EXPERT LEVEL TRAINING ON TELECOM NETWORK COST MODELLING FOR THE HIPSSA REGIONS

Banjul

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Session 7 – Approaches to cost modelling and their regulatory function

Agenda

Aims and objectives for this session

- Identifying types of cost models
- Understanding cost modelling approaches
- Knowing when to apply them
- Effective regulation

Identifying and understanding different types of cost model

Four basic types of cost model

BRAINSTORM

- What does each term mean?
- What are the 2-3 key features of each?
- How would you go about constructing each model?

Top-down

Bottom-up

Hybrid

Benchmarks

Top-down cost model

Top Down Models Characteristics

- PURPOSE: derive cost estimates from accounting data provided by incumbent
- Often confidential company data
- Based on existing network, potential inefficiencies
- Embedded historical cost
- Critical issues
  - exact separation between core and access network
  - depreciation period
  - rate of return
  - Valuation of assets
- Real World Data (no assumptions)

Source: RTR

Top down model flowchart

Step 1: Take costs from GL and determine relevant costs

Step 2: Group costs into Homogeneous Cost Categories

Step 3: Group relevant costs into network elements and common costs

Step 4: Revalue fixed assets on a current cost basis

Step 5: Calculate CCA depreciation

Step 6: Construct Cost-Volume Relationships

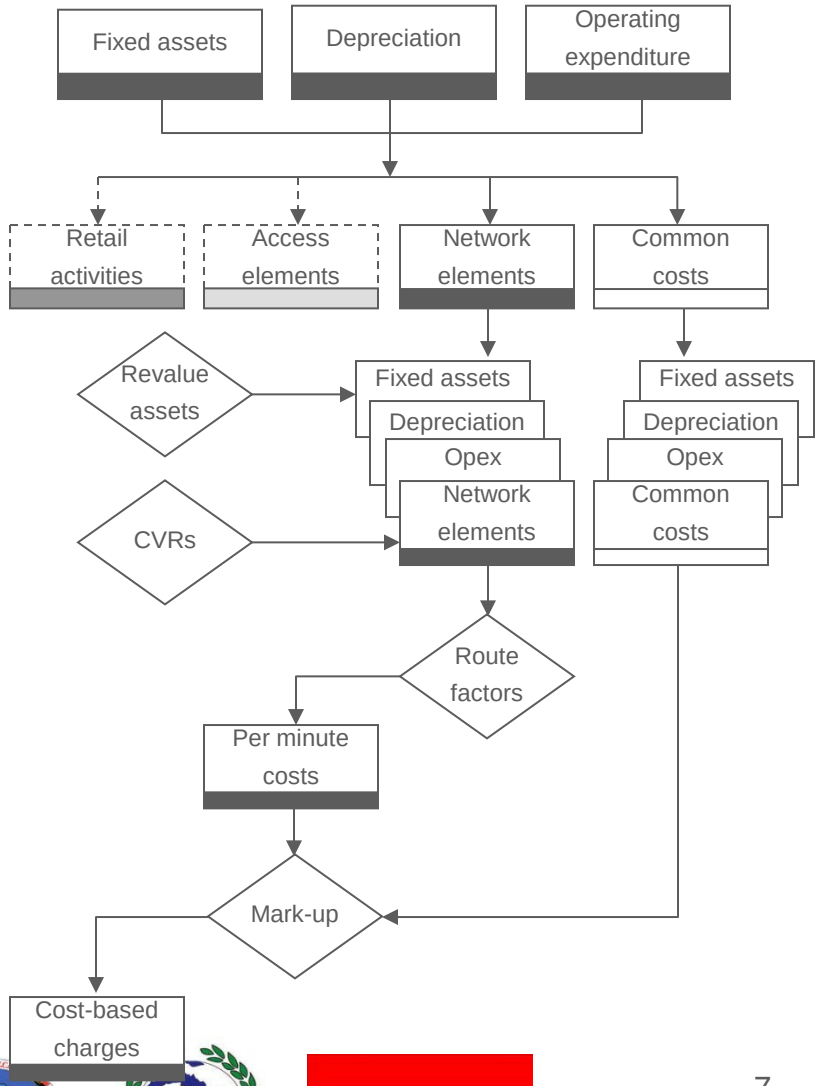
Step 7: Group operating expenditure, depreciation and NBV of fixed assets by network element. Convert to annual costs

Step 8: Divide network elements by minutes of traffic using route factors

Step 9: Bundle network element minutes into standard interconnection service

Step 10: Apply mark-up to recover common costs

Step 11: Calculate charges



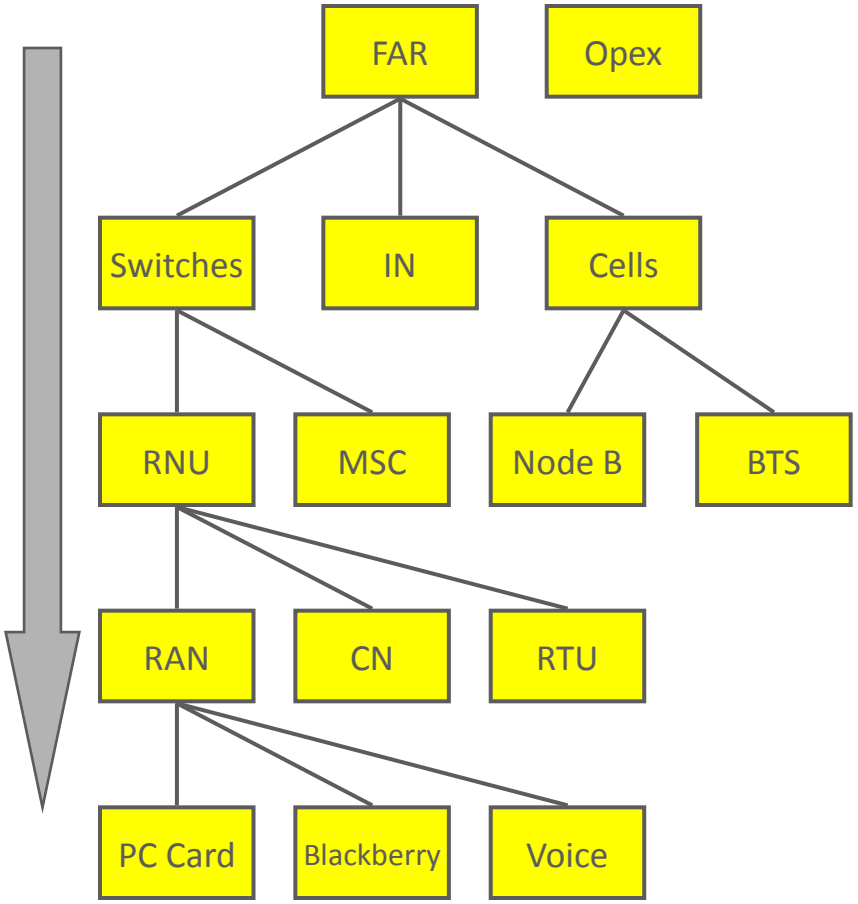
Pros and cons of top-down models

Advantages

- Takes General Ledger as the starting point, which provides a real basis for reconciliation.
- In turn, this encourages *buy-in*; often essential for a successful project.
- Asset Values can use any relevant methodology from NBV to GRC.
- Uses "Real" sales traffic.

Disadvantages

- Value of the Network Assets may not represent the economic value.
- Depends very much on the quality of the Fixed Asset Register (FAR)



Top-down models in telecommunications

- Top-down models have to be built from the base accounting data of the network operator
- Close co-operation from the operator is essential
- Almost always the model is constructed by the operator
- Regulatory control of the process involves:
  - Establishing clear cost allocation guidelines
  - Requiring the model to be updated and submitted to the regulator annually
  - Ensuring that the final model is independently audited for consistency with the guidelines and accuracy of the data.

Typical cost allocation guidelines

- Establish required services to be costed
- Identify main cost pools (e.g. Network, Retail, Common)
- Establish any costs that should be excluded
- Describe allocation keys for assets and operating expenditure to be used where direct allocation is not possible
  - e.g. Staff, Buildings, Vehicles, Software
- Cost of capital
- Routing tables – for converting cost pools (by equipment) onto cost pools (by services).

Bottom-up cost models

Bottom Up Model Characteristics

- PURPOSE: To estimate the infrastructure investments of an efficient network from an engineering type model.
- Analytical model to determine an abstract state-of-the-art network with an optimal network topology.
- Different degrees of freedom possible:
  - Scorched node approach:
    geographical location of high level network elements and main distribution frame/base station sites are given.
  - Scorched earth approach:
    all locations optimised.

Source: RTR

Bottom up model flowchart

Step 1: Establish network design

Step 2: Identify and determine capital cost of network elements

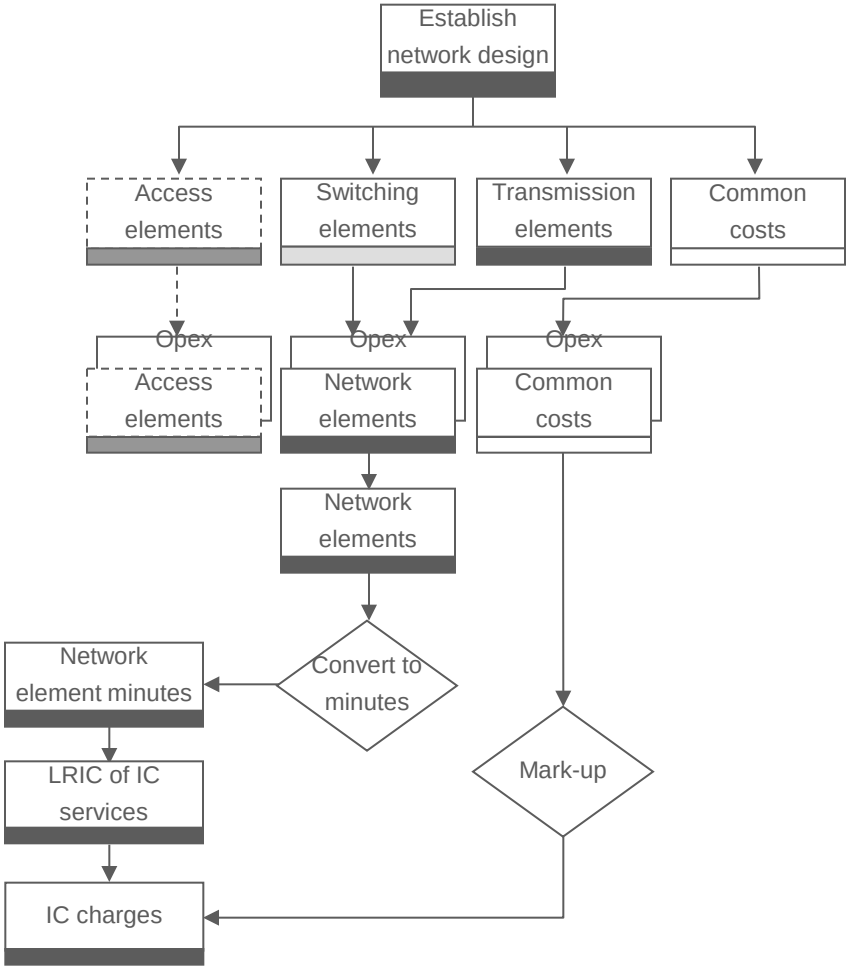
Step 3: Calculate operating expenditure

Step 4: Combine capital and operating costs into an annual costs per network element

Step 5: Divide network elements by minutes of traffic

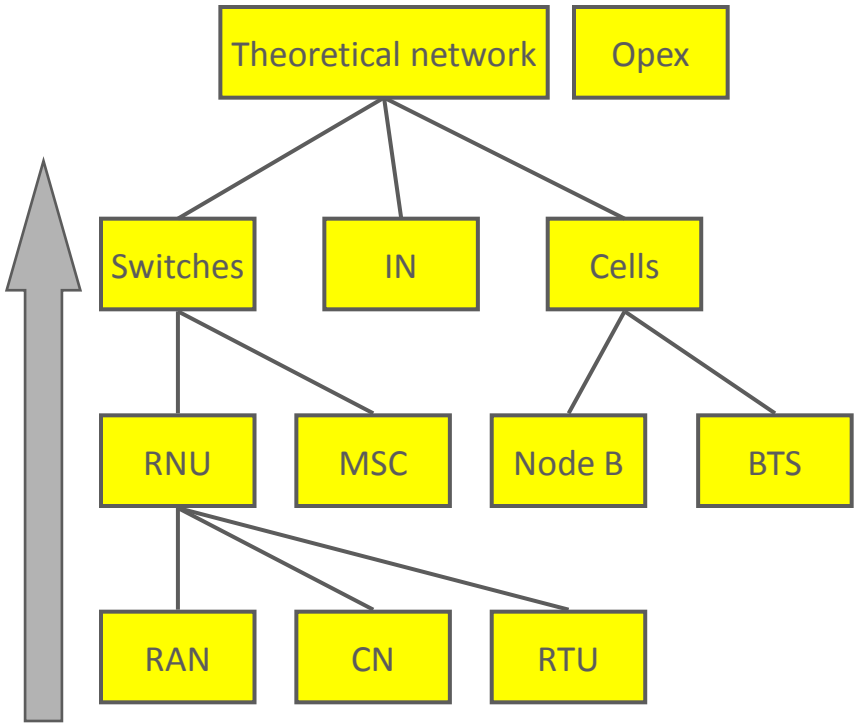
Step 6: Bundle network element minutes to calculate LRIC of each interconnect service

Step 7: Mark-up to set interconnect charge



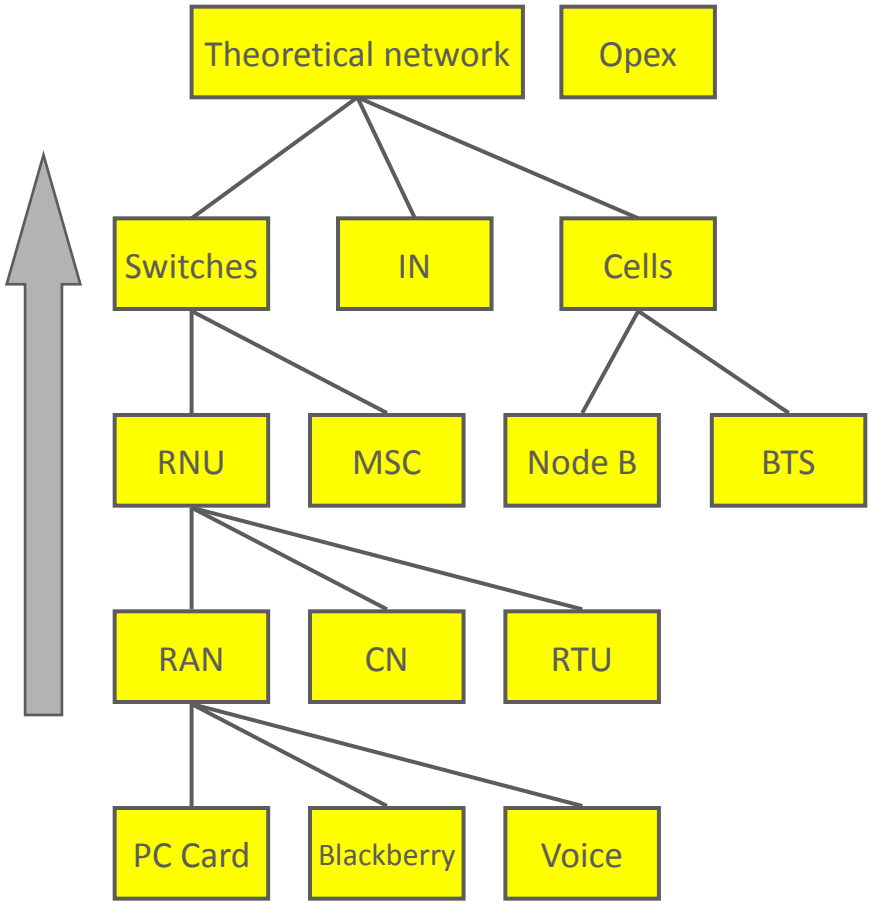
Pros and cons of bottom-up models

- **Advantages**
  - Often preferred by regulator, who also allows Weighted Average Cost of Capital (WACC) = Interest on investment.
  - Useful if there are doubts about the existing infrastructure
- **Disadvantages**
  - Harder to compare to the real organisation.
  - Far more complex to implement than Top Down.
  - Uses Traffic estimates.
  - Results DO NOT agree with any other financial analysis.



Pros and cons of bottom-up models (2)

- Bottom Up approach assumes we start with nothing and rebuild the network from scratch.
- "Scorched Node" Replace existing assets with Modern Equivalent Assets (MEA).
  - Advantages
    - Can use real sales data
    - Can use existing network structure
  - Disadvantages
    - Might not be suitable for very old fixed networks
- "Scorched Earth" assume a green field optimal network, with MEA.
  - Advantages
    - Useful for comparing different operators.
  - Disadvantages
    - Difficult to do
    - Results are easy to challenge as it relies on so many assumptions.

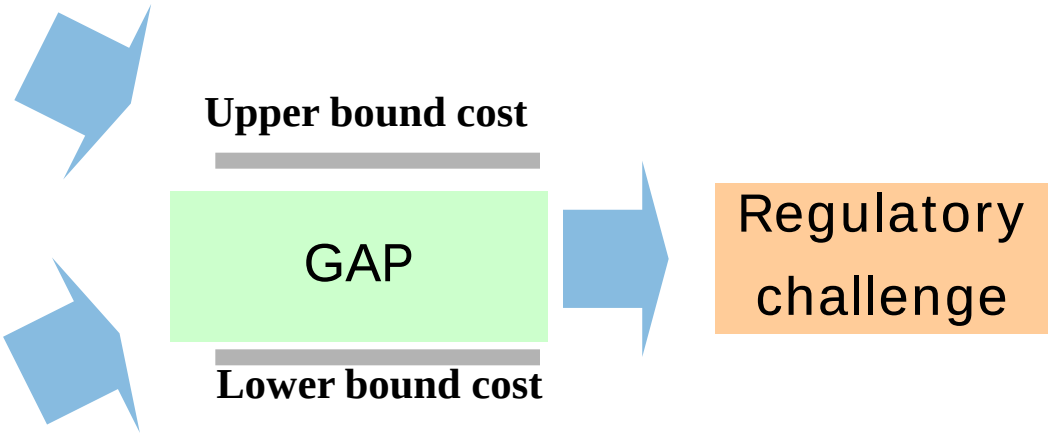


Gap between top down and bottom up results.

Range of costing approaches

Top down

- Uses existing historic cost accounting data



Bottom up

- Investment cost calculated by a theoretical model

Source: RTR

Closing the Gap – Hybrid models

- Hybrid models seek to close the gap between top-down and bottom-up results
- They can start at either end, adding functionality from the other side:
- Start from top-down:
  - Revalue assets on a modern equivalent assets (MEA) basis
  - Recalculate depreciation on an economic basis (or proxy for economic depreciation)
- Start from bottom-up:
  - Calibrate total network investment and direct operating expenditure from accounting data
  - Derive mark-ups for common costs from actual opex

Overview of three cost model types

Top-down models

Good at:

- Accurately capturing total historical costs

Poor at:

- Transparency
- Dis-aggregation
- Efficiency

Bottom-up models

Good at:

- Transparency
- Efficiency
- Future projections

Poor at:

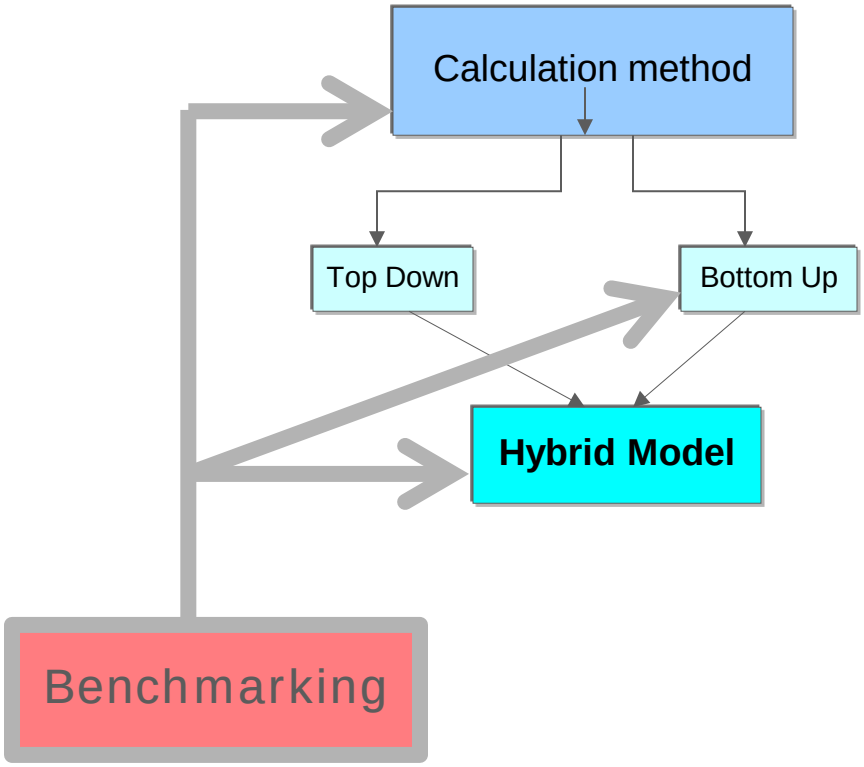
- Ensuring cost recovery
- Estimating opex

Hybrid models

Combine good points of each approach:

- Accurately capturing total costs (with efficiency adjustments)
- Transparency
- Future projections

Where does benchmarking fit in?



There are many levels at which benchmarking can contribute to regulatory pricing:

- Total calculation – no need to model
- To test or provide input data for BU Model
- To provide data for a Hybrid Model
- To test other data and calculations

Benchmarking as a tool in cost modelling

Benchmarking is often used to:

- **verify data in top-down models**
- **supply input assumptions in bottom-up models**

- Top down modelling
  - Cost allocation rules
  - Routing factors
  - Efficiency adjustments (hybrid)
- Bottom up modelling
  - Unit asset prices, price trends and asset lives
  - Installation and operating expenditure
  - WACC
  - Mark-ups

Benchmarking as a proxy cost model

Benchmarking can also be used as a proxy cost model:

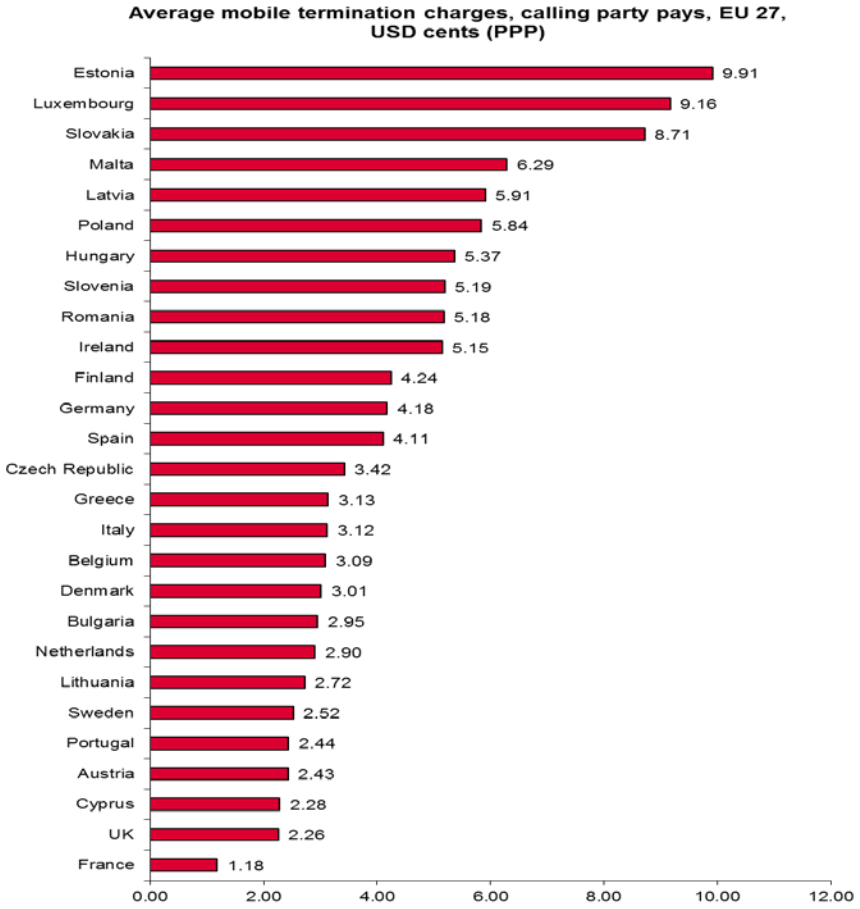
- **As an alternative to other methods**
- **To cross-check results obtained from other methods**

- Establishes an estimate of cost-based prices by comparison of similar service prices in other countries
- Choosing the benchmark set is critical
  - consider the comparability with the home country
  - make sure that the charges being compared are themselves cost-based

The pros and cons of benchmarking

- Advantages
  - can be implemented quickly and with minimal development cost
  - compares to actual practice
  - useful for setting initial costs and to check the output of models
- Disadvantages
  - difficult to take into account the variations in operating conditions of the other countries
  - choice of the benchmark set is often contentious
  - does not directly examine local cost considerations

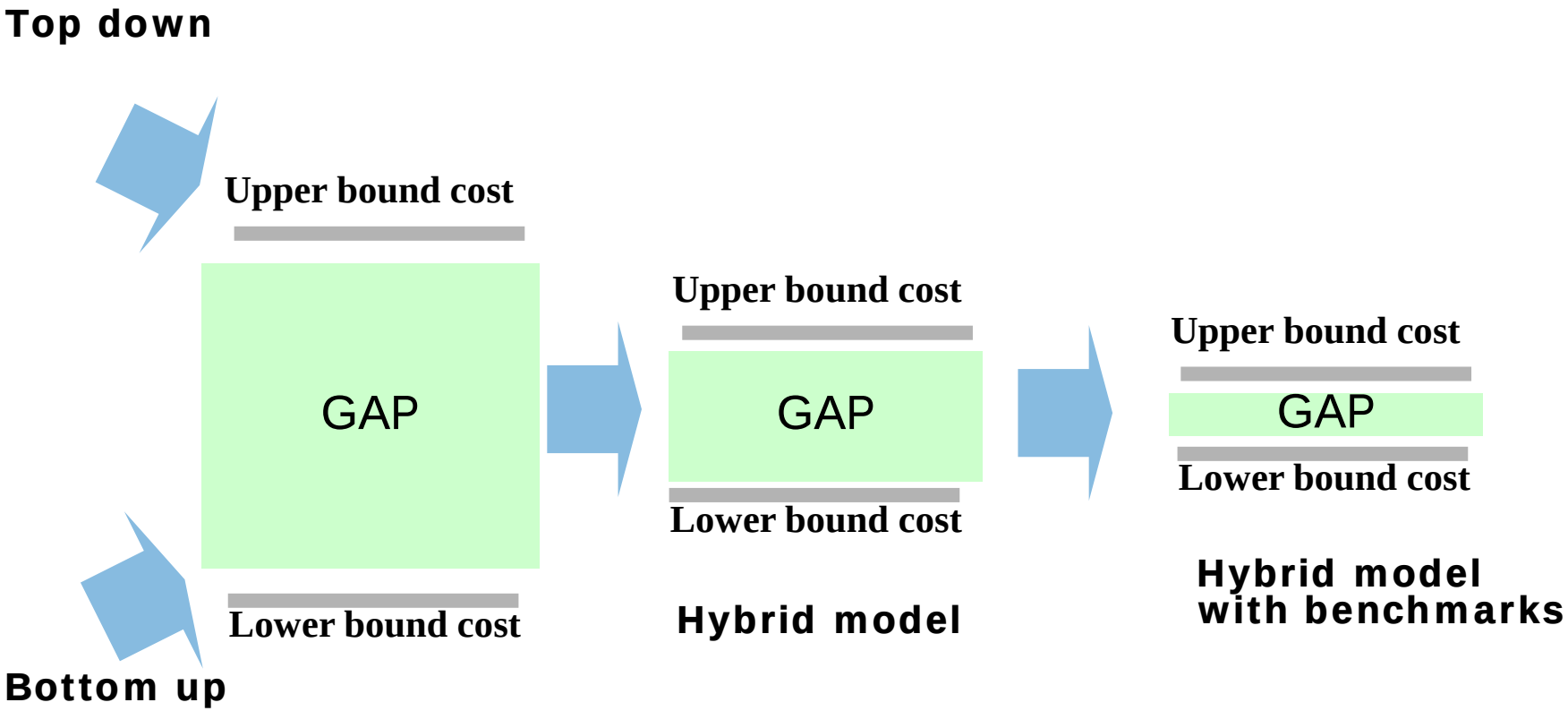
A typical benchmark



Source: Ovum

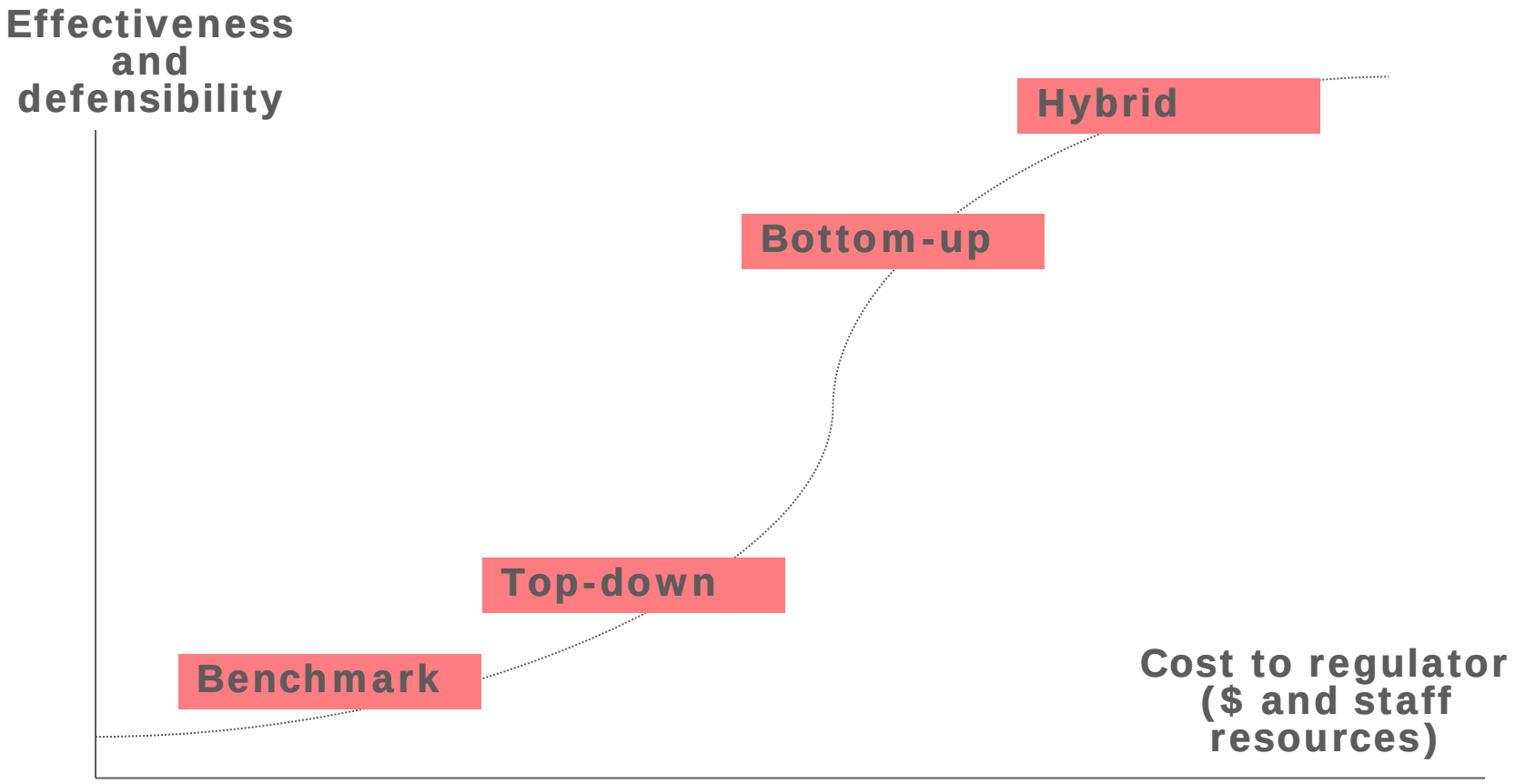
- Range 1.18 to 9.91cpm
- Some use pure LRIC some use LRAIC
- Variations in scale of country, urbanisation, mobile penetration, GDP, wage rates – all of which affect unit costs
- How might the benchmark be set:
  - Average
  - Median
  - Average of lowest quartile
  - Average of 10 most similar countries
  - etc

Relationship between cost model types



How to apply different cost model techniques for effective regulation

The best choice is the practical choice



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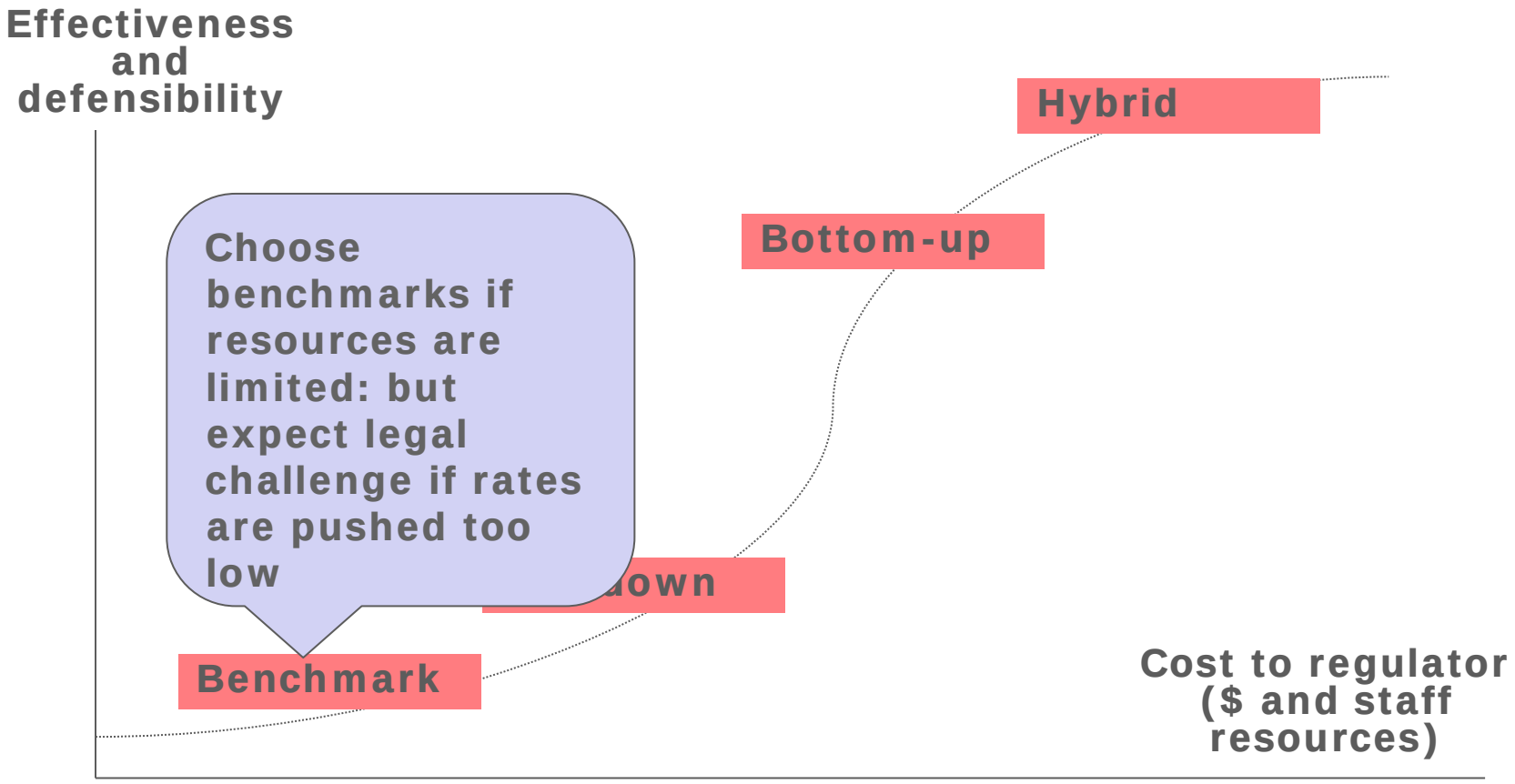

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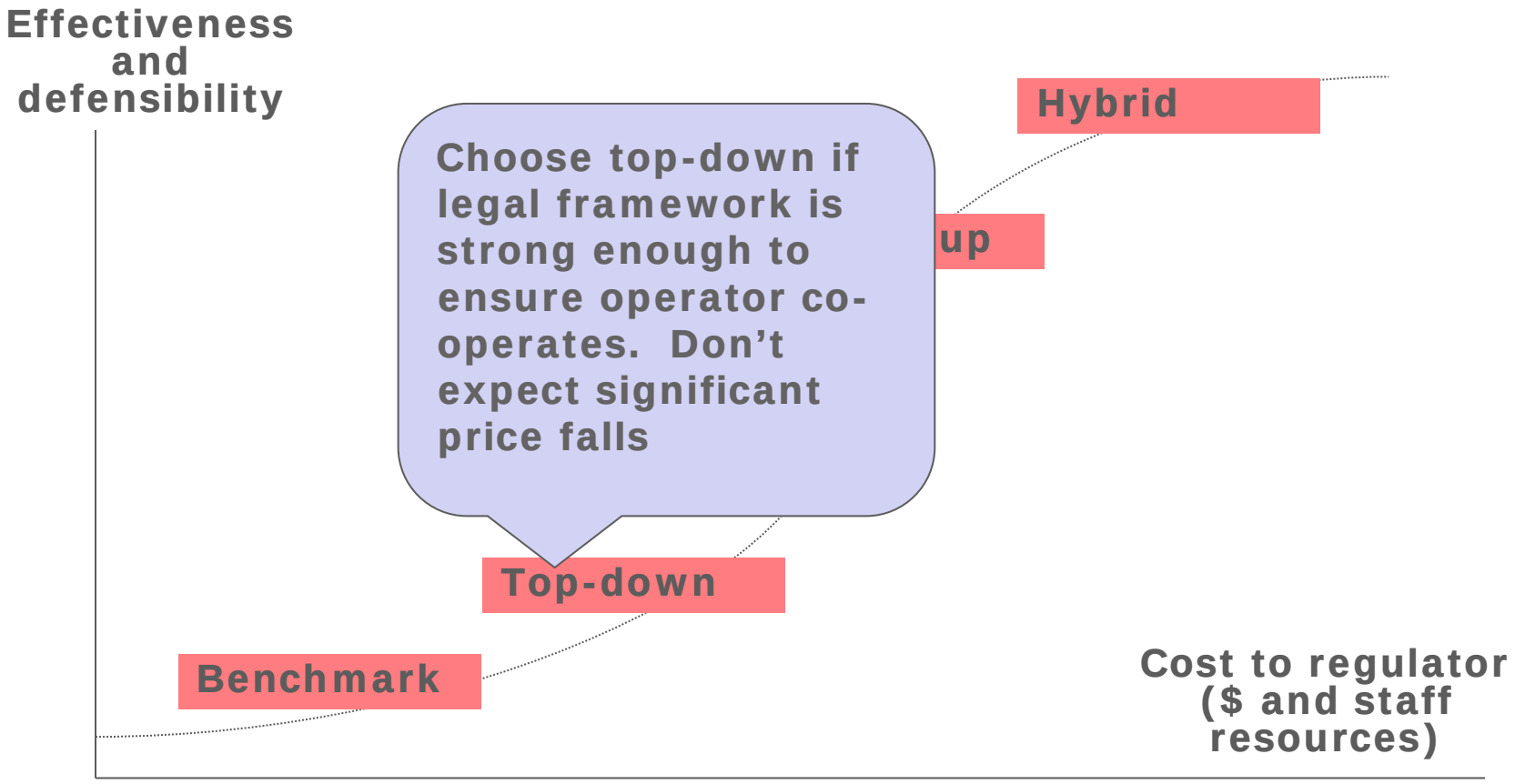

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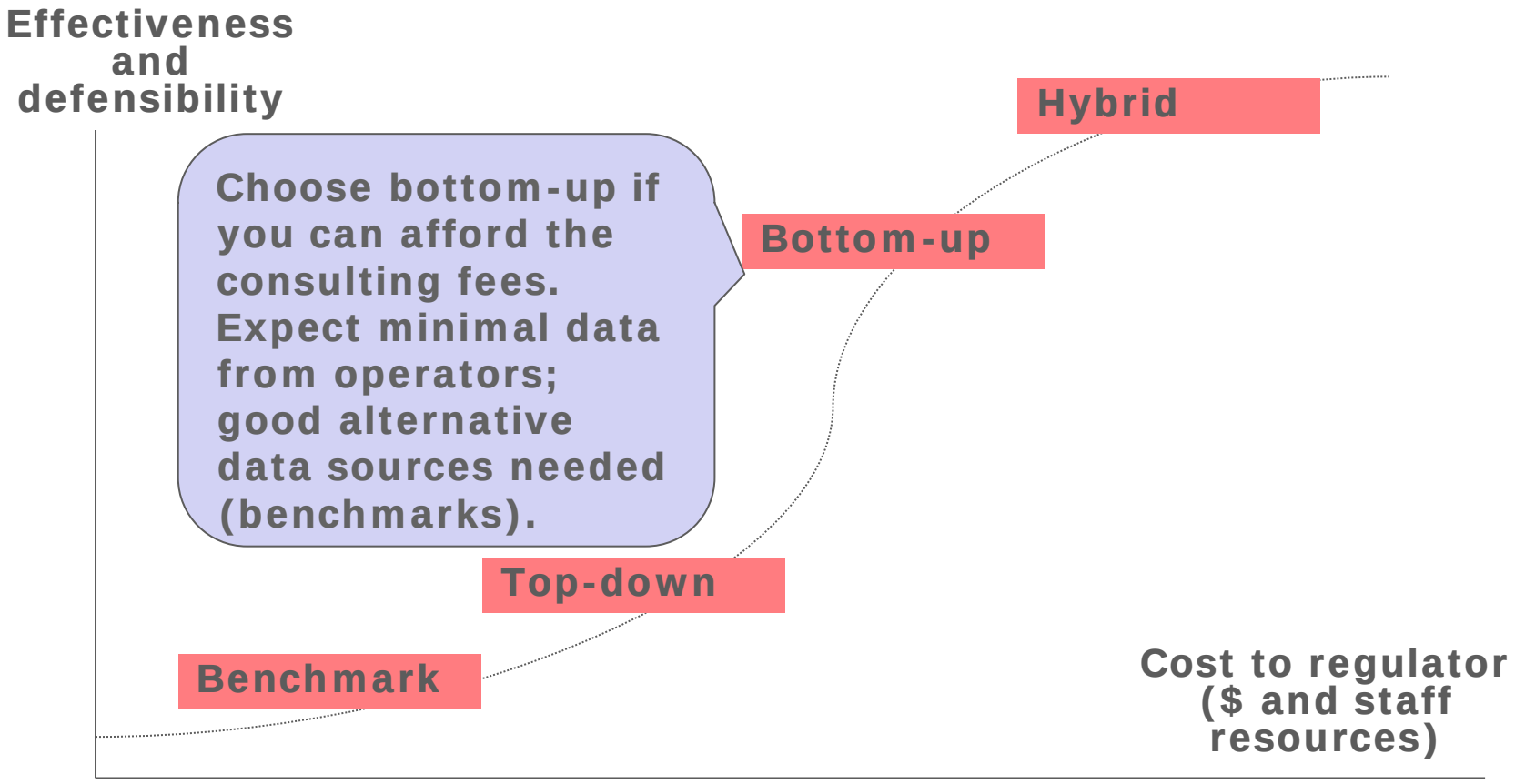

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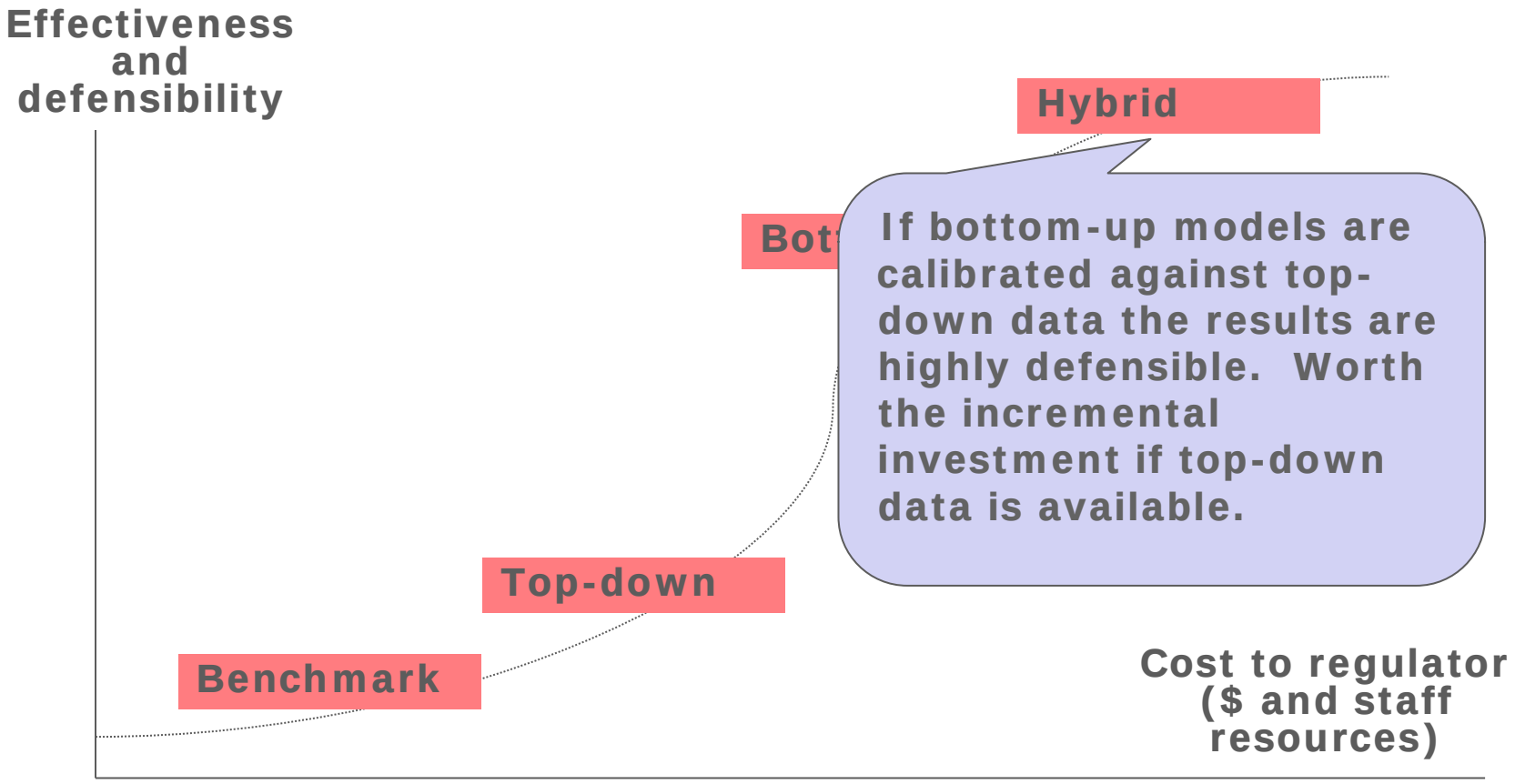
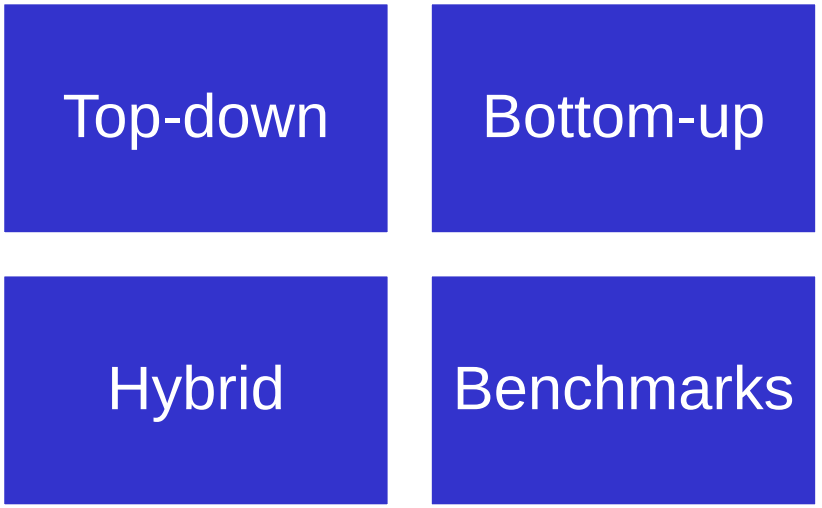


Mini-case study

- Mobile termination rates (MTRs) in A-land currently stand at 5.5cpm (USD cents per minute)
- Respondents to a public consultation have said that:
  - A regional benchmark of 18 countries shows that MTRs range from 2cpm to 12 cpm, with an average of 5.1cpm and a median of 4.2cpm.
  - One mobile operator claims it has a top-down model which shows its costs at 4.8cpm
  - The regulator in a neighbouring country has recently completed a bottom-up model estimating costs of 1.8cpm. This is being challenged in court.
- Consultants responding to a recent RFP for bottom-up models quoted $100k – 20% over your budget.

Your task

- The Chairman of the Regulatory Authority has asked you to consider the facts and make a reasoned recommendation on the way forward.
  - Evaluate the options
  - Propose a course of action
- You may include any or all of the four main modelling approaches



Effective cost-based regulation