Car km**
- F3 Service Operations Cost & Staff hours / Car km**
- F4 Maintenance Cost & Staff hours / Car km**
- F5 Administrative cost & Staff hours / Car km**
- F6 Investment cost / Car km**
- f7 Total Cost / Passenger Journey
- f8 Operations Cost / Passenger Journey
- f9 Fare Revenue / Passenger Journey
- f10 Average Operating Cost / Station

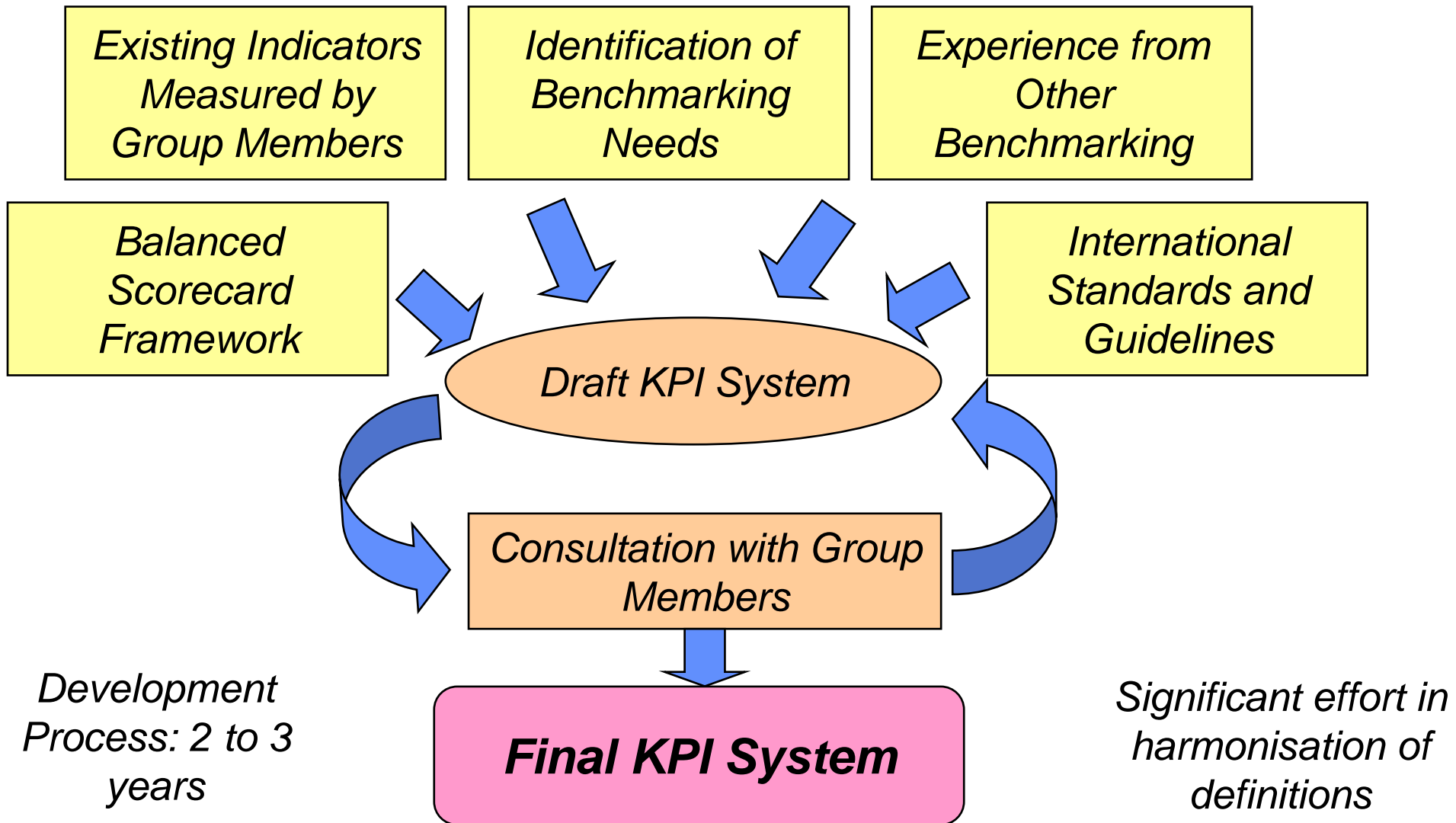
## Safety

- S1 Total Fatalities / Total Passenger Journeys**
- s2 Suicides / Total Passenger Journeys
- s3 Medical Conditions / Total Passenger Journeys
- s4 Illegal Activity / Total Passenger Journeys
- s5 Accidents / Total Passenger Journeys



# Bus Benchmarking KPI development process

## - Long term approach to benchmarking



# Principles of KPI systems

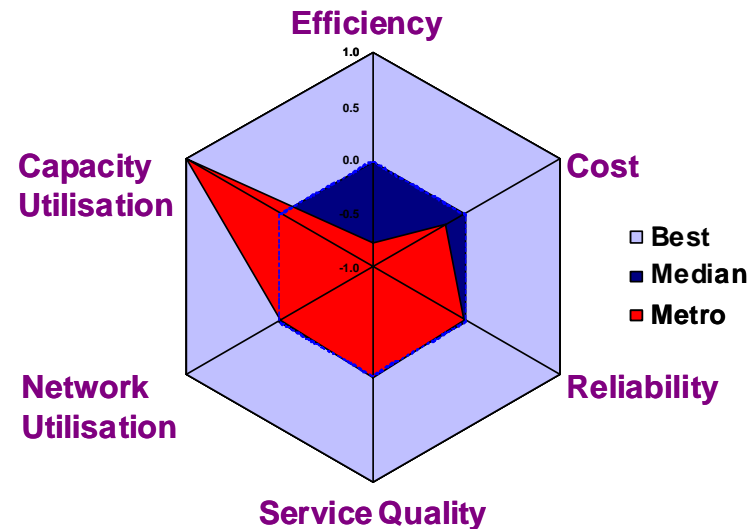
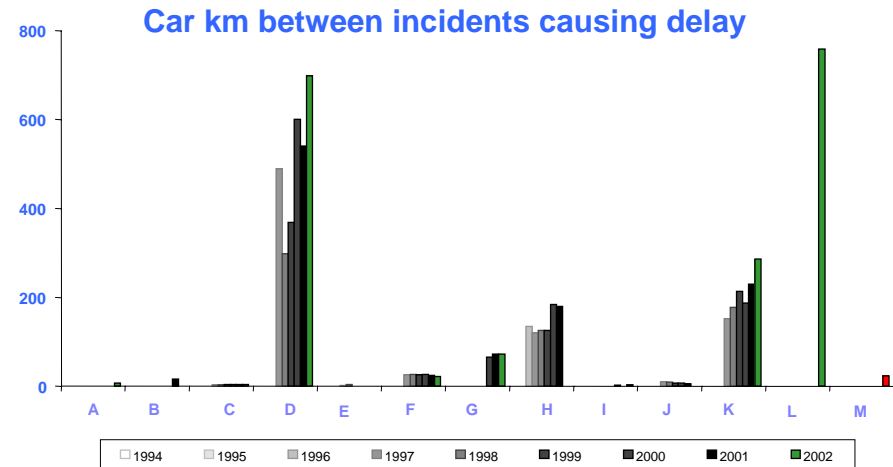
- Comprehensive and yet concise.
- Internally consistent.
- Externally relevant for benchmarking purposes.
- Statistically reliable, with appropriate and reliable tolerance.
- Based on identified data sources.
- Well-structured, with the flexibility for change and evolution over time.
- Benefits of measurement greater than costs.

# Purpose and use of KPI comparisons

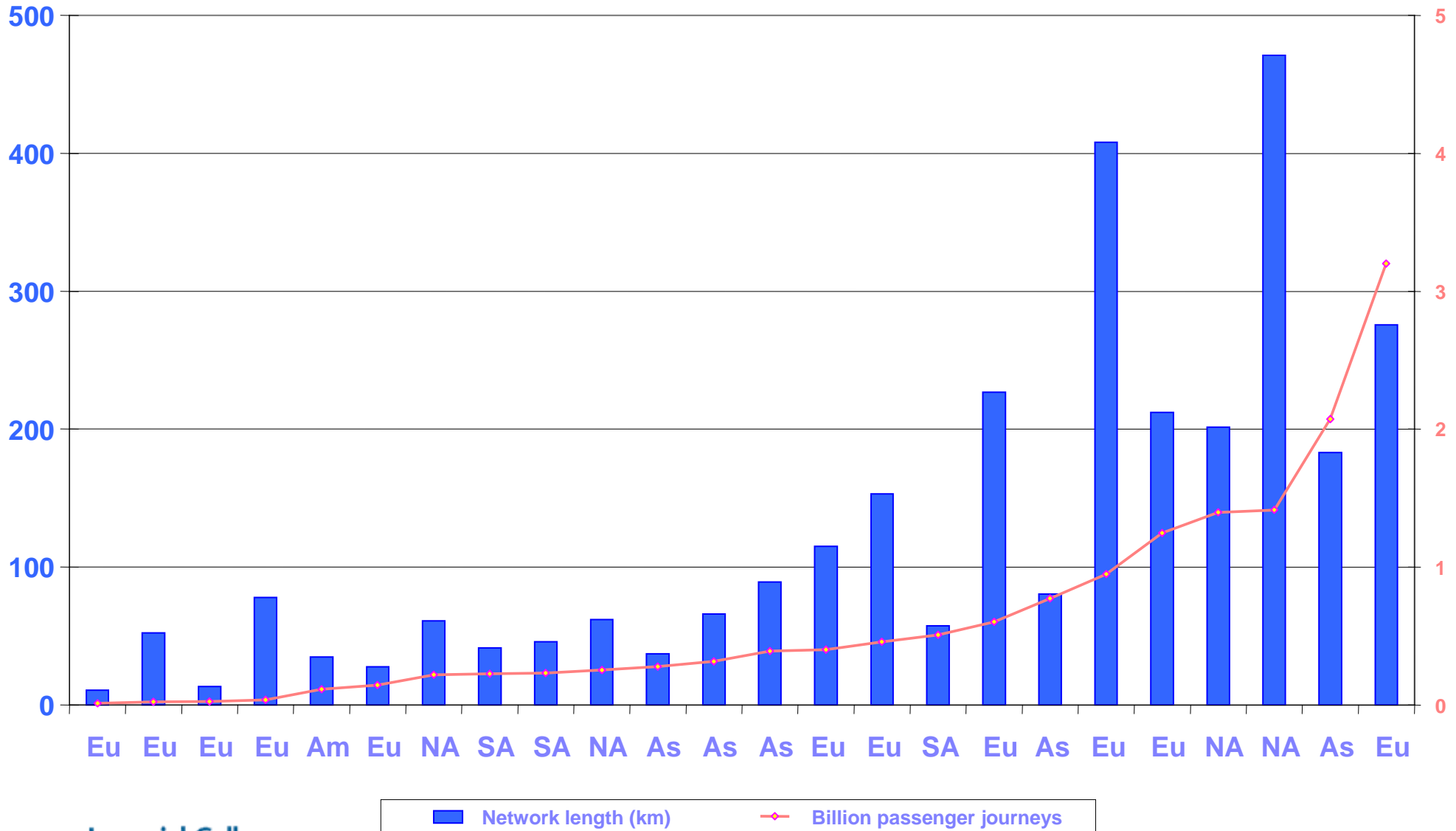
- Structured KPI comparisons, used for:
  - Direct comparisons – better understand differences between operators
  - Internal motivation – set targets for improvement
  - Identifying high priority problems
  - External use with stakeholders (when anonymised)
  
- Lead to question why performance is high, low or improving ...
  - Stimulates productive questions / identifies lines of inquiry
  - Value in time-series database – monitoring performance over time
  - Supporting the pursuit of best practices

# Use and Analysis of KPI Data

- Need to understand exogenous effects on performance and limitations of direct comparisons
- KPIs can be normalised to counter for external influences (e.g. wages, traffic speeds, etc)
- Statistical analyses can be used to provide a greater understanding of results:
  - Regression analysis
  - Non-Parametric – e.g. Data Envelopment Analysis (DEA)

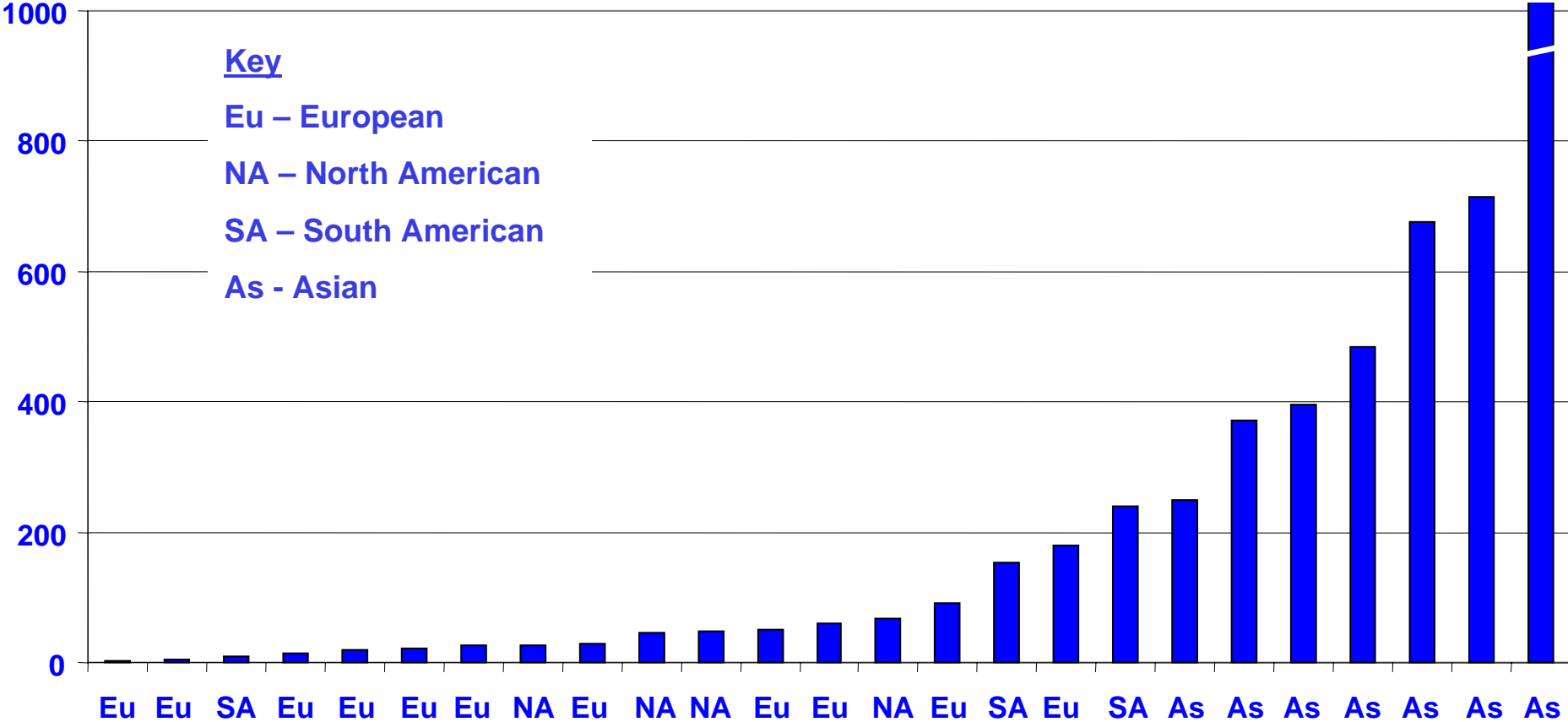


The different sizes of the metros means some form of “normalisation” is required. E.g. - output per passenger journey, or “car kilometre”



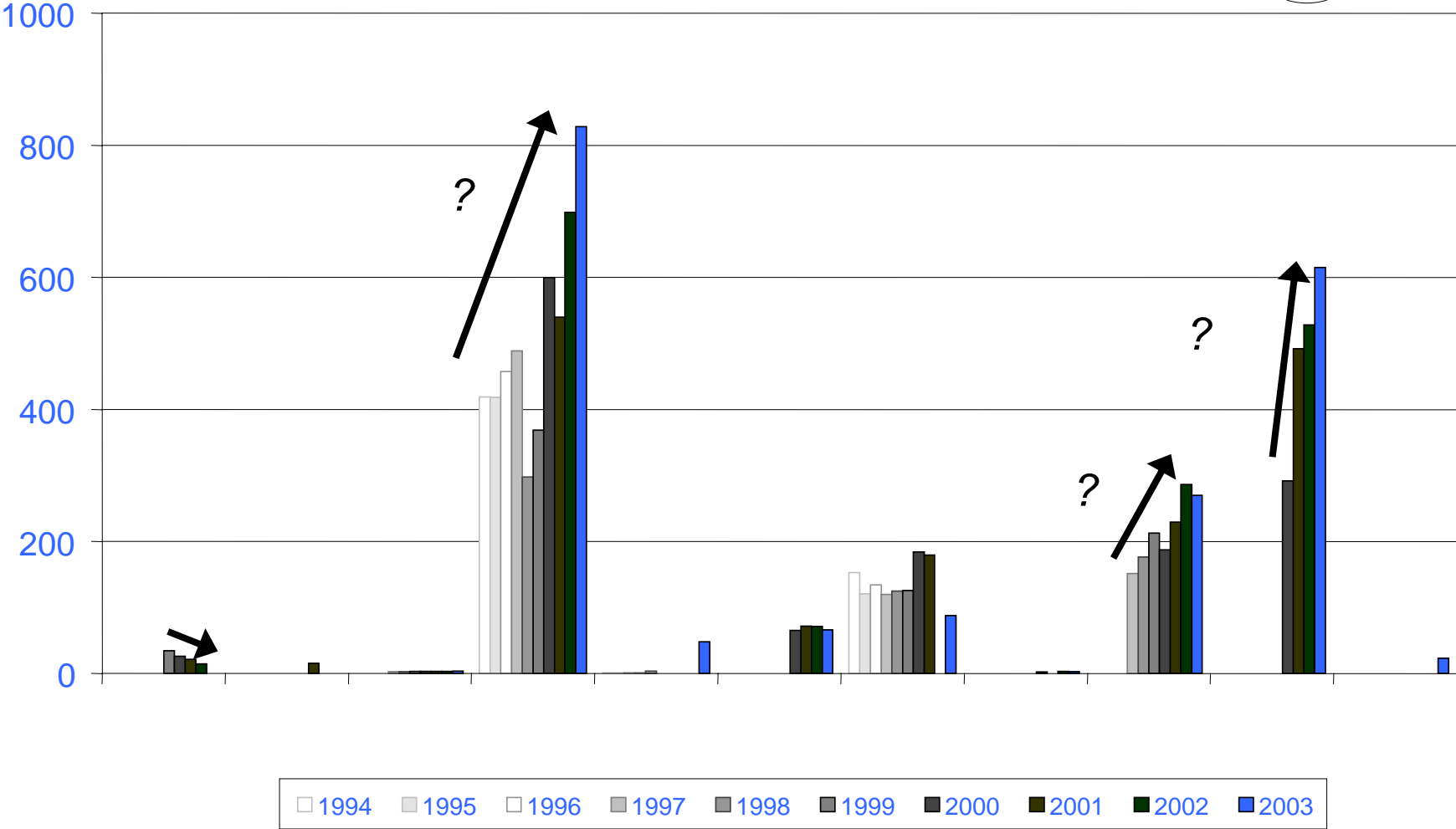
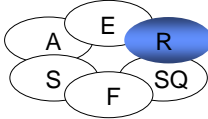
# Metro KPI reliability indicator: high variations

Car km (thousands) between incidents causing a delay of 5 minutes or more (2004)



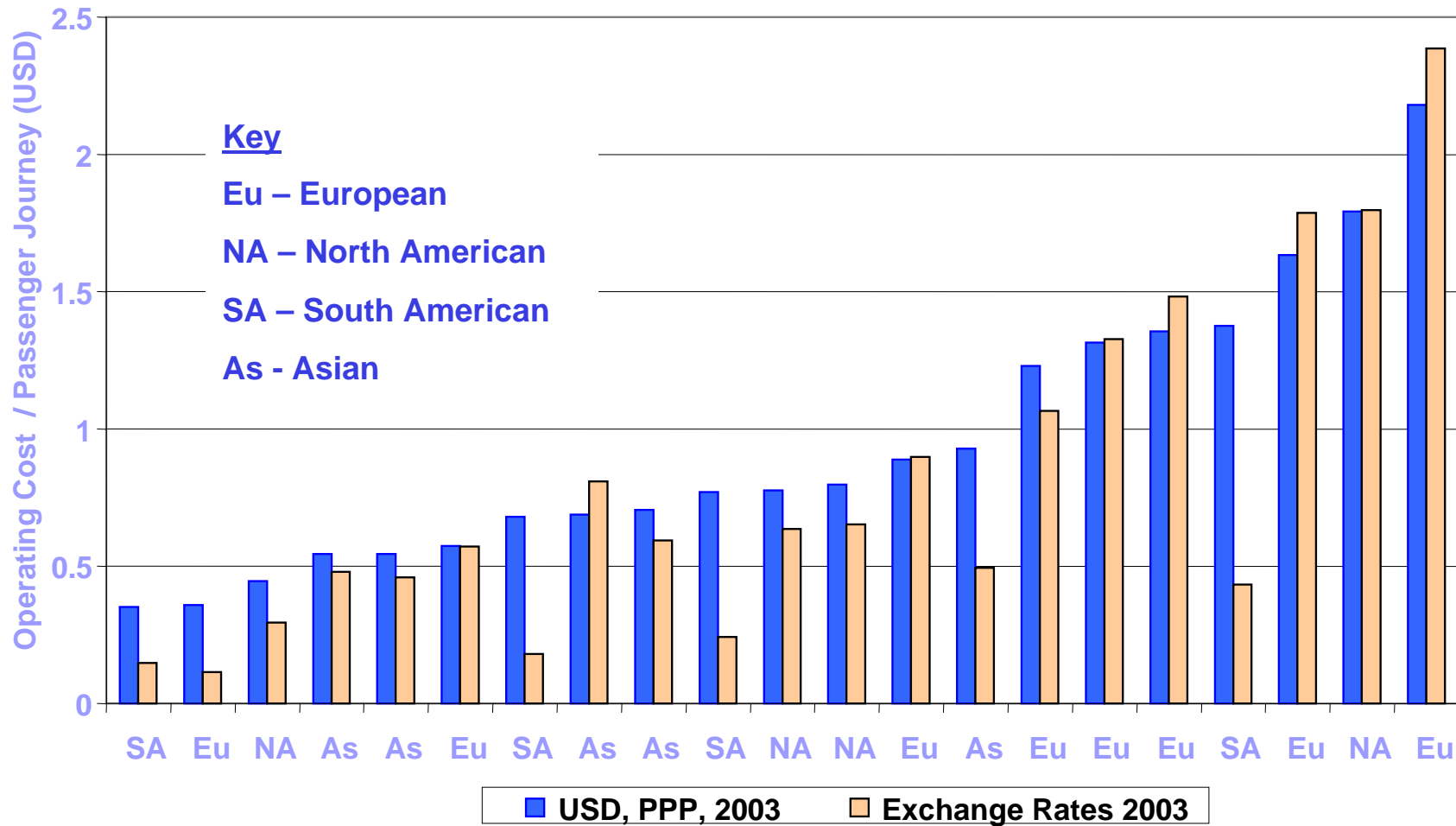
# Time series data allows for trends to be identified – who is implementing good practices and what improvement is relatively achievable?

Car km ('000) between incidents causing delay (5 mins)



# Use of Purchasing Power Parity for comparison of international financial data eliminates market exchange rate volatility

Operating Cost / Passenger Journey (2003)





# Benefits from Benchmarking Case Studies (Metros)

- Driver Productivity improvements by Singapore SMRT
  - Reorganisation of drivers' shifts 10% saved so far
- Station Management rationalisation by Hong Kong MTR
  - 12% reduction in station staff in 2001
- Controlling Fare Evasion in Montreal
  - used to justify penalty fares to local media
- Line capacity study
  - Station stop times improved, 6% increase in capacity on Victoria Line
- Metros use with government
  - London Underground to justify performance to the Mayor of London
  - Hong Kong MTR to argue for fare autonomy (2000, 2004)

# A successful approach to benchmarking: setting expectations

- One-off benchmarking studies are rarely successful
- Long-term annual process helps achieve comparability, confidence and tangible benefits
- Achieving full comparability (KPIs) will take time
- Necessary to provide value to all participants
- Benchmarking has its limits

# A successful approach to benchmarking

- The user steers the process
- Focus on implementable results
- Identify best practice / provide insights which add value
- Not overly theoretical
- Achieve confidence in comparability
- Confidentiality agreement
- Active involvement from members with supportive information and systems / Supported and understood by top-level management
- Indicators used to stimulate productive questions and identify lines of enquiry

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