Planning for a Successful Railway

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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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A number of objectives can be appropriate:

– Maximise profit
– Maximise revenue
– Maximise demand
– Reduce road traffic congestion
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
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
3 Methods of Demand Forecasting
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
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

\[ T_{ij} = k \times \frac{P_i \times P_j}{d_{ij}^2} \]

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
3 Generalised Cost Analysis

\[ GC = \frac{F}{V} + b_1 t_a + b_2 t_w + b_3 t_r + n.l + b_0 \]

- 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?
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
4 The Iterative Process
4 The Iterative Process

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

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Policy
  ↓
Economic forecasting
  ↓
Service forecasting
  ↓
Prefered option
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Service forecasting
  ←
Service planning
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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
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
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