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Planning for a Successful Railway

5th Annual African Railway Conference,

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Structure of this Presentation

- Railway objectives
- Planning process
- Methods of demand forecasting
- The iterative process

1 Railway Objectives

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1 Railway Objectives

- A number of objectives can be appropriate:
  - Maximise profit
  - Maximise revenue
  - Maximise demand
  - Reduce
    road traffic congestion

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1 Railway Objectives

- A number of objectives can be appropriate:
  - Maximise social benefit/employment
  - Military traffic
  - Minimise environmental impact of transport
  - Increase economic activity
    - Local
    - National

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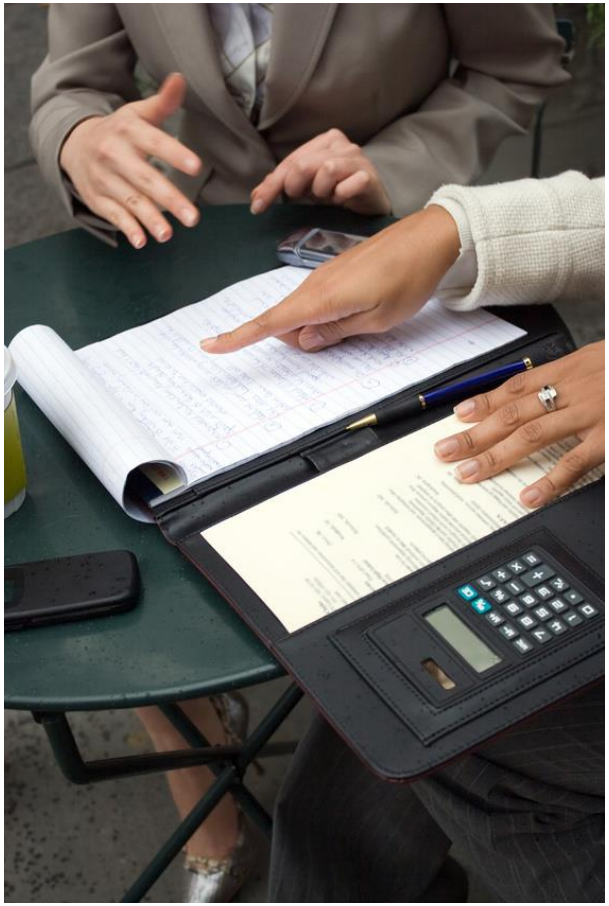
2 The Planning Process



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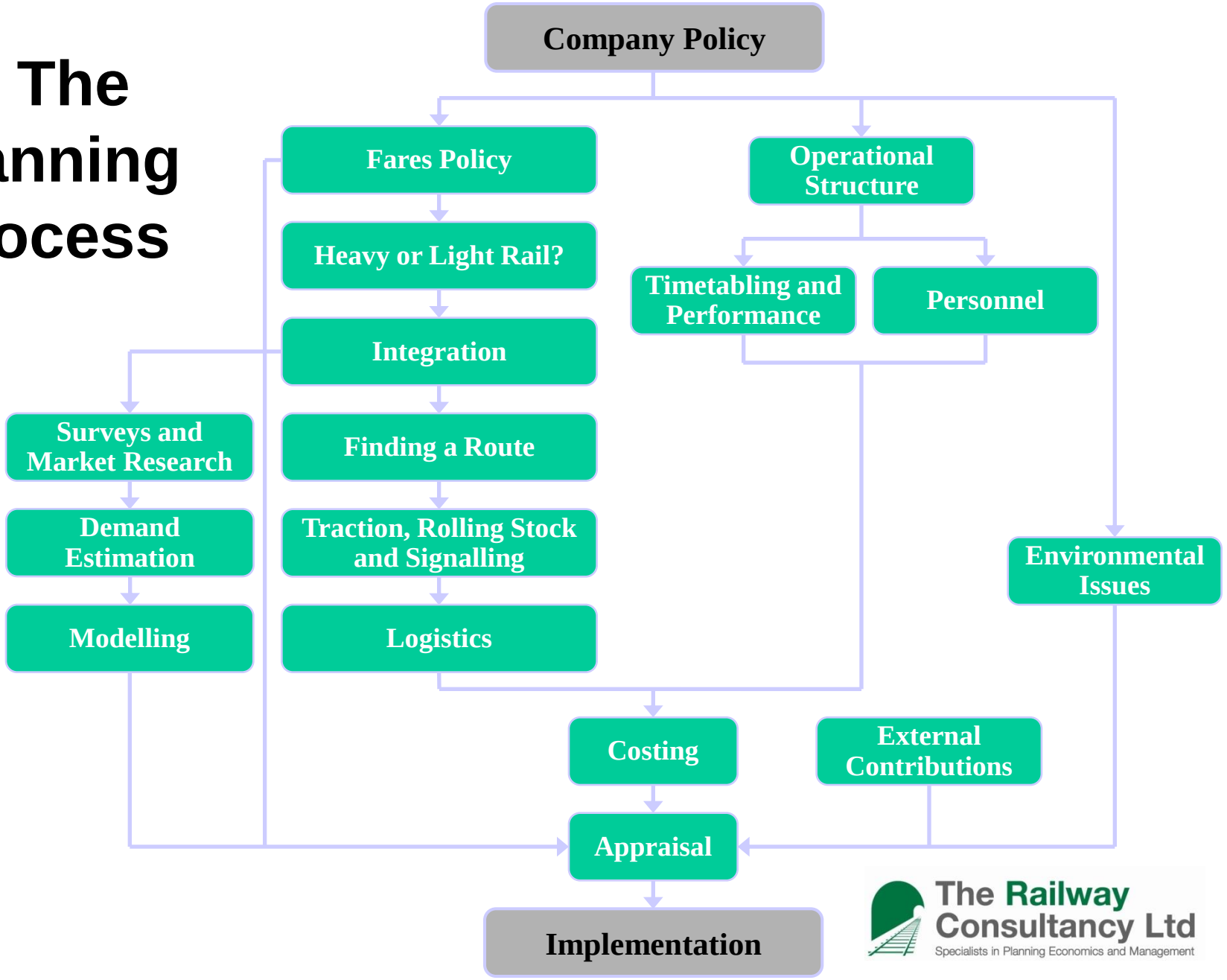
2 The Planning Process



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2 Planning Process

- So: What problem are you trying to solve?
  - (see previous objectives)
- Only then can we think about doing it efficiently
  - Too many railways are poorly-focussed

2 Planning Process

- Clear chain of authority
  - From *commercial/customer* point of view

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3 Methods of Demand Forecasting

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3 Types of Methods

- Aggregate v disaggregate
  - ‘Top-down’ v ‘bottom-up’

- Aggregate perhaps more useful in the African freight context
  - Detailed data not available
  - Commercial confidentiality

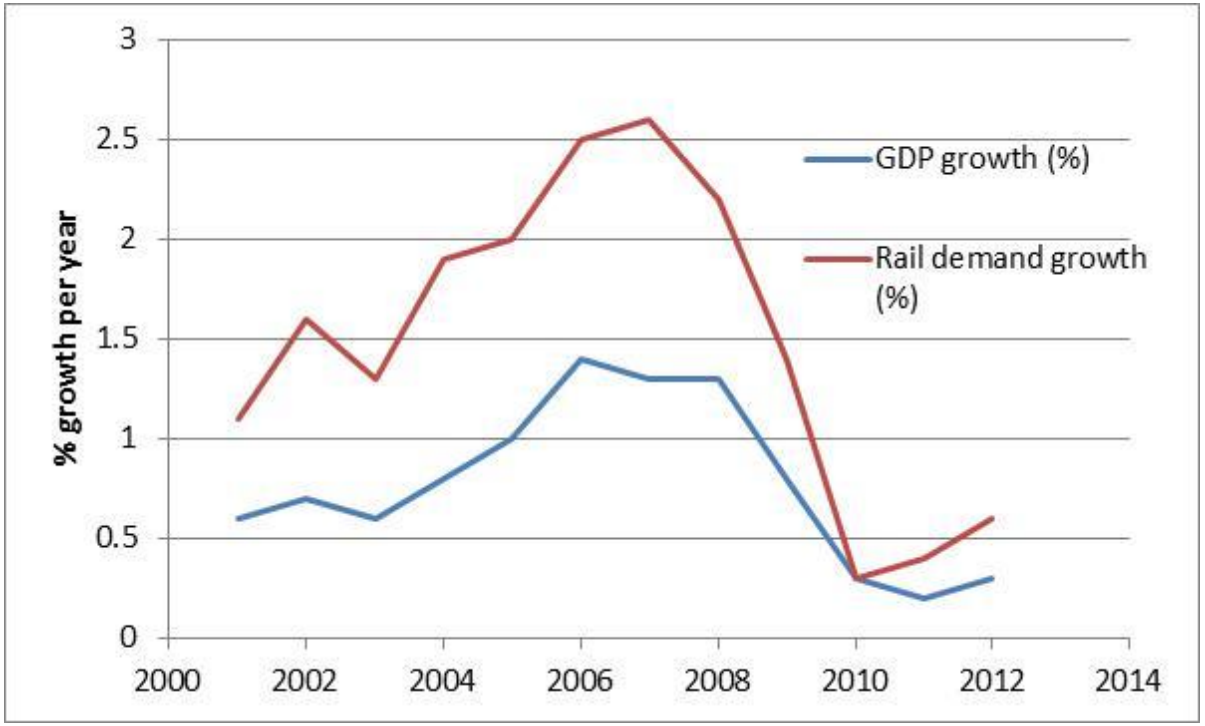
3 Types of Methods

- Revealed Preference v Stated Preference
  - historic v ‘what if?’

- Might feel more comfortable with historic but trends may not continue
  - Customer behaviour in the future may be different

3 Econometrics

- Statistical analysis of underlying factors
- Only for established operators with a history
  - Can examine impact of (e.g.) GDP, oil prices



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3 Aggregate

- Split down generic data with a target mode share
  - e.g. for agricultural or industrial production

- Fails to take account of service quality
  - Frequency, punctuality, price,…

3 Trip End Forecasting

- Population-based methods
  - e.g. One return work trip per day
  - Existing mode share data an unreliable indicator of potential where no established market
  - No account of geography or competitive position

3 Gravity Model

$$T_{ij} = k * \frac{P_i * P_j}{dij^2}$$

where T_{ij} = trips between i and j
P_i, P_j = populations of i and j
d_{ij}^2 is the distance between i and j
k = constant (typically 0.1 for annual trips in Britain)

- Reasonable relationship for all modes
  - Existing mode share data an unreliable indicator of potential
  - No account of competitive position

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3 Generalised Cost Analysis

$$GC = (F/V) + b_1 t_a + b_2 t_w + b_3 t_r + n.I + b_0$$

- An “index of hassle”/basket of attributes
- Approach applicable for both passenger and freight; better for disaggregate
- Forces thought about door-to-door journey
  - Important implication to counter those who are focussed solely on fares – perhaps passengers would better be served by improvements in quality?

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3 Stated Intentions

- “Would you use my railway service?”
- Very unreliable predictor of use
  - Vicarious response bias
  - Policy response bias
  - Lack-of-understanding bias
- Don’t use it!
  - But is the basis for a better method

3 Stated Preference

- Offers 6-9 choices of options to respondents
- Each option has e.g. 3 characteristics
- These chosen carefully to ensure that respondents make real trade-offs
- Can deduce much about behaviour
  - e.g. Value of Time
  - Potential benefit of particular features

3 Stated Preference

- Useful in two main areas:
  - Small quality variables (e.g. security), difficult to discern through other methods
  - Where respondents have no previous experience
- Real potential in African environment where rail network sparse

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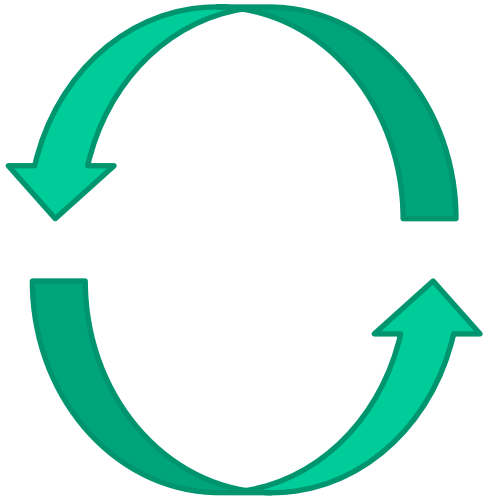
4 The Iterative Process



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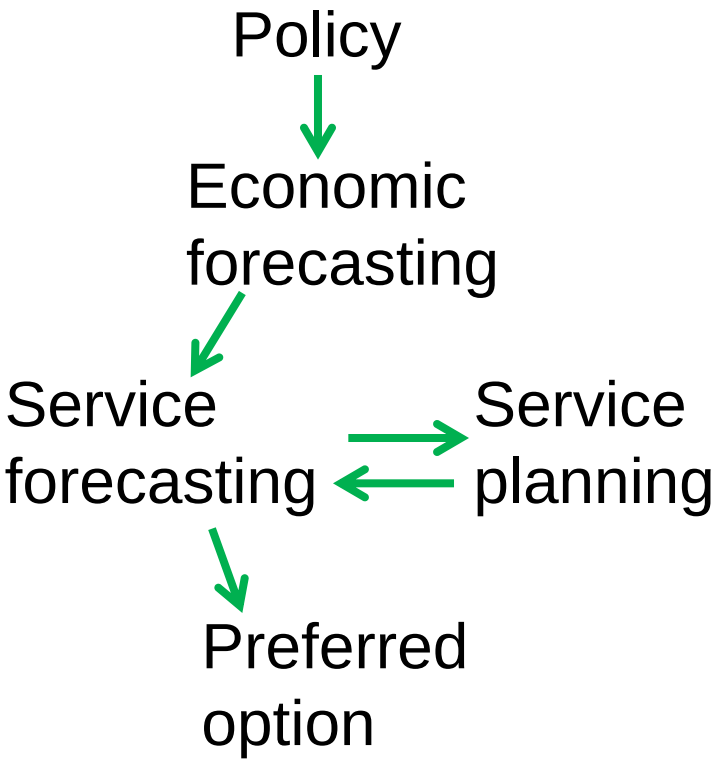
4 The Iterative Process

- Clear chain of authority
  - From *commercial* point of view



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4 The Iterative Process

- Railways are classic ’systems’
  - Everything impacts on everything else
  - Decisions must reflect this
- Planning means compromise
  - Straighter faster route for end-to-end traffic or serve intermediate communities better?
  - Flatter route aids freight or increases capex?
  - Value engineering trade-offs essential

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4 The Iterative Process

- More station stops reduce end-to-end speed
  - Large benefit to (a few?) local people
  - Small disbenefit to (more?) long-distance passengers
- Turning commuter trains short of their destination
  - Increases frequency to inner suburbs
  - Reduces frequency to outer suburbs

5 Conclusions

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Conclusions

- Keys to success:
  - Having clear objectives
  - A business-like approach
- Many demand forecasting tools available
  - do ensure consideration of geographic variation, competitive position & quality
- Iterative nature of service forecasting/ planning essential if the best outcomes are to be realised

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