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Ten Ways to Manage Railways Better

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Contents

Introduction

Restructuring a railway is a process which undoubtedly benefits most railways but it is only a means to an end

- The basic objective of restructuring is to reorganise railway activities and assets – which in many cases are stuck in another age - to better meet current market needs
- Typically, this involves
  - separating regulatory functions (normally left in Government) from the operational management of the railway
  - reorganising the internal operations of the railway from being functionally-based to being commercially-based (the Line of Business model)
- Sometimes the previous management remains under the new structure, more often it is changed
- Often, the restructured railway performs much better commercially than its predecessor
  - But this is not guaranteed
  - And the basic principles of railway management apply just as much in a restructured railway as in an un-restructured one

The basics of successful railway management are the same as for any other business

DRIVE REVENUE UP

Know your customers

Set the right prices and collect the money

DRIVE COSTS DOWN

Know your costs

Control your costs

This talk will discuss (and give examples) of each of these four basic elements – applied to the three main businesses of most railways (passenger, freight and infrastructure)

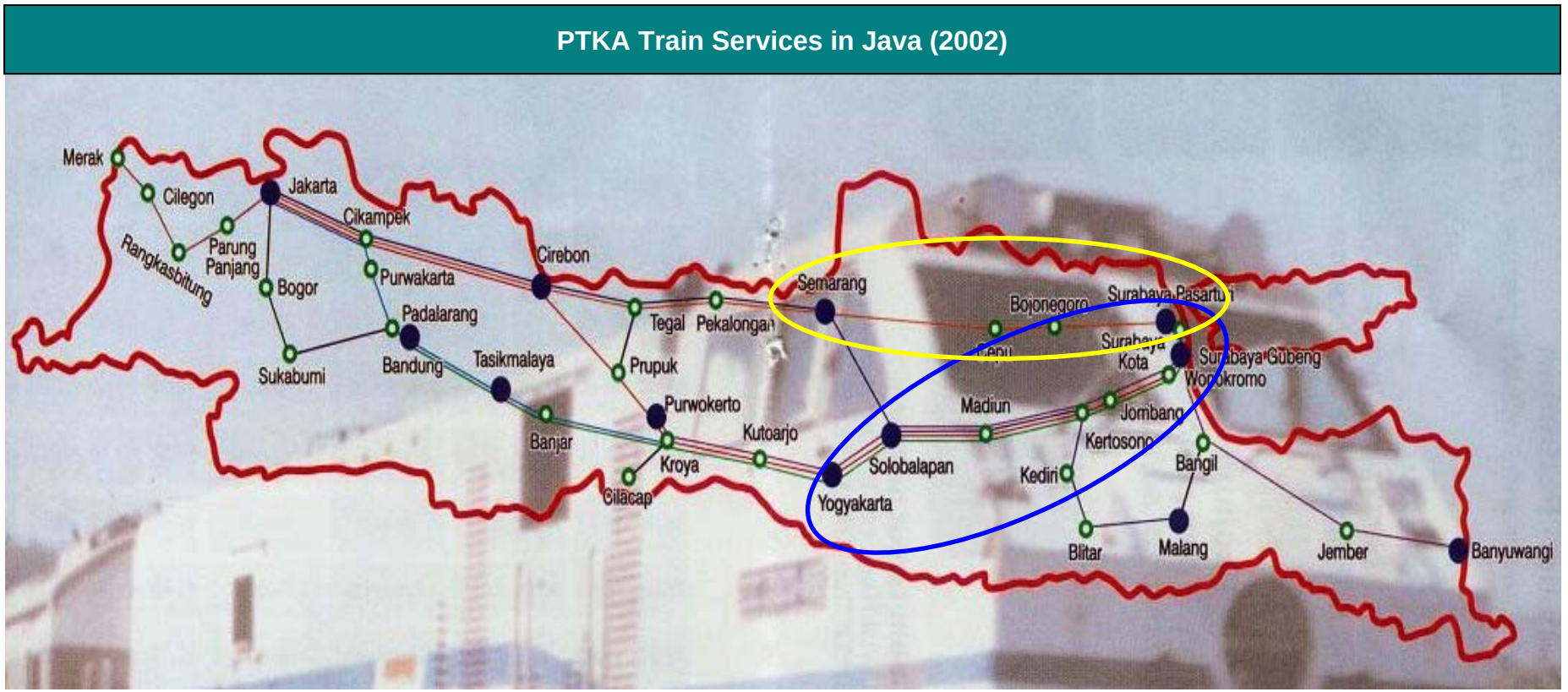
	Passenger	Freight	Infrastructure
Know your customers	●	●	**If an infrastructure company**
Know your costs	●	●	●
Set prices	●	●	**If an infrastructure company**
Control costs	●	●	●

Know your customers - passenger

On many systems the passenger fares are regulated – but several managements have successfully restricted this to the economy-class services and developed a flourishing ‘commercial’ passenger business

- Such commercial passenger services generally easily cover their avoidable costs and the main challenge in tariff-setting is to establish the market price
- Unlike bulk freight, for which the tariff is generally either acceptable or not acceptable for the whole tonnage on offer, passenger traffic is characterized by a large number of individual decision-makers, each of whom has their own ‘market price’. Increasing the fare, or otherwise changing the service specification, will thus generally not affect all the traffic in a single step but instead will cause a change in traffic to a greater or lesser degree. This partial response is defined by the elasticity of demand with respect to the characteristic that has been changed.
- This impact on demand of a particular fare level can be estimated from market research.
- A good example of this is the commercial services in Indonesia – which have been strongly developed over the past fifteen years. In 2003 the PTKA management undertook a series of on-board surveys to better understand the market and its response to changes in service specification.

The survey covered the Argo Wilis (Bandung – Surabaya) and Argo Bromo (Jakarta – Surabaya) executive services



Southern corridor (blue) is served by services from Bandung – Surabaya and by several services from Jakarta to Surabaya and East Jawa (Malang, Kediri, Jombang) in addition to the Jakarta-Solo/Yogya servuces

Northern corridor (yellow line) is served by KA Argo Bromo, KA Sembrani and KA Gumarang

Competition in both corridors is provided by executive bus and air

Bandung – Surabays Rail

- Three services daily
- Tariff is Rp. 165,000 (executive) and Rp 90,000 (business)
- Travel time ranges from 11 -12 hours

ON-BOARD SURVEYS

Rail Jakarta - Surabaya

- Five services on two routes
- Tariff is Rp. 195,000 (executive) and Rp 90,000 (business)
- Travel time ranges from 9 to 14 hours

Bandung – Surabaya: Other Modes

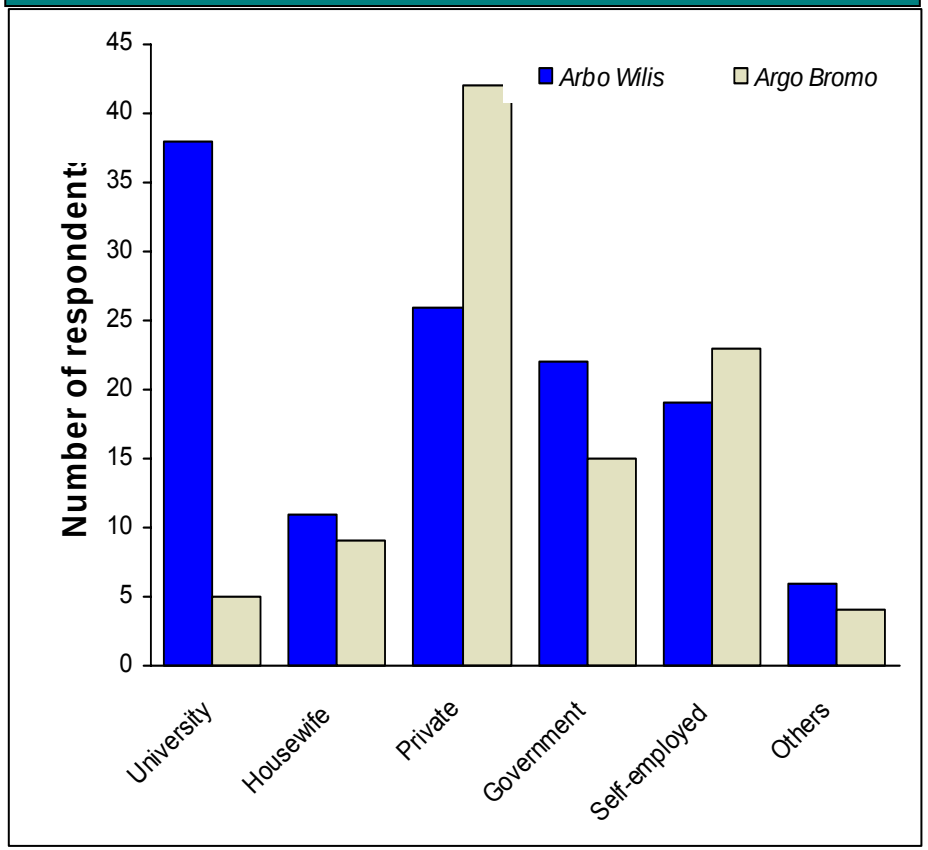
- Airline
  - Indirect services via Jakarta
  - Fare : Rp. 640,000 ($80)
  - Effectively 4 per day, travel time 3.5 hours
- Buses
  - Fare Rp. 130,000
  - Effectively 2 per day, travel time 12 hours

Jakarta – Surabaya: Other Modes

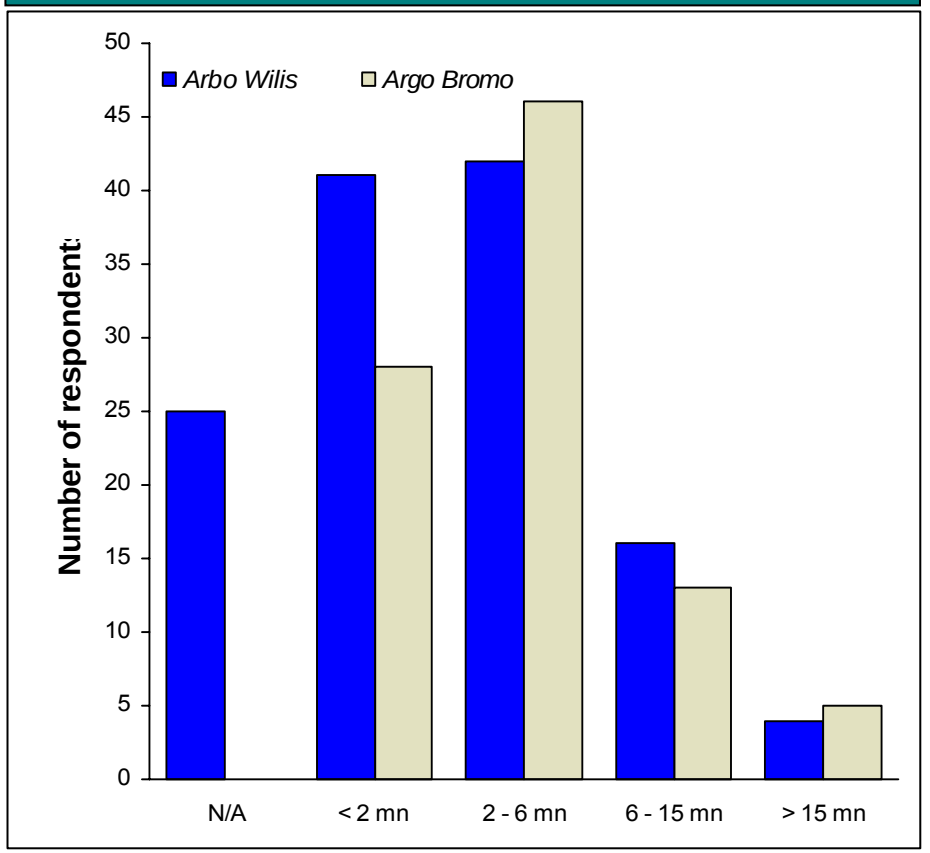
- Airline
  - Jakarta – Surabaya: Rp. 325.000 to Rp 390,000
  - Frequency 10/day, time 1.5 hrs
- Buses
  - Jakarta – Surabaya Rp. 130,000
  - Frequency 10/day, time 14 hrs

Many Bandung - Surabaya passengers are university students who do not earn any income, while most Jakarta – Surabaya passengers are private employees: on both trains passengers typically earn Rp. 2 – 6 Mn ($750) per month

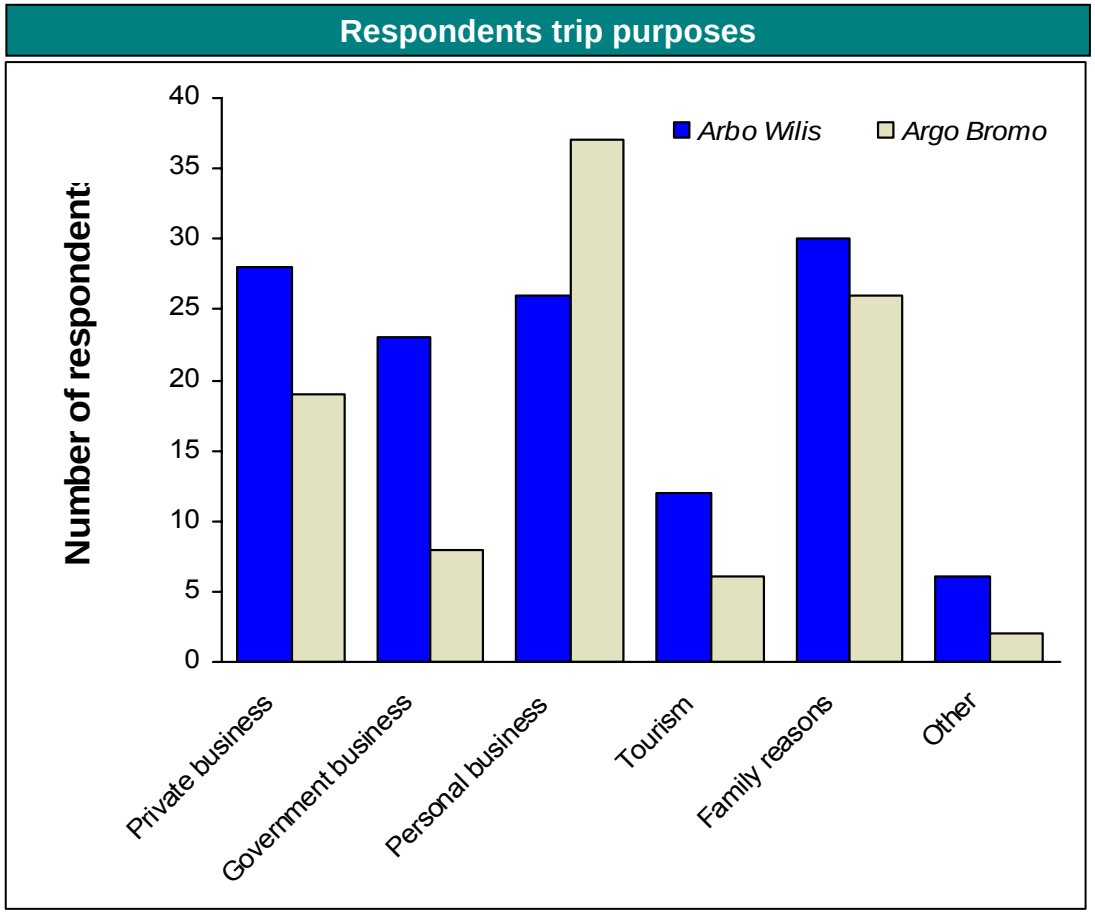
Respondents Occupation



Respondents Monthly Income – in Class

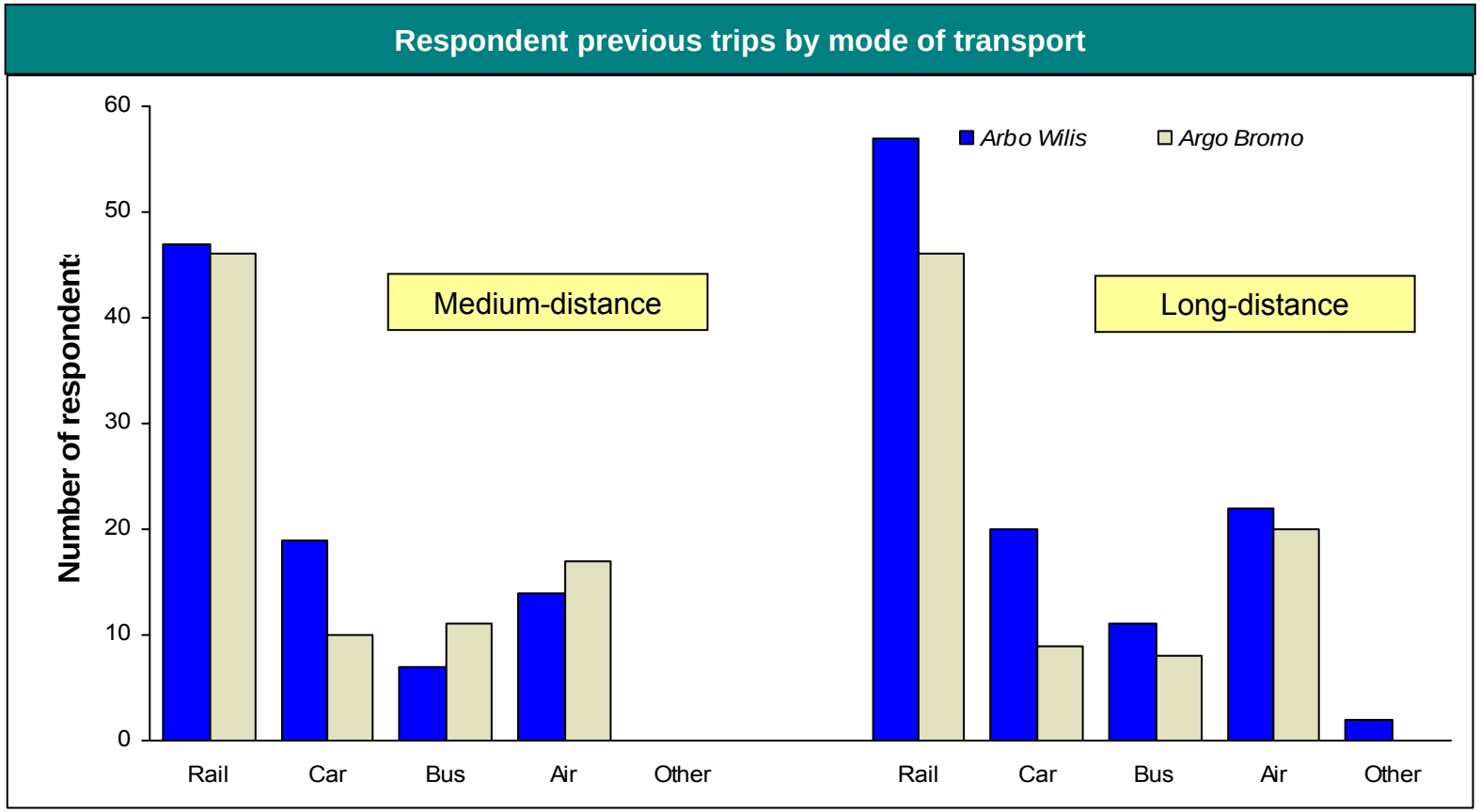


Most trips between Bandung and Surabaya were for private business and family purposes, while trips between Jakarta and Surabaya were for personal reasons - influenced by the survey being just before a holiday



Note: More representative results will be achieved by combining surveys during peak and off-peak times. A normal day will have more business-related trips and fewer personal and family purposes trips

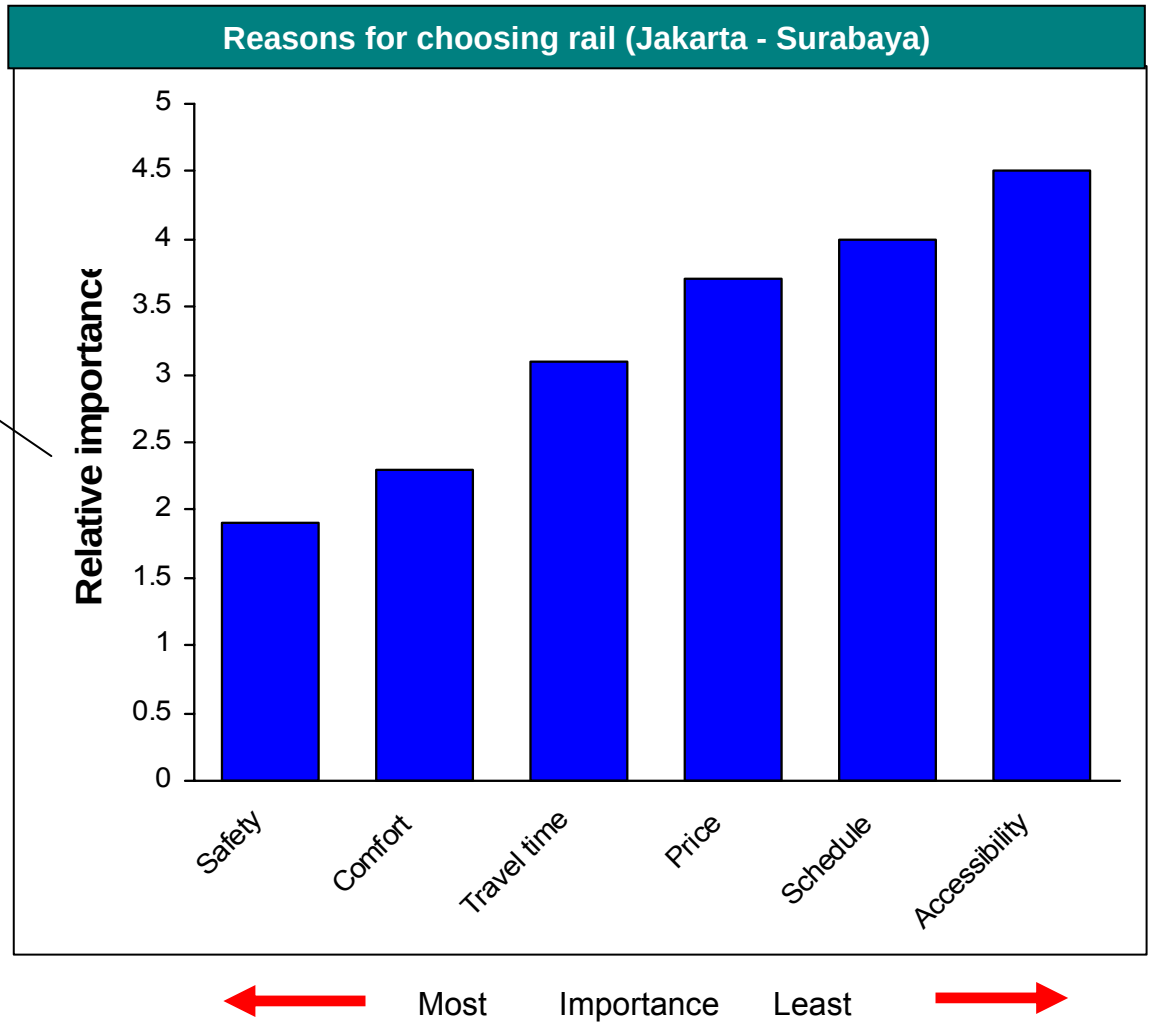
Passengers are not captive to rail: during the last year about 50% of trips were by train, with the balance split over car, bus and air



Argo Wilis : Bandung – Jogja
Argo Bromo : Jakarta - Semarang

Argo Wilis : Bandung – Surabaya
Argo Bromo : Jakarta - Surabaya

Safety is the most important reason for choosing rail, followed by comfort and travel time (presumably compared to bus); price is not a primary consideration

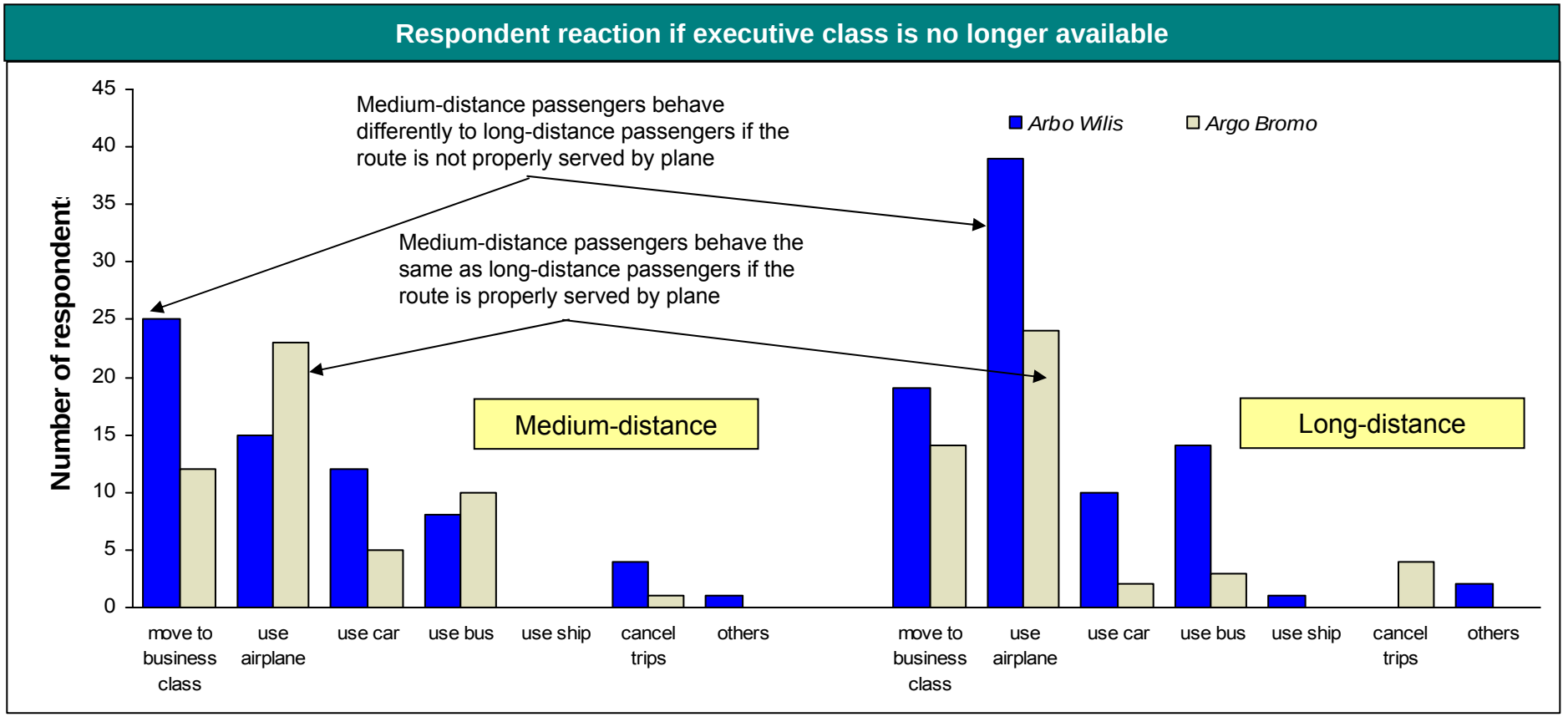


Smaller is more important

These results are similar to surveys in other countries – and previous surveys in Indonesia as far back as 1981- service quality is a major factor in mode selection for intercity travel.

The general importance is the same whichever alternative would be taken if rail did not exist – except that time is more important for those who would otherwise take bus and less important for those who would otherwise take air

If no executive train were available, passengers will generally switch to air where it is available, followed by business rail and car or bus



Argo Wilis : Bandung – Jogja (no direct flight)
Argo Bromo : Jakarta - Semarang

Argo Wilis : Bandung – Surabaya
Argo Bromo : Jakarta - Surabaya

More detailed analysis can be undertaken using two analytical approaches – revealed preference and stated preference

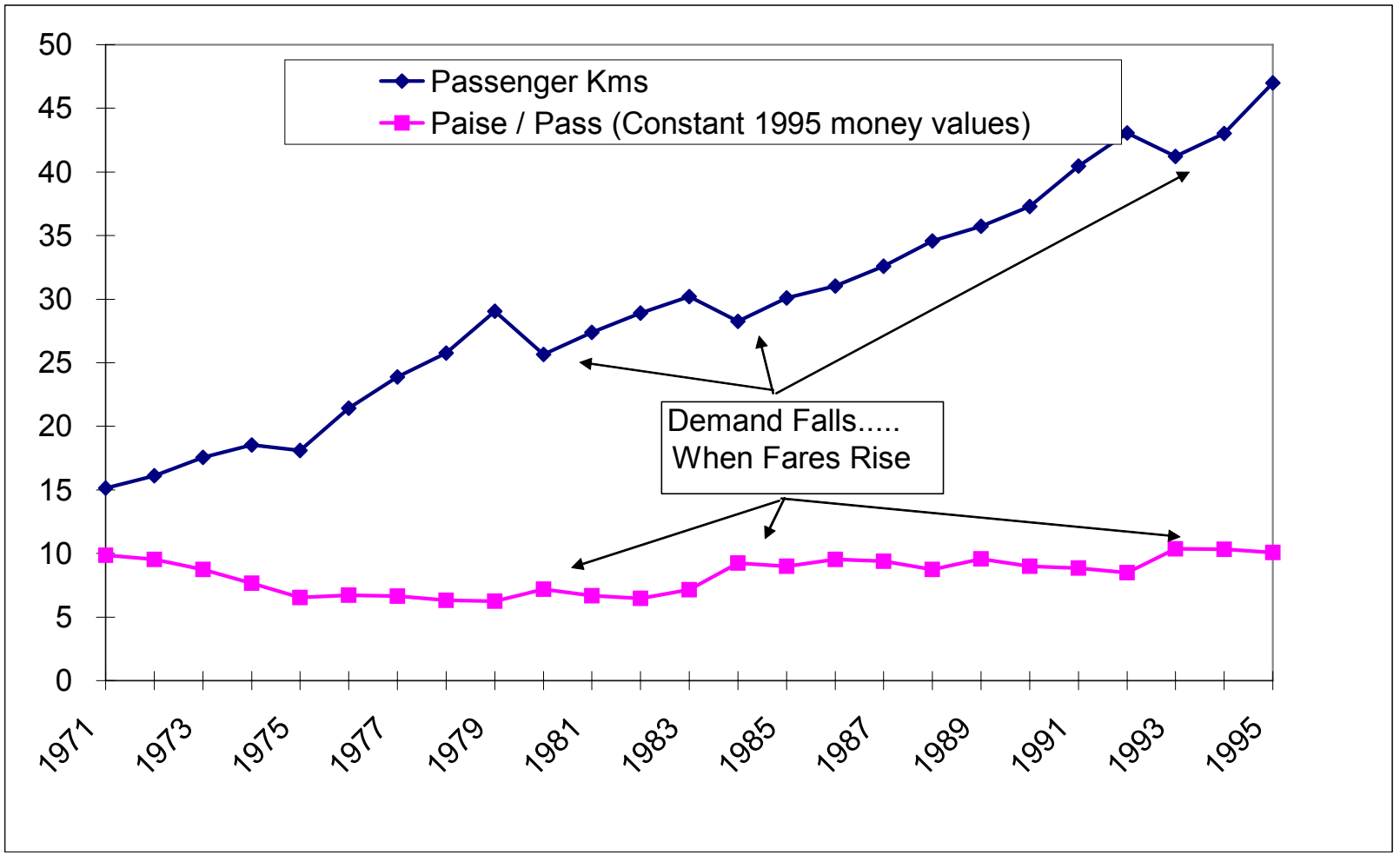
REVEALED PREFERENCE

- Revealed preference data is data that has been collected by observing the choices that passengers have actually made in practice i.e. that have ***revealed*** to observers
- This data is normally of two types:
  - cross-sectional data which compares choices that passengers make, at a particular point in time, when faced with alternative modes of transport e.g. this type of analysis would try to relate the choices between air and rail, say, between Jakarta and major centres in Jawa to the level and type of services available by each mode
  - time-series data, which records how passengers changed their habits in response to changes in modal characteristics e.g. the impact of changes in air fares on rail and air travel between Jakarta and Surabaya and other 'before-and-after' studies

STATED PREFERENCE

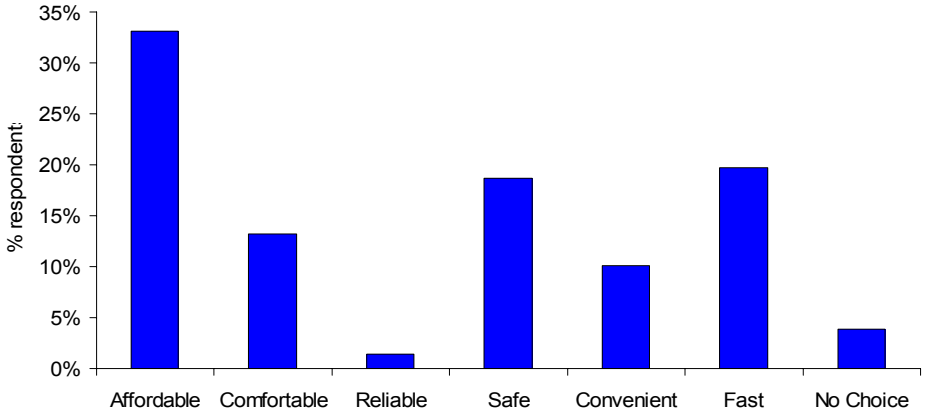
- There are often issues which are difficult to analyse, particularly hypothetical situations such as the introduction of a new service or changes in the qualitative aspects of a service
- Stated preference methods were therefore developed in which surveys interviewed passengers who then ***stated*** what their reaction would be to a change in service levels
- **Such methods are widely used but need to be undertaken carefully – quality is an essential ingredient of a successful stated preference survey**
- Experience has also shown that stated preference data generally overstates passenger responses to any given situation – in part because idealistic alternatives are often compared to a less-than-ideal existing situationl

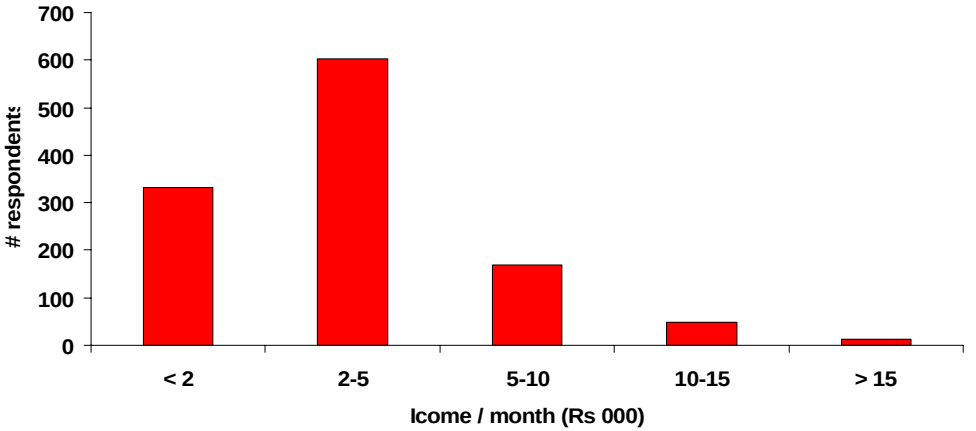
An example of revealed preference analysis – price elasticity of suburban traffic in Bombay

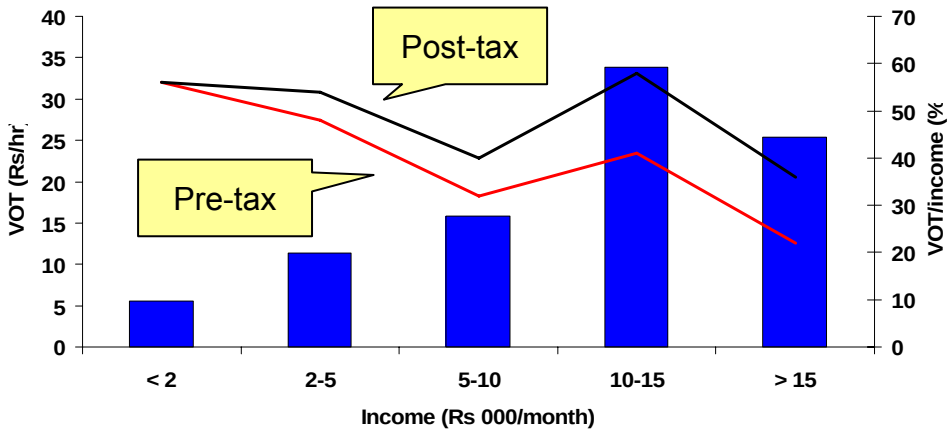


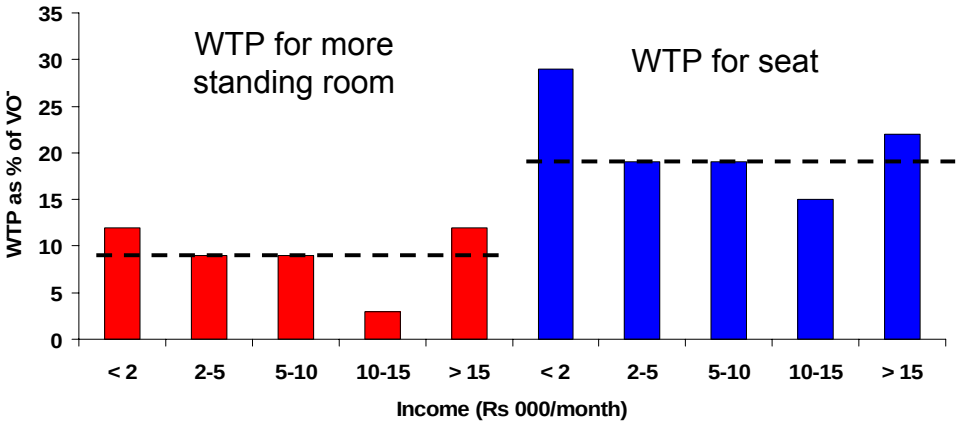
The estimated fare elasticity is -0.35, comparable with normal experience

An example of stated preference – value of time and the price of crowding in Bombay









Know your customers - freight

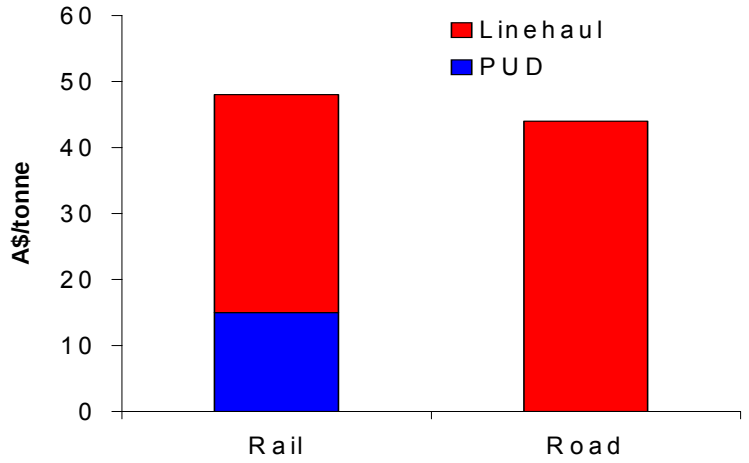
Freight customers are influenced by a range of factors – and these all need to be addressed to operate a successful business

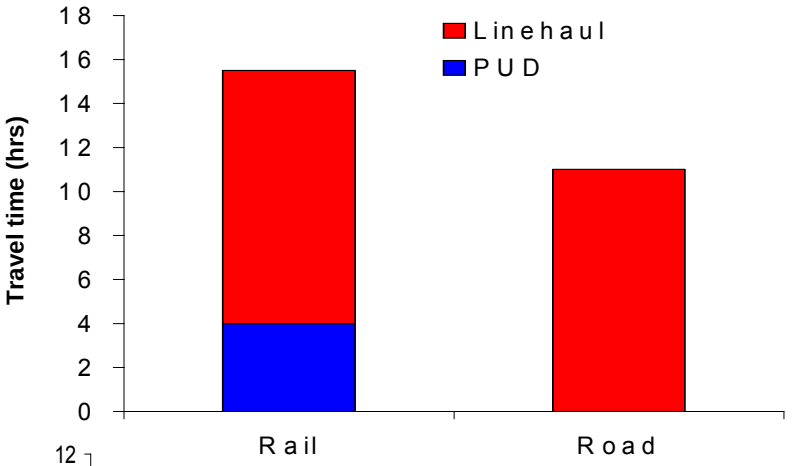
PRICE	For rail, this includes pick-up and delivery (PUD) – this can be as large as the linehaul cost for short hauls (under 500 km)
TRANSIT TIME	For rail, this also includes PUD
RELIABILITY	Poor reliability either means the cost of waiting time at destination terminals or customers factoring expected delays into expected transit times
Schedules	Particularly important in the overnight freight markets – on longer corridors is also linked to arrival time window

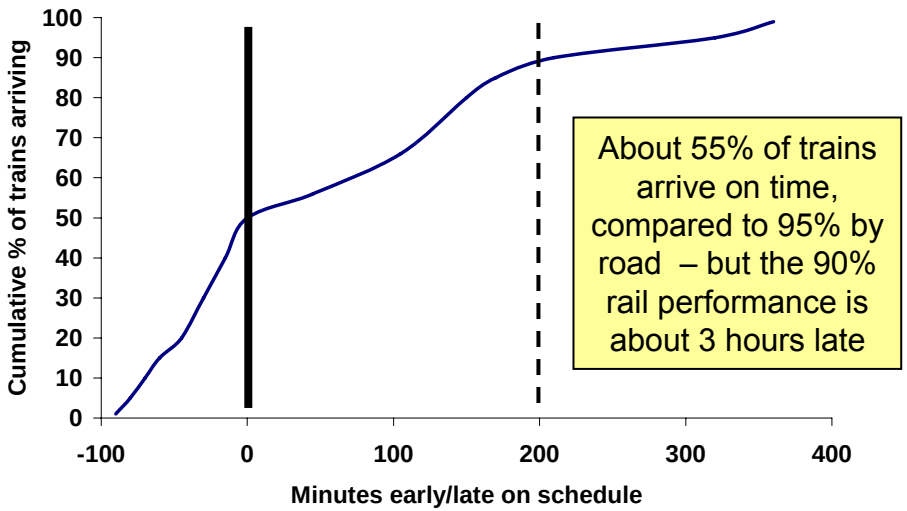
Other important factors are security and damage

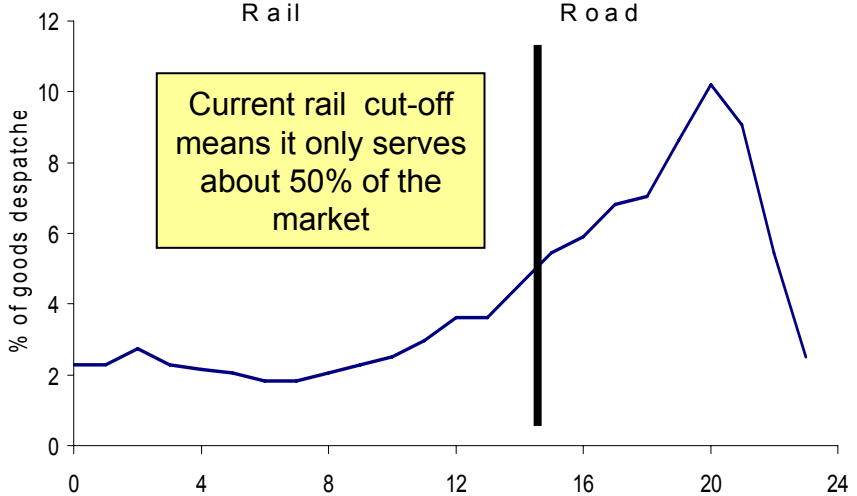
Customers are prepared to trade these attributes off against each other – but all too often the only weapon rail uses is price – reliability, schedules, and security are also within management's control

Between Melbourne and Sydney rail is uncompetitive on price and transit time; it is also unreliable – besides serving only a small part of what is essentially an overnight market

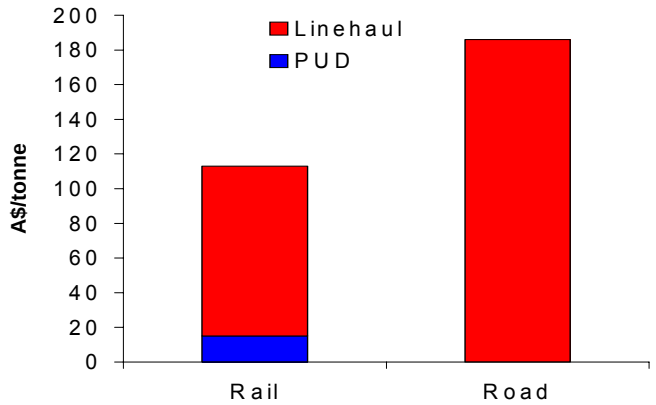


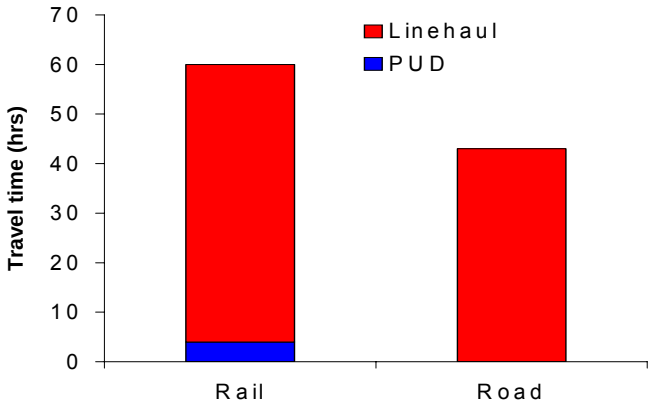


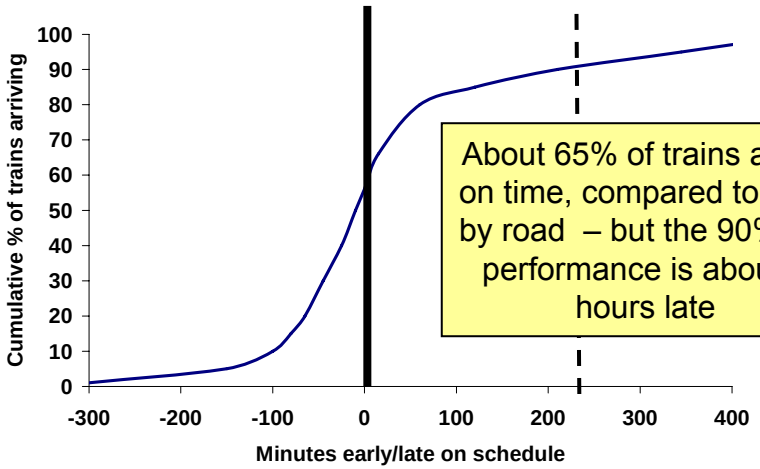




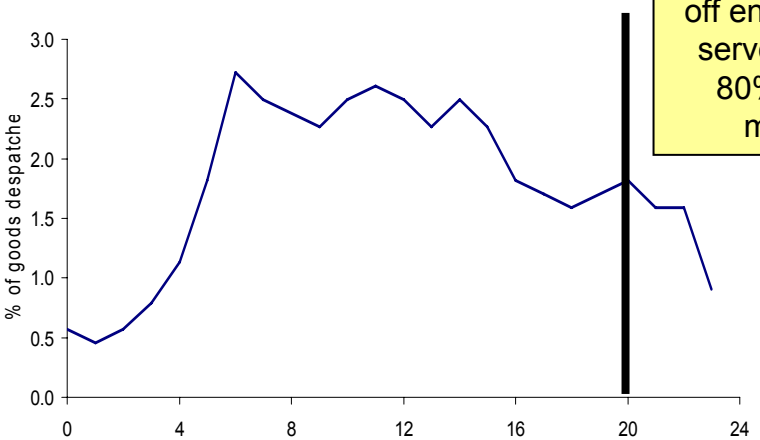
But, rail is very competitive on price between Melbourne and Perth, has reasonable reliability and serves almost all the market







About 65% of trains arrive on time, compared to 95% by road – but the 90% rail performance is about 4 hours late



Current rail cut-off enables it to serve at lesat 80% of the market

The trade-offs can be expressed in terms of elasticities

Elasticities for Australian rail long-haul general freight

PRICE	-1.1
TRANSIT TIME	-0.3
RELIABILITY	0.6
CUT-OFF TIME	0.4

In this context, the elasticity is the % change in freight mode share (or demand) in response to a 1% change in the particular service characteristic. Thus, a 1% reduction in price will increase demand by about 1.1%

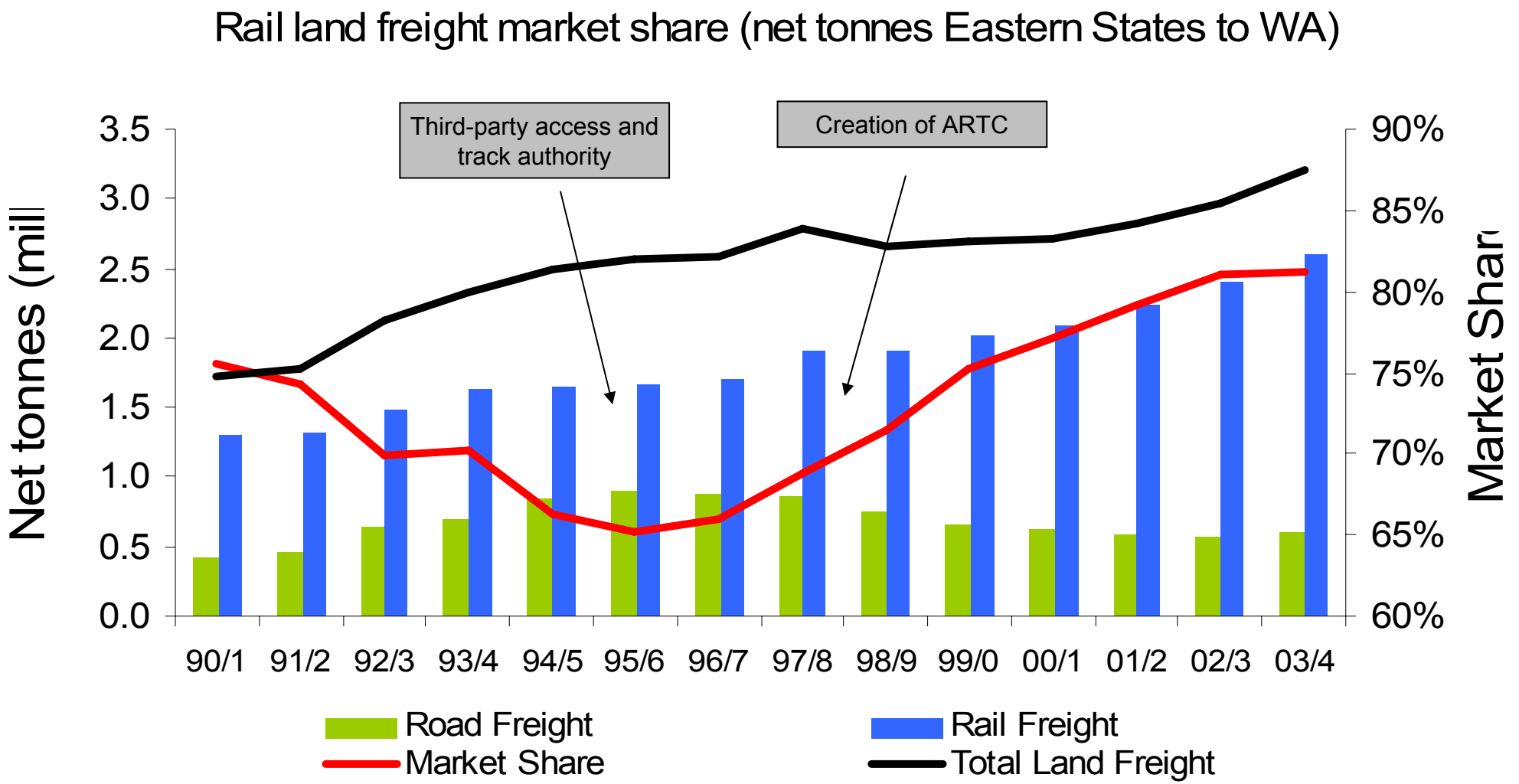
These elasticities can be used to assess the impact on demand of various changes in rail service characteristics

For example, increasing the rail mode share on Melbourne – Perth from 70% (2002) could be done by:

- Reducing the price from $103/ tonne to $96/tonne
- Reducing the transit time from 60 hours to 45 hours
- Improving the reliability from 66% to 75%
- Increasing the service availability from 80% to 95%

Reliability (almost entirely a management issue) almost certainly offers the best pay-off

Almost all this work was undertaken not by an above-rail operator but by a track authority (ARTC) – and they seem to have been doing something right



Know your costs - general

There are two dimensions to knowing your costs – knowing your input costs and knowing your output costs

Input costs

Input costs are the costs of undertaking particular technical activities e.g.

- Cost of locomotive maintenance
- Cost of tamping

This information is essentially a matter of **financial accounting** – a well-structured general ledger will provide the raw material but will also normally require some manipulation to produce useful information.

Output costs

Output costs are the costs of the products the railway is producing e.g. the cost of carrying a wagonload of freight or the cost of operating a passenger train:

This is essentially a matter of **management accounting** – only in exceptional cases can financial accounts provide this information directly.

Knowing output costs is essential for:

- setting floor prices
- deciding whether to reinvest by replacing life-expired rollingstock and infrastructure

Historically, most railway accounting systems were quite good at financial accounting but little effort was put into service and traffic costing – and even less use made of it.

Although modern accounting systems may have much more power and capacity then previous ones, in the end they are only as good as the quality of the information going into them.

Most railways know their input costs well – but not their output costs. A key step is to analyse the contribution of services – the difference between revenue and 'avoidable cost' – the costs that would be avoided if the traffic were not carried or the service not undertaken

Two approaches to analysis

Service-based	Traffic-based
The service is taken as the unit of costing • Costs are calculated for the service • Revenue is then allocated e.g. if a passenger had a through ticket from A to B via C, the revenue would need to be split into A-B and B-C Passenger traffic is almost always costed using this approach	The traffic is taken as the unit of costing: • Revenue is derived directly from accounting data (e.g. A-B) • Costs are calculated by combining the cost of the different legs (e.g. A-C plus C-B) Freight traffic is generally costed using this approach

BUT

Where revenue can be related directly to a specific train operation, e.g. where there is no through ticketing for passengers (as in Indonesia) or where freight traffic travels in dedicated block trains, the two approaches are identical in practice

The most important factor in traffic costing – and business management generally – is to ensure that reliable financial and operating information is provided on a timely and consistent basis.

- Financial information should enable costs for each of the activities identified in the previous slides to be derived in a reasonably simple manner. If the costs are to be used to support claims for PSOs, there will be major advantages in credibility if this can be done directly from the accounts with a minimum of manipulation using data from other sources

- Operational data should be available on both an aggregate and service-specific basis. **This is often a major management weakness. It can be addressed by initiatives such as TIMS but unless management takes an active interest in reviewing the data on a regular basis, the quality almost invariably deteriorates.**

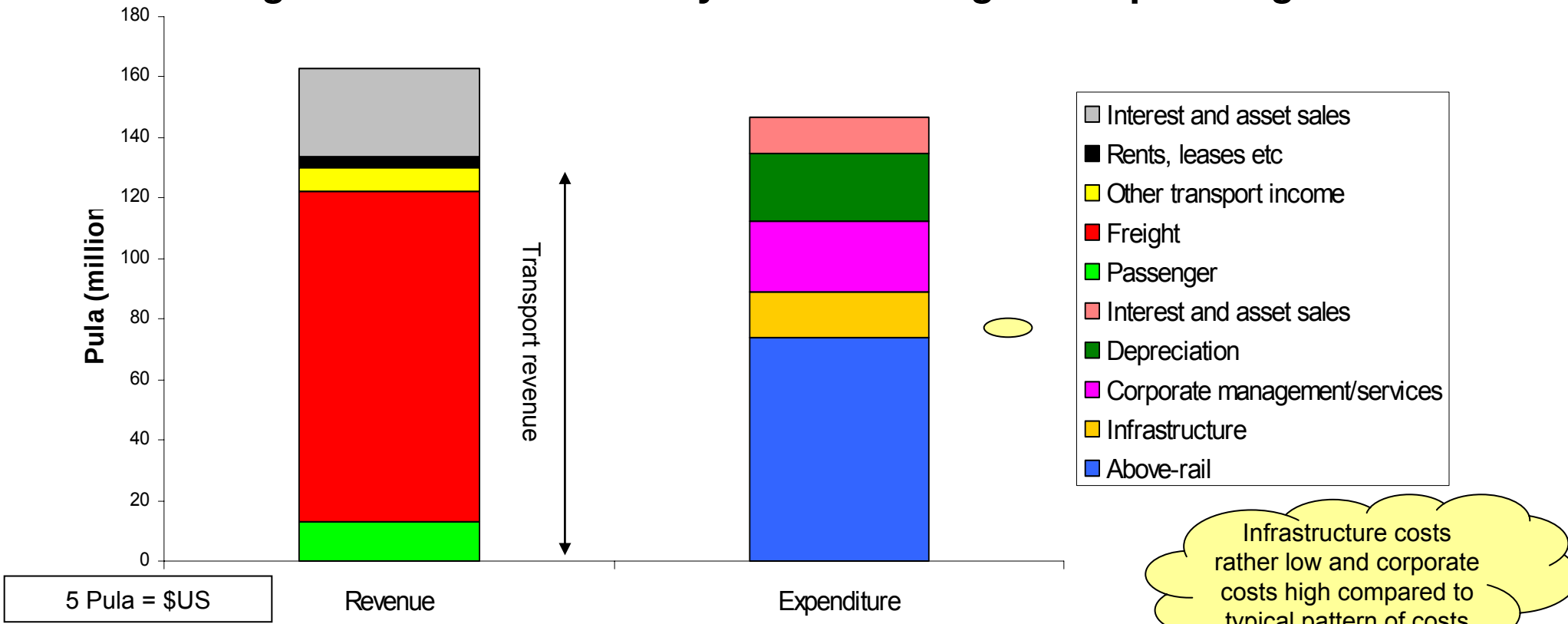
IF YOU CANNOT MEASURE, YOU CANNOT MANAGE

Know your costs - passenger

Botswana Railways (BR) has a network of 888 km and carries about 2 million tonnes and 0.7 million passengers

- The mainline was constructed in 1897 and for many years was the only line between South Africa and Zimababwe, as part of Rhodesia Railways
- On independence the line continued to be operated by Zimbabwe Railways until the infrastructure was purchased by Botswana in 1987.
- Since then it has been operated independently by Botswana Railways
- The Selebi Phikwe and Morupule branches were funded by Botswana and opened in 1974 and the Sua Pan line in 1992.

In 2001/2 BR transport revenue almost covered working expenditure and depreciation – comfortably ahead on a cash basis – but this hides a significant cross-subsidy between freight and passenger



Infrastructure costs rather low and corporate costs high compared to typical pattern of costs

- Total revenue of P166 million, of which P130 million from transport activities
- Total expenditure of P146 million, of which working expenditure of P112 million, depreciation of P22 million (historic basis – understates true renewal requirement) and interest of P12 million

BR currently operates two return passenger services on the north-south line as well as a twice-daily school service in Gaborone

Description of Service

- The day train (typically operated as a 8-car consist) operates daily in each direction between Gaborone and Francistown with a scheduled transit time of about 8 hours.
- The night train (typically a 10-car consist) operates daily in each direction between Francistown and Lobatse with a scheduled tranist time of about 10 hours.
- The Gaborone schools service operates a return ten-minute trip twice daily from Gaborone.

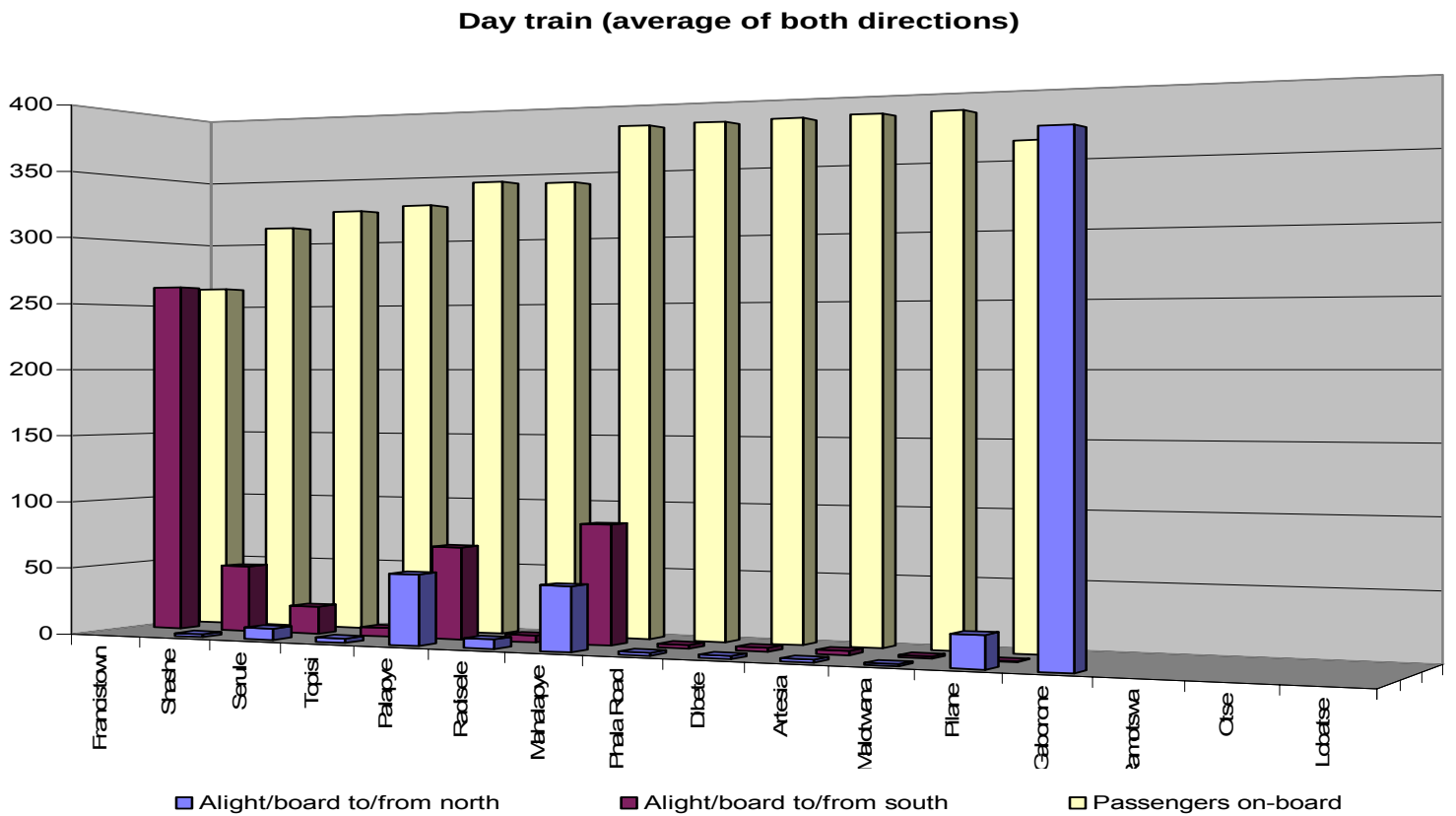
	Day	Night	Commuter
Pass (000)	322	195	215
Passenger-km (mill)	95	74	2
Revenue (P000)	5561	7560	232

Key operating statistics

	Day	Night	Commuter
Distance	435	506	7
Train-km (000)	318	369	7
Car-km (000)	2540	3694	35
Loco-km (000)	330	384	7
Gross tonne-km (mill)	135	172	2
Train-hrs	4964	8395	500
Loco-hrs	5763	10131	500

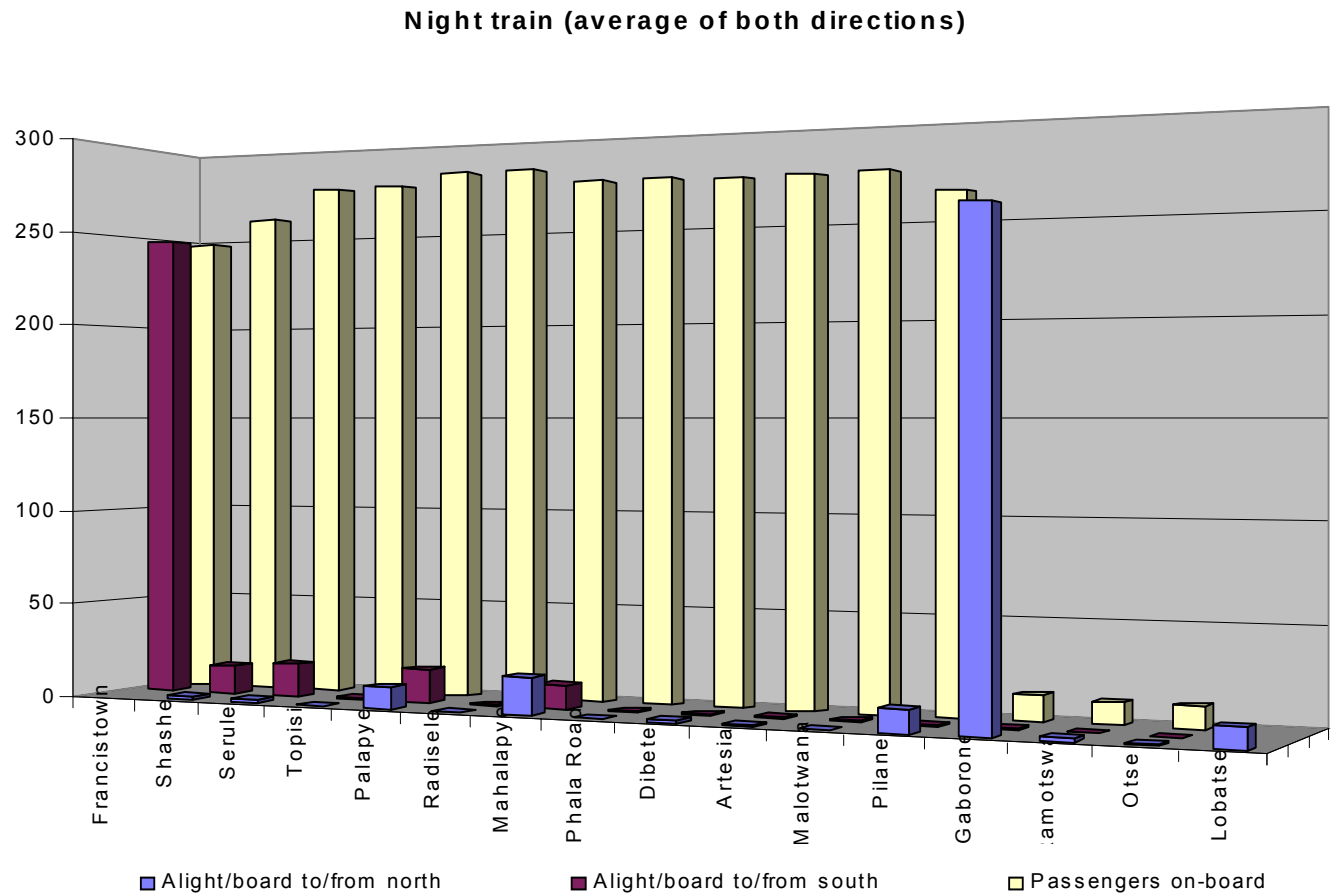
Based on 2002 operations; commuter service estimated

The day train currently has an average maximum load of about 400 passengers, with loadings a little lower north of Mahalapye



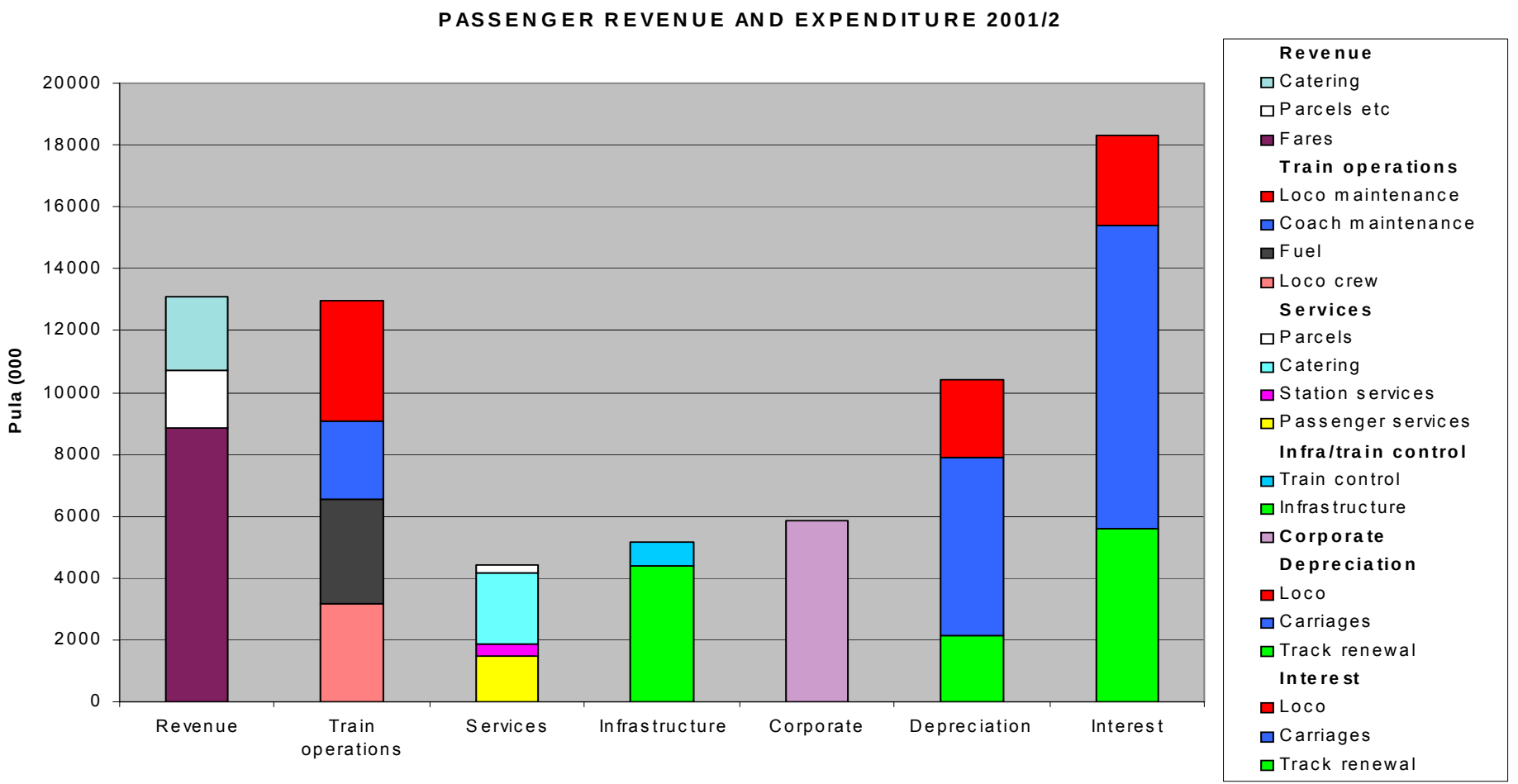
Based on analysis of ticket sales for November 1-7 2002

The night train carries mostly end-to-end traffic between Gaborone and Francistown, with an average load currently of about 280, but is very lightly loaded between Gaborone and Lobatse



Based on analysis of ticket sales for November 1-7 2002

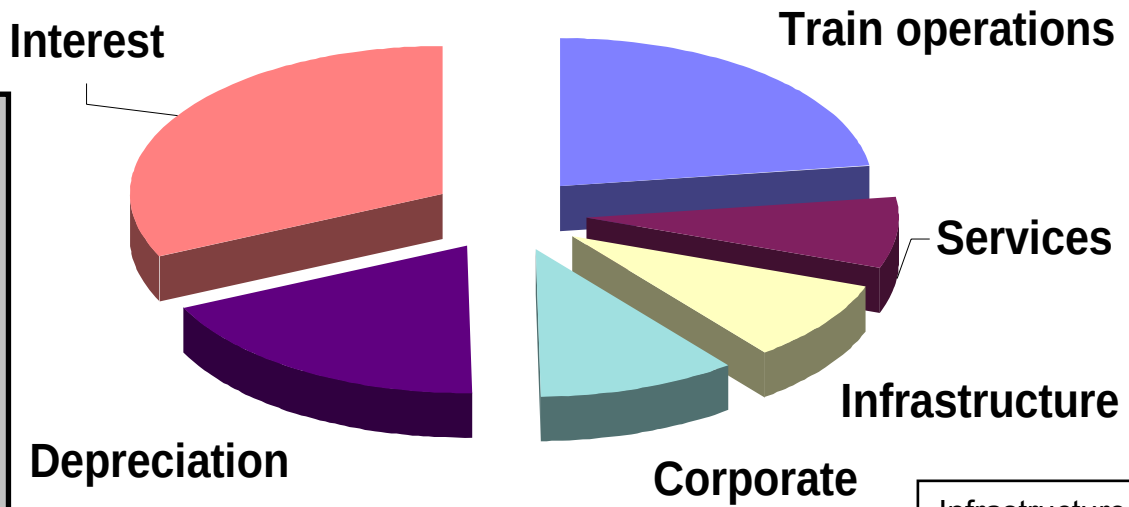
The overall financial performance is poor – revenues barely cover fuel, crew and rollingstock maintenance



Commercially, revenue must cover marginal recurrent operating costs (train operations and services) as well as the capital costs of assets that will be replaced

Interest calculated at 7% real. In Botswana, loco capital should be covered; coaches and track could be treated as effectively sunk

Train operations cost probably understated as historically coaches have been under-maintained.



Cost of services uncertain as booking to passenger and freight cost centres does not properly reflect actual activities.

Revenue (currently Pula 13 million) should aim to cover:

	Pula (million)
Train operations	13
Services	2
Variable infrastructure	2
Share of corporate	4
Loco depreciation	3
Loco interest	3
Total	27

Corporate management is high (up to twice) compared to other railways – fixed in short –run but will vary pro rata to other costs in long-run

Infrastructure-related costs are largely fixed but passenger services impose some costs associated with track quality, train control and some wear and tear.

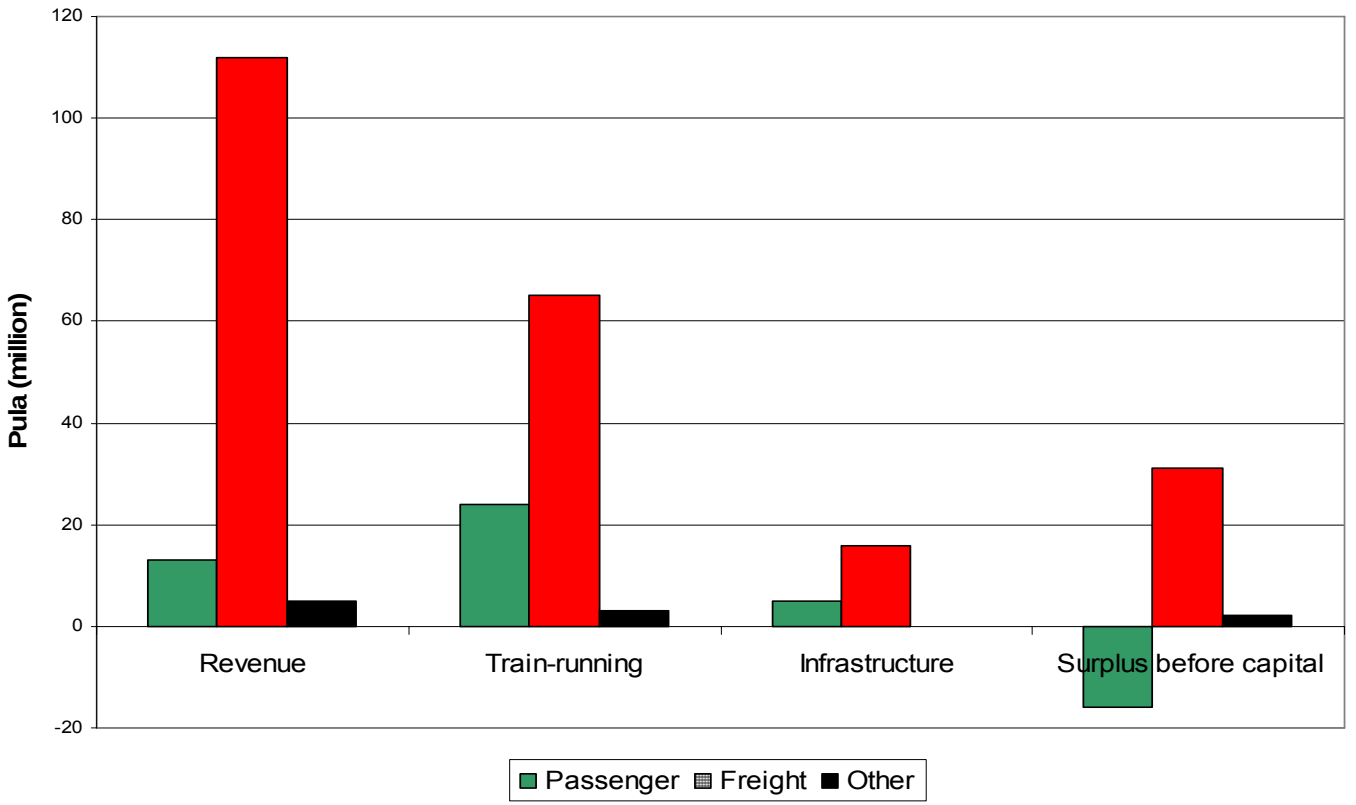
Based on the analysis, management developed three sets of options to improve the financial performance of the services

- **Operational changes**
  - Improve carriage utilisation by using common rakes on both the day and night services – reducing fleet requirements and maintenance costs
  - Attaching priority freight to the night services
  - Rationalising maintenance and car-cleaning facilities
- **Route changes**
  - Operate only between Gaborone and Francistown
  - Withdraw low-volume stops for night service
- **Level-of-service changes**
  - Withdraw sleeper service and ensure club/second service is a net contributor

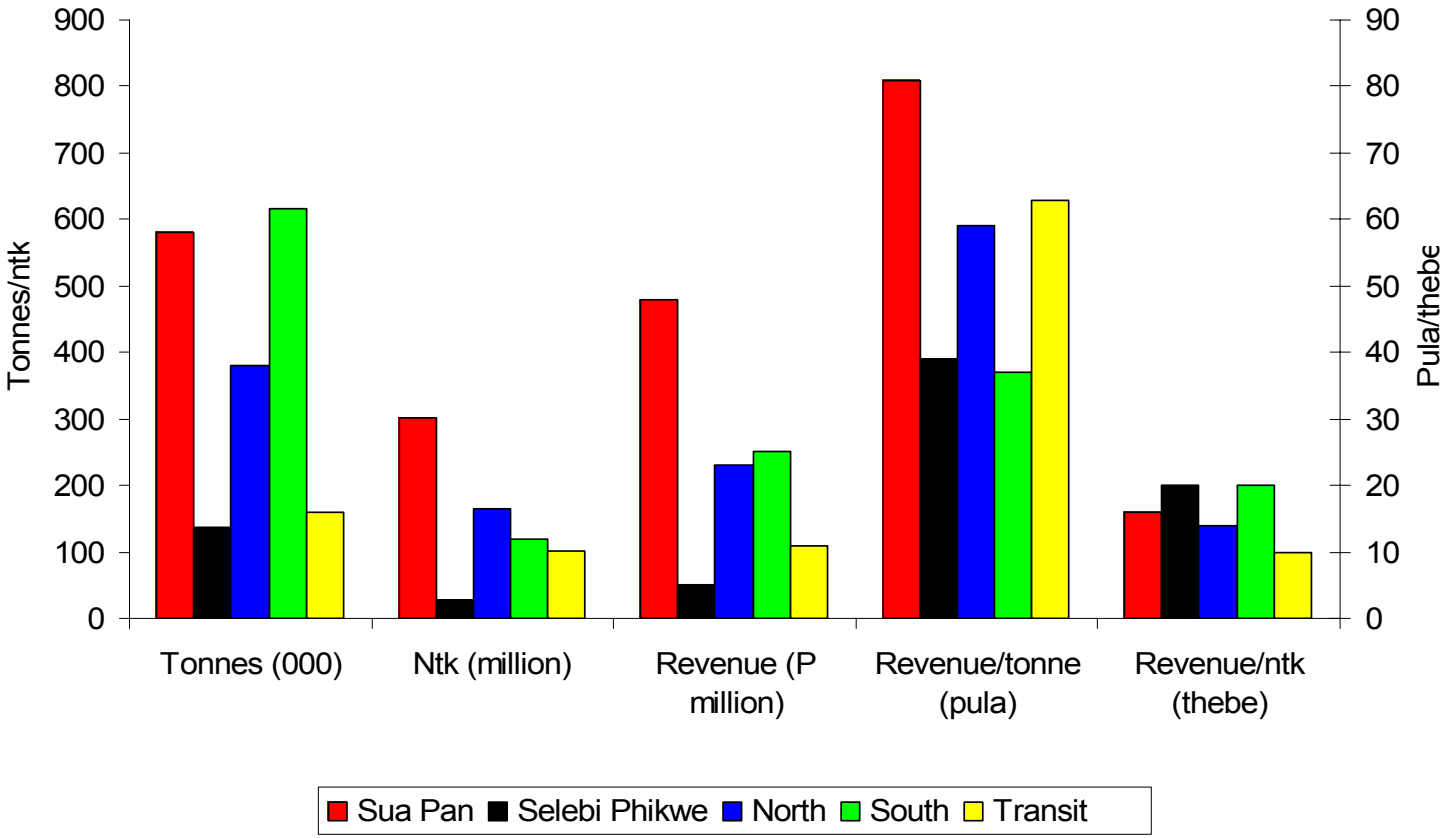
Some of these changes can be done on a stand-alone basis – others need to be done in combination. The combined effect of the above measures would improve overall cost recovery from 40% to 60%

Know your costs - freight

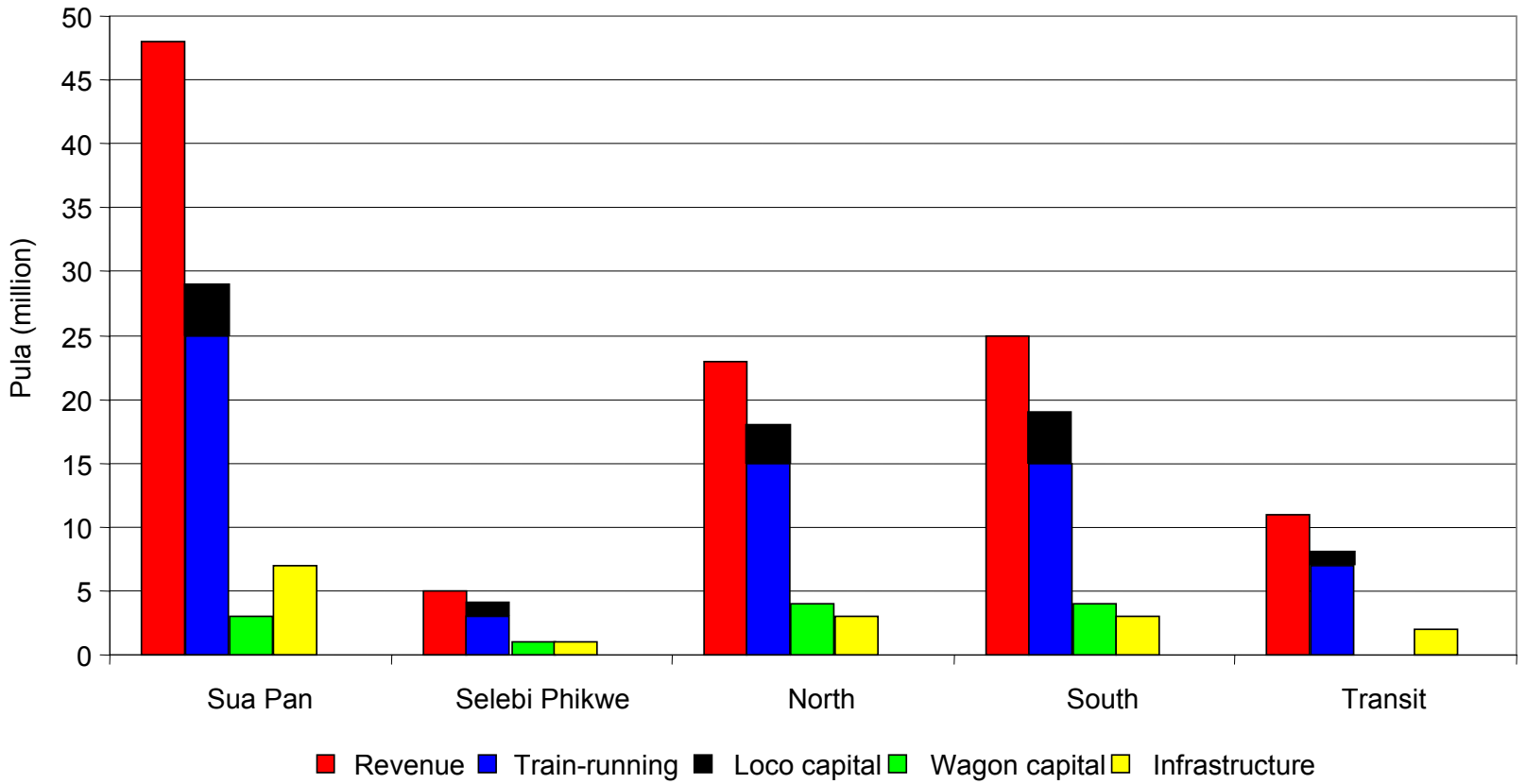
By contrast to passenger, the BR freight traffics easily covered their working costs in 2002



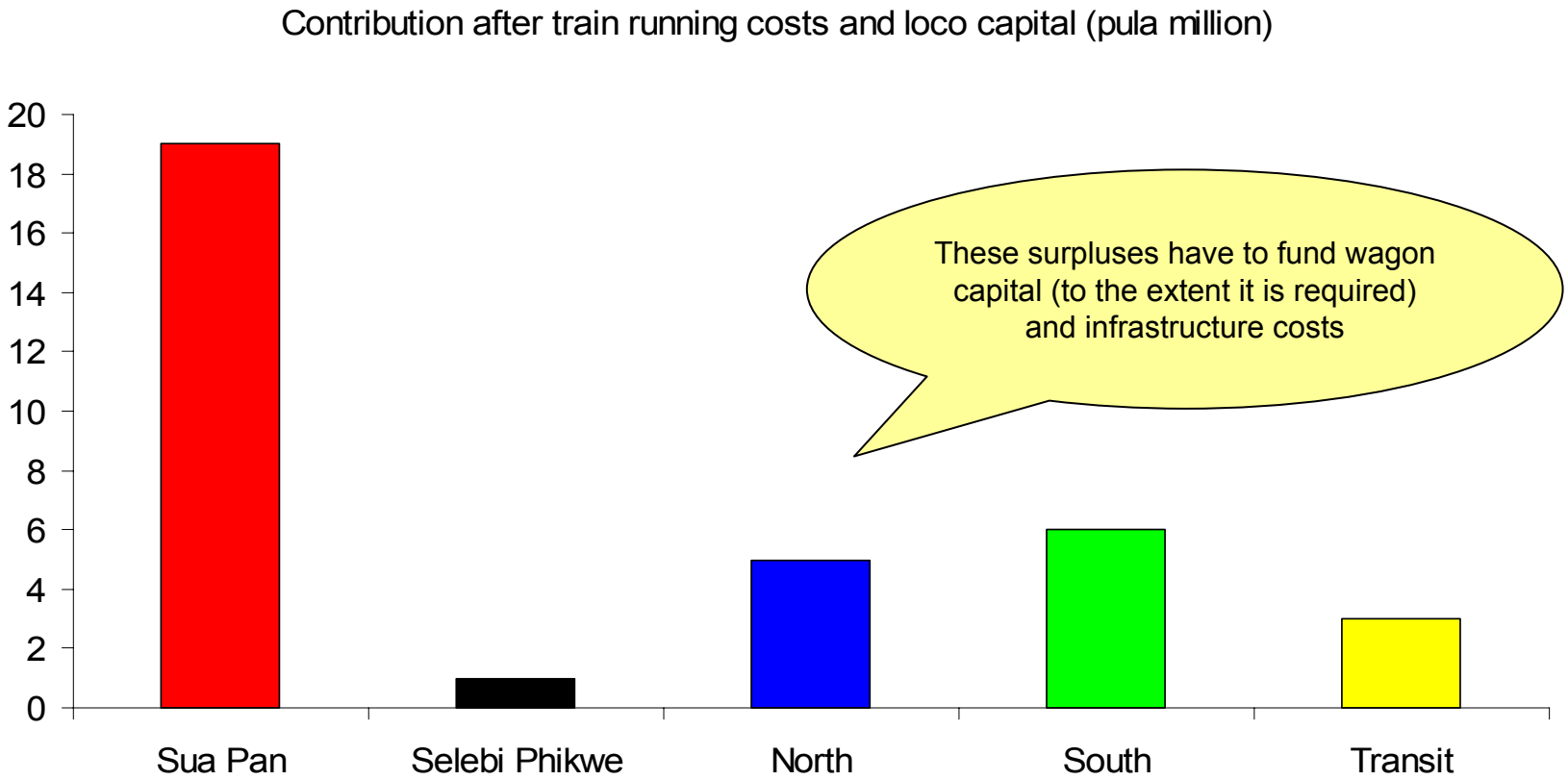
The freight traffics form five groups – the largest is the Sua Pan soda ash traffic to South Africa



But the margin above train running and loco capital costs varies significantly between traffics



The Sua Pan traffic (40% of ntkm) generates all the aggregate freight contribution to passenger and corporate costs



More detailed analysis showed that many of the individual traffics (especially to/from South) failed to cover even train-running costs

Know your costs - infrastructure

It is important to understand both your input costs (unit costs of maintenance) and also the factors affecting costs – but this latter is not so easy - pay your money and take your choice!

CONSULTANTS ADVICE TO UZBEKISTAN

To develop accurate levels of variability of expenditures on an activity basis, regression analysis is often used but this requires three or four years of statistical data related to each infrastructure expenditure activity. In this instance, this was not feasible as infrastructure related expenditures could not be provided by UTY for a four-year period. **Therefore based on the consultant's experience of major freight railways working in a competitive regime, variability was set at 80% for activities that are traffic related.** While an 80% variability may appear excessive in the light of past practice it is, nevertheless, considered normal when dealing with open access for market-driven railways and the necessity to recover, as a minimum, all variable expenditures.

CONSULTANTS ADVICE TO KAZAKHSTAN

Rail infrastructure costs can be considered as being mostly fixed and not vary directly with the volume of traffic that uses the infrastructure. There have been many technical discussions on the issue of the variability of infrastructure costs due to a higher frequency or heavier train loads. **Typically the variable costs of providing and operating railway infrastructure range between 15% and 25%.** Such costs include a proportion of maintenance costs associated with the wear and tear of the track and associated equipment, certain shunting activities, dispatching trains and other traffic control services, breakdown and emergency services. Most other costs are fixed as they are related to time, weather and the environment and will be incurred irrespective of traffic density.

So what might be the right answer?

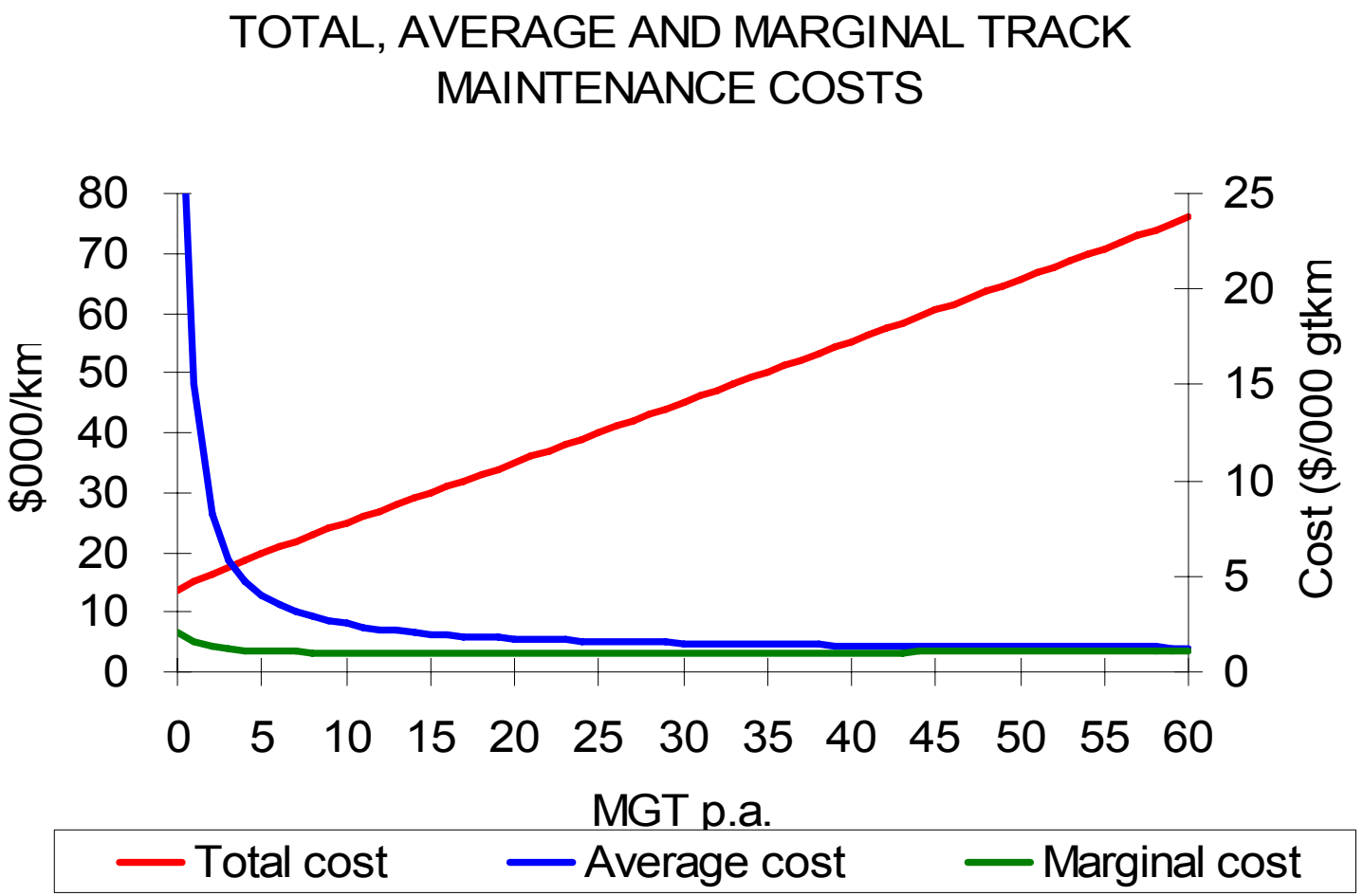
The most important group of infrastructure costs – track maintenance and renewal include activities influenced by a wide range of factors

Cost breakdown shown is for typical Australian main-line track (80-100 km/hr linespeed)

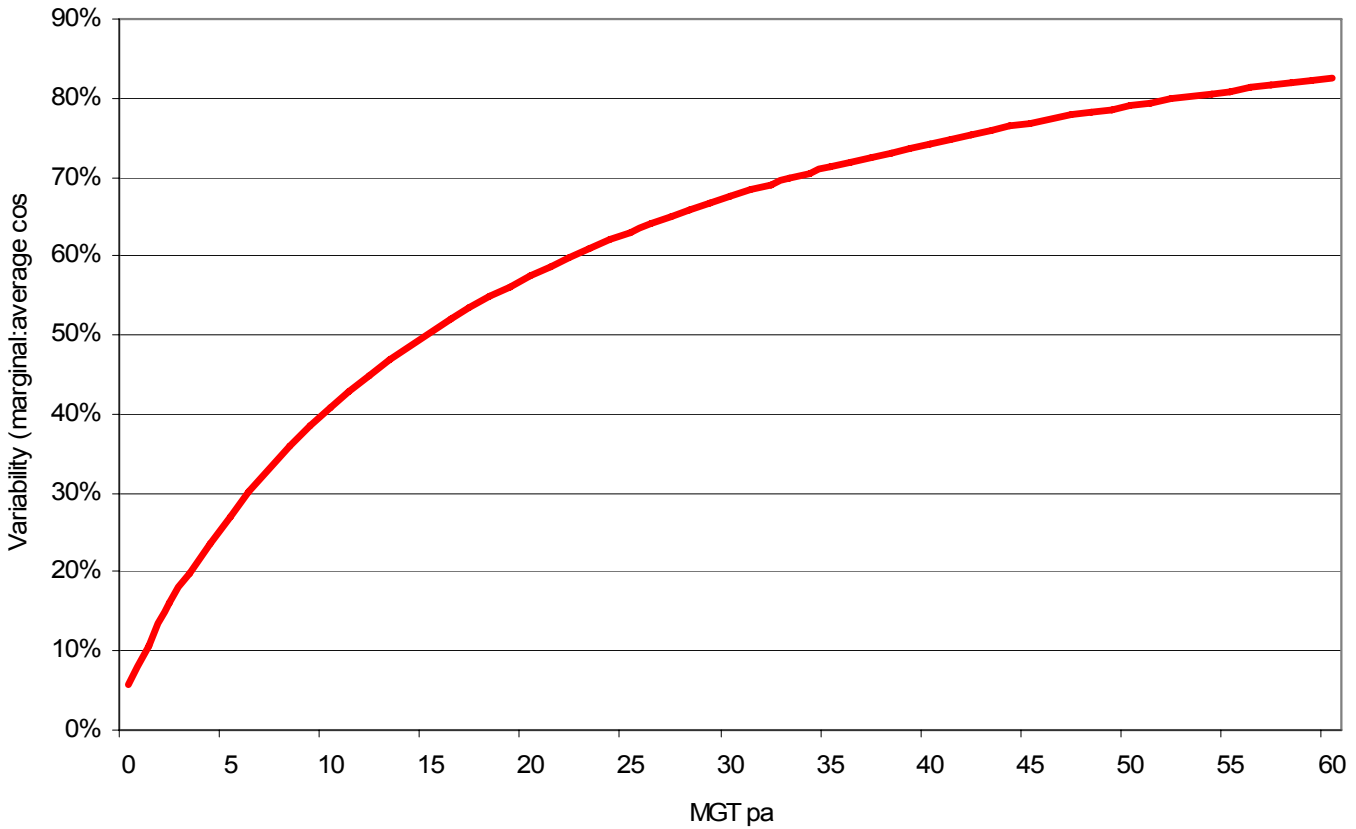
	Line speed	Volume	Elapsed Time	Standard of constr.	Climate	Curvature	% of cost	
							2MGT timber	20MGT concrete
Visual inspection	✓	✓					2	1
Other inspection		✓					0	1
Resurfacing	✓	✓		✓			8	10
Ballast cleaning		✓	✓				8	10
Rail grinding		✓				✓	1	3
Miscellaneous maintenance	✓	✓	✓	✓		✓	16	18
Formation maintenance			✓		✓		13	8
Resleepering	✓	✓	✓		✓	✓	48	25
Rail renewal	✓	✓					4	23
Total							**100**	**100**

Many of these cost relationships are non-linear e.g. resurfacing (tamping) is probably variable with Tonnes$^{0.3}$

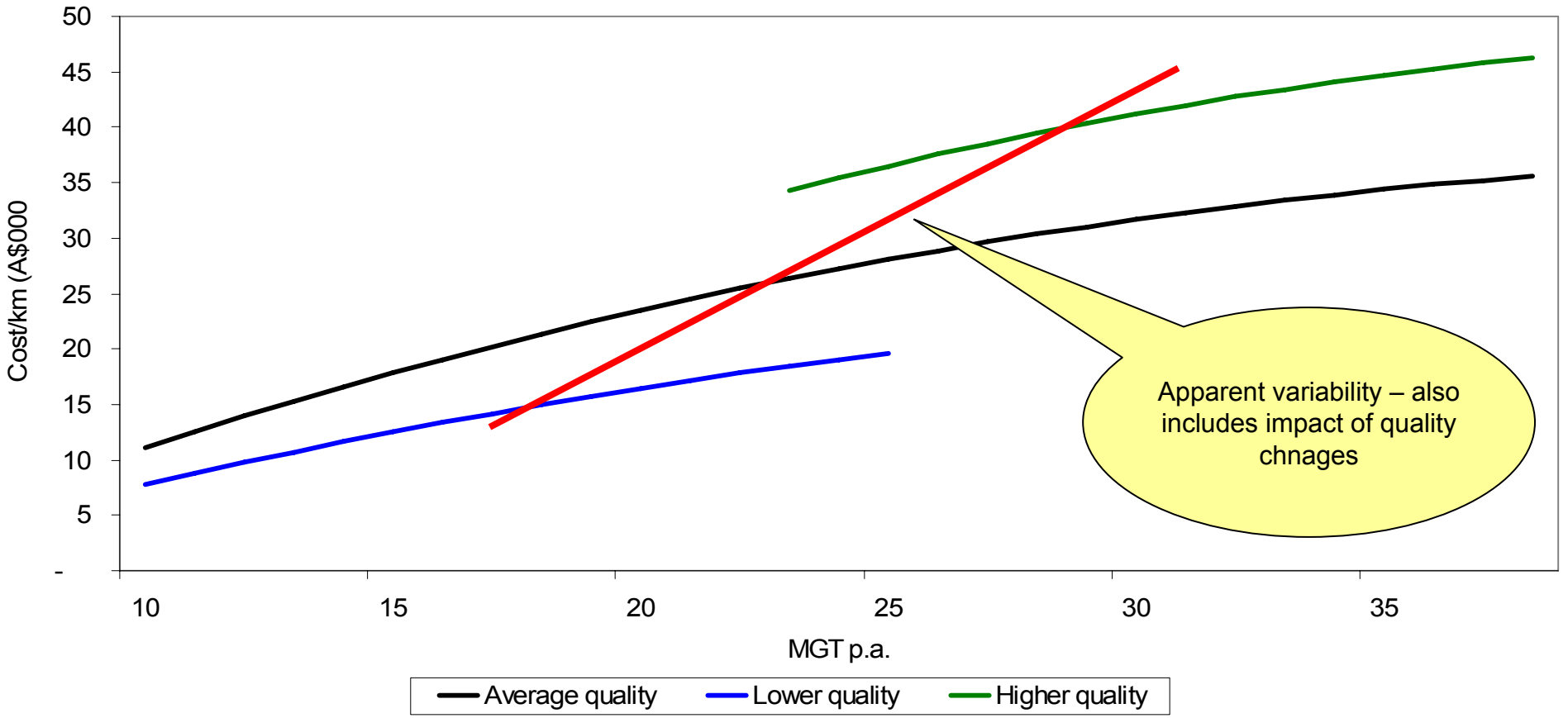
An aggregate cost function for Australian track maintenance and renewal, based on individual functions for each of the components, shows average costs reducing rapidly with tonnage



Variability is thus not a single figure –it steadily increases with tonnage from almost zero at very low tonnages to 70-80% at high tonnages



But, beware, track quality (and hence cost) is also correlated with tonnage – so statistical cross-sectional analysis is likely to demonstrate a long-term variability which may not exist in practice



Setting the price

Research has shown that the choice of mode where a choice exists can be related to the difference in utility between the modes.

LOGIT MODEL

The most commonly-used model – and one that has theoretical support – is known as the **logit model.**

In this model, the proportion P of trips made by mode A is related to the difference ΔU in utility between two choices by

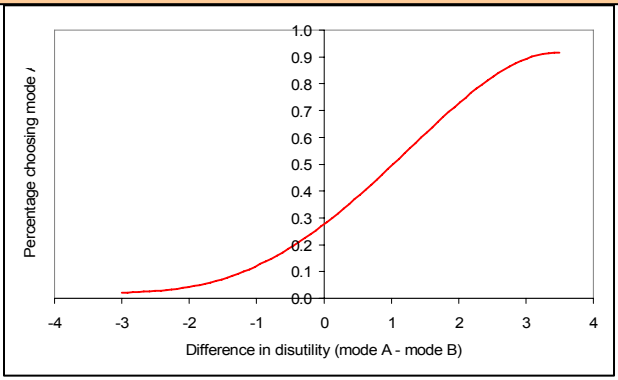
$$P = \frac{\exp(k(\Delta U+C))}{(1+\exp(k(\Delta U+C)))}$$

Logit models are very widely-used and give good results if properly calibrated.

The parameters k and C are estimated during model calibration

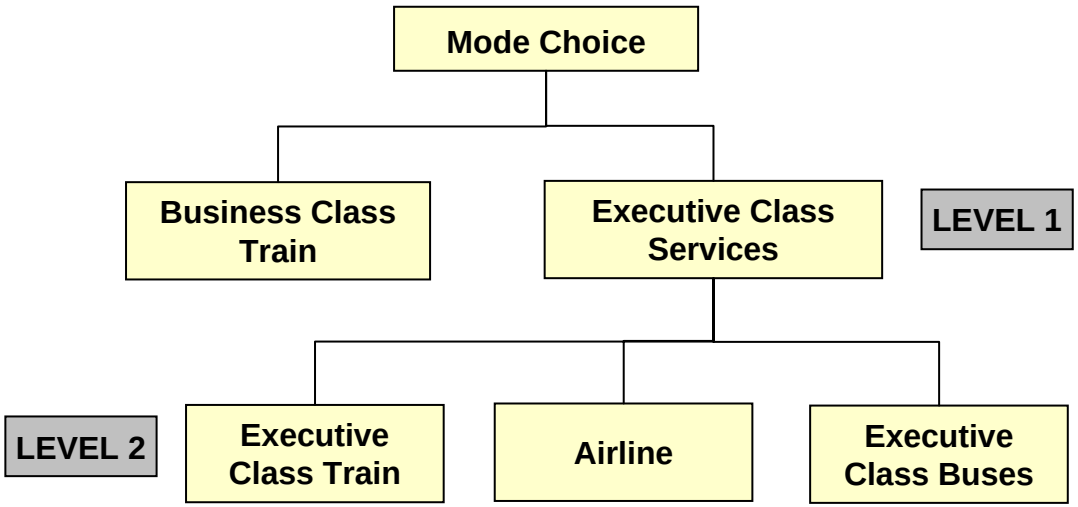
K is known as the *spread parameter*

C is the *mode-specific constant*



- The standard approach to a competitive market such as that for commercial passengers is to develop a choice model
  - The simplest form is the binomial logit model, applied where there is a choice between two alternatives (e.g. executive and business class of train where other modes do not exist)
  - In commercial markets with several alternatives – e.g., bus, air and car – a multinomial model must be used to deal with the multiple choices
  - A further complication is that some modes are 'closer' substitutes for each other than others – and to overcome this 'nested' logit models have been developed to reflect these differing sensitivities
  - Calibrating a binomial model is relatively simple but the other models are more difficult – and in order to obtain something useable some simplifying assumptions generally need to be made

An example of such a nested multinomial structure was developed in Indonesia: it has two levels in which level 1 chooses between executive class modes and business train and level 2 between executive train, airplane, and executive bus



Model characteristics and assumptions

- All logit models assume each individual has a utility function with a systematic compoent reflecting the physical characteristics of each choice and a random component reflecting his personal taste. However, each person is also assumed to behave rationally in maximising his personal utility
- In a multinomial model the probability person t chooses alternative i from a choice set Ct =

$$Pit = \frac{e^{Vit}}{\sum_{i \in Ct} e^{Vjt}}$$

- Nested logit models are derivatves of the above model in which the choices are considered as taking pace in two or more stages – as shown in the diagram
- Vit = systematic utility function in this case can be simplified as the sum of fare and the value of time, as discussed previously

A model was calibrated using survey data combined with market information and general experience

These parameters (in Rp 000) allow for non-measured factors e.g. suitability of schedules, difficulty of booking, general preferences for a particular mode due to perceived safety, comfort etc

The spread parameters determine the sensitivity of the model to changes in variables such as fare, travel time etc – they are directly related to the *elasticity* of demand.

The generation parameter determines the amount of suppression and generation that occurs when variables change – these are trips that do not divert to or from other modes but are not made at all.

Demand model calibration parameters

	Surabaya	Semarang
Mode-specific constants		
Executive rail	0	0
Business rail	-230	-65
Air	245	75
Executive bus	-210	-105
Spread parameters		
Level 1	0.008	0.008
Level 2	0.010	0.010
Generation parameter	0.001	0.003

The parameters differ for the two routes – partly due to the inherent differences in the characteristics of the two markets and partly due to the mixed quality of the base market data – which could be improved with further research

The model predicts a tariff increase by Rp. 40,000 will reduce PTKA market share by 7%, equivalent to a 26% reduction in demand – but some of these transfer to business class

Market shares – Base Case and with executive rail fare increase of Rp 40,0000

	Base		Rail +Rp 40,000	
	Surabaya	Semarang	Surabaya	Semarang
Market share				
Executive rail	30%	26%	23%	19%
Business rail	14%	40%	15%	43%
Air	49%	18%	54%	20%
Executive bus	6%	17%	8%	18%
Trip generation			-1.0%	-2.7%

The model forecasts a 26% reduction in demand for a fare increase of 24% to Surabaya and 31% to Semarang. This gives a fare elasticity of about -1, a value at which revenue remains constant.

This prediction can be checked against historic data and the model parameters adjusted accordingly.

Conversely, an air tariff increase of Rp. 50,000 will reduce air's market share by between 25-35% and increase PTKA market share by 11% to Surabaya and 5% to Semarang

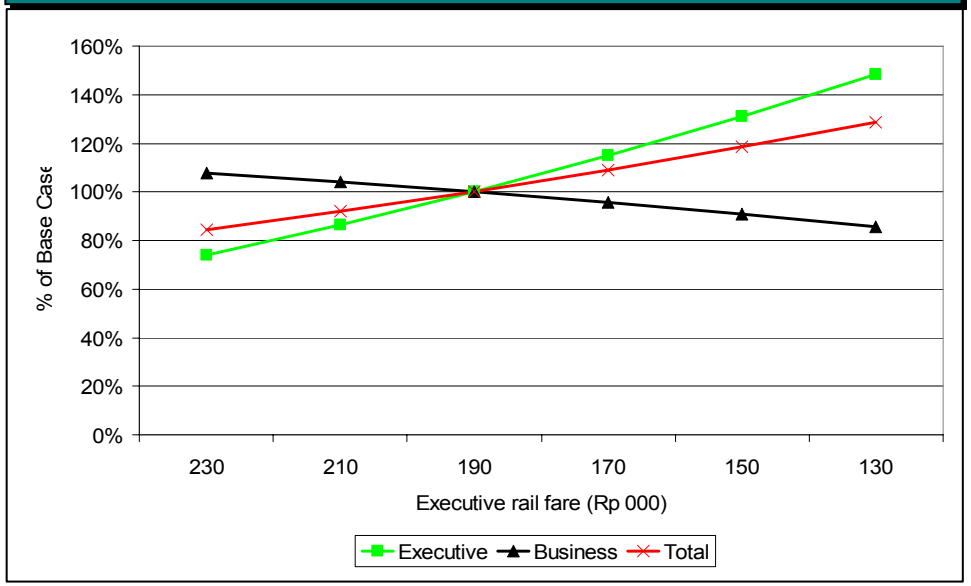
Market shares – Base Case and with air fare increase of Rp 50,0000				
	Base		Air + Rp 50,000	
	Surabaya	Semarang	Surabaya	Semarang
Market share				
Executive rail	30%	26%	38%	28%
Business rail	14%	40%	17%	42%
Air	49%	18%	37%	12%
Executive bus	6%	17%	9%	18%
Trip generation			-2.1%	-2.2%

The response of PTKA demand to a change in the characteristic of another mode (in this case the air fare) is known as the *cross-el;asticity*, and for the Surabaya market is estimated at about 1.8 (an increase in demand of 20% for an increase of 12% in airfare), although the corresponding estimate for Semarang is rather small at 0.4.

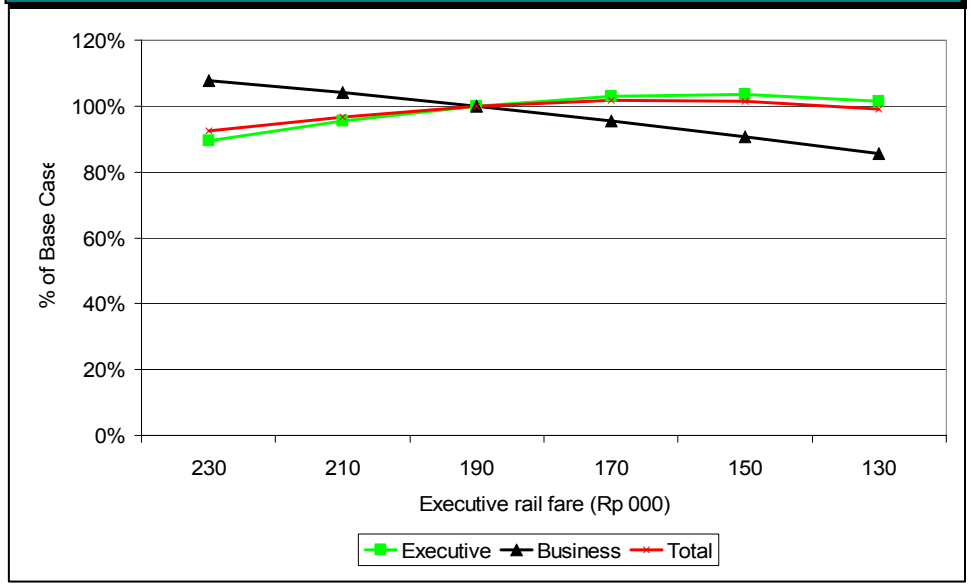
Again, these predictions can be checked against historic data and the model parameters adjusted accordingly.

This suggests the current rail fare structure between Jakarta and Surabaya is about right.

Demand as a function of executive rail fare



Revenue as a function of executive rail fare



The case study costings estimated the floor price of executive travel at Rp 88 per passenger-km, excluding tuslah. This wpuld cover train operating costs but contribute nothing to track costs or corporate overheads. For the Surabaya service (725 km) this gives an absolute minimum fare of about Rp 75,000, comfortably below even the lowest fare considered in this analysis. However, as such a price is below the business class fare it would destroy PTKA's pricing structure and has not been included in this analysis.

Setting the price - freight

The Gede Bage terminal is a dry port which is part of a chain of transport services (including freight forwarders (EMKL) and terminal operators (PT MTI and PT JICT)) for Bandung and West Java exporters/importers

EMKL / Freight Forwarders/ Trucking	PTKA – Freight Terminal and Train	PT. Multi Terminal Indonesia – Pasoso Terminal and Transport	PT. JICT – Container Terminal
▸ Connect exporters with foreign market ▸ Have the flexibility to use railway-based or road based services ▸ Transport containers from the factory to PTKA's freight terminal or directly to the port ▸ Influenced by Organda rate for trucking	▸ Export document management, quarantine, banking etc ▸ Container storing ▸ Container handling (loading off and loading on) ▸ Container transport from Gede Bage to Pasoso/Lagowa station ▸ Transport container from Pasoso/Lagowa to Gede Bage	▸ Container handling ▸ Container storing ▸ Container transporting from Pasoso station (the land for Pasoso terminal is owned by MTI) to JICT	▸ Container handling ▸ Ship loading and un-loading ▸ Container storing

KAI, MTI and JICT signed an agreement in year 1999 for a joint tariff

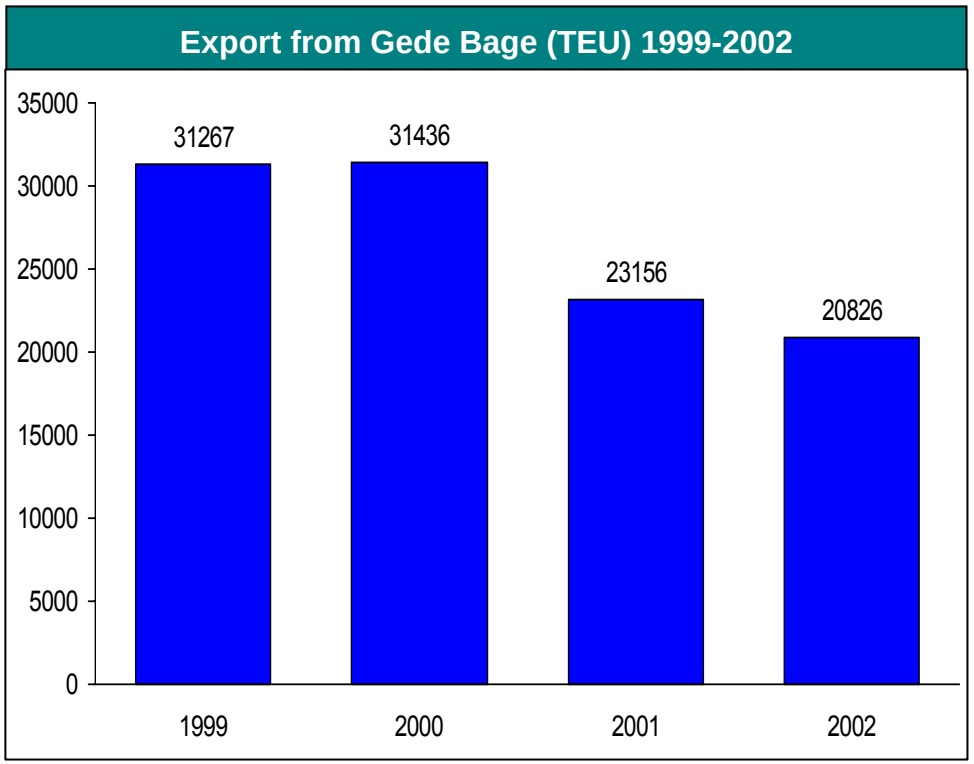
In 1999, PTKA entered an agreement with MTI and JICT to integrate their services including offering a joint tariff to the customers

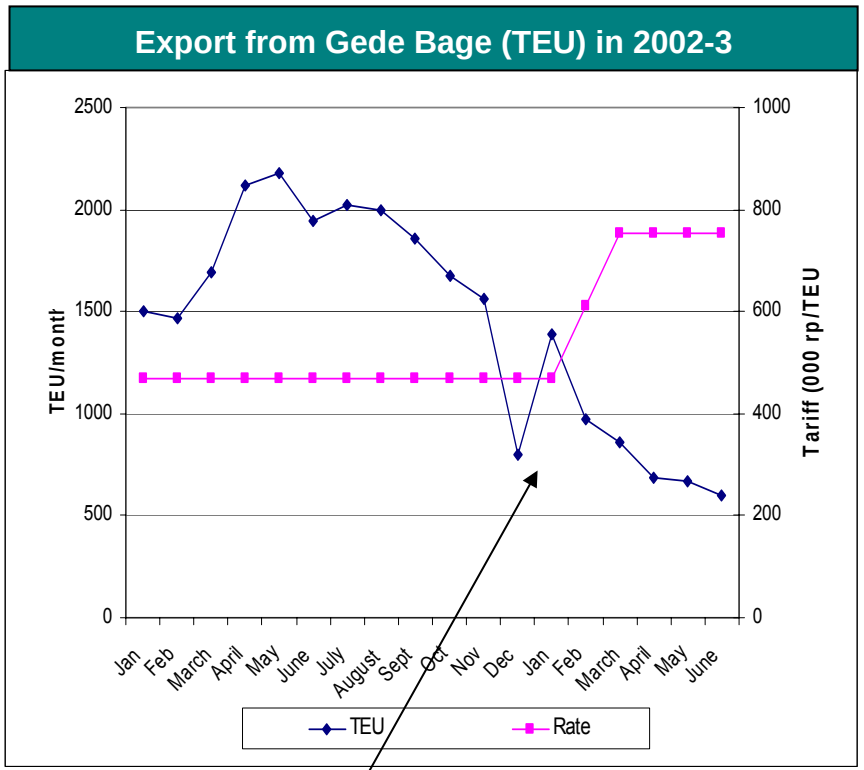
Role and Responsibility of Each Party
▸ PTKA prepare export summary list, export documents, container exchange interchange receipt, train documents and transport container from Gede Bage to Pasoso ▸ MTI inform PTKA on ship schedules, prepare equipment, labor and storage areas, perform loading off and loading on of container in the Pasoso terminal; transport containers from Pasoso to JICT ▸ JICT prepare ship schedules, provide priority to the Gede Bage containers from gate in to the stacking areas; put containers on the ship

Activities & Rate in 1999 (Rupiah 000)	Feet	PTKA	MTI	JICT	Total
▸ Container from TPKB to JICT via Pasoso or vise versa	▸ 20 ▸ 40	▸ 232 ▸ 390	▸ 107 ▸ 154	▸ 23 ▸ 37	▸ 363 ▸ 580
▸ Container from TPKB to Pasoso or vise versa	▸ 20 ▸ 40	▸ 232 ▸ 390	▸ 47 ▸ 73		▸ 279 ▸ 463
▸ Empty container from TPKP – Pasoso or vise versa	▸ 20 ▸ 40	▸ 137 ▸ 233	▸ 23 ▸ 37		▸ 160 ▸ 270

$US = Rp 8000 approx

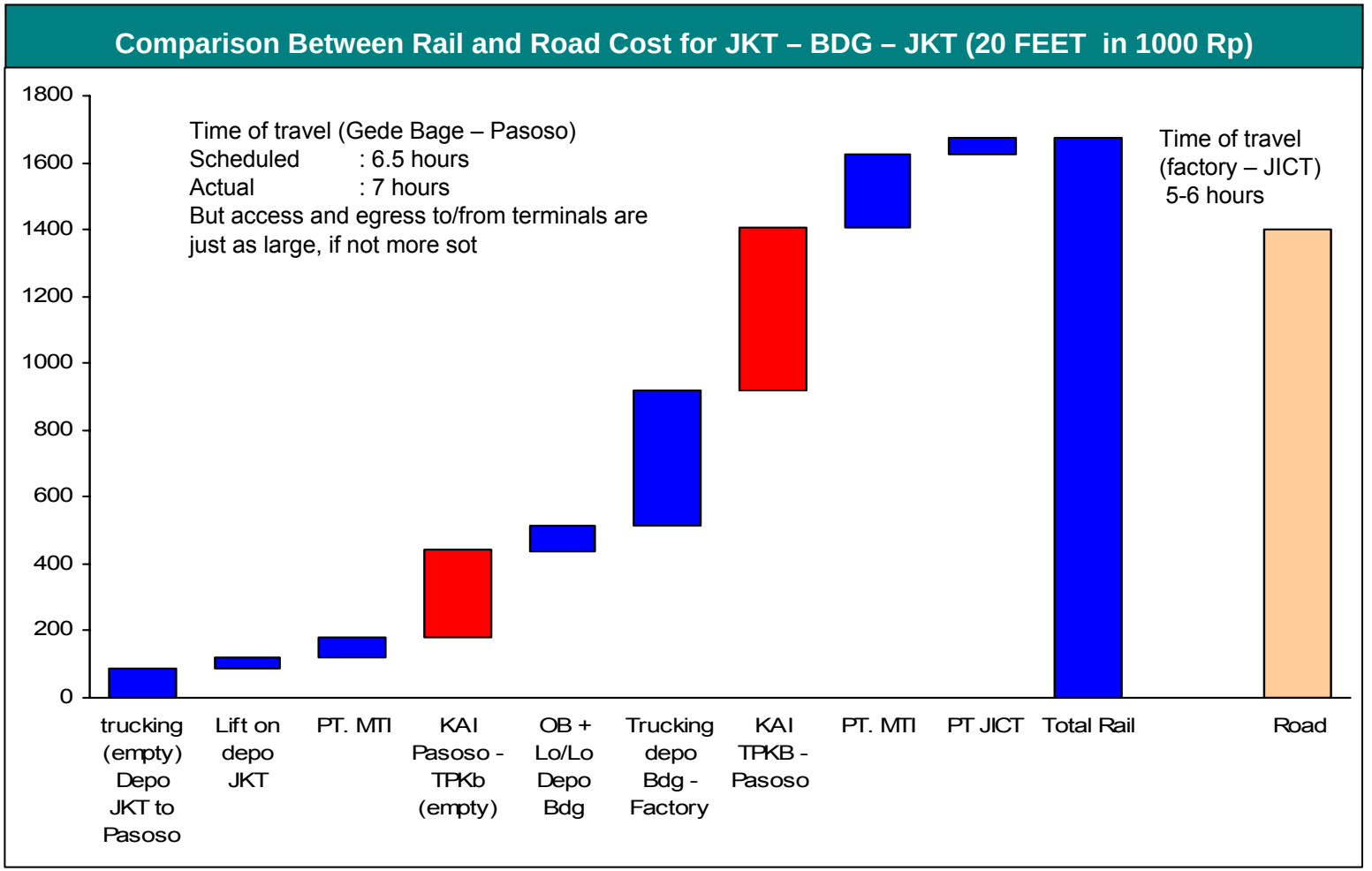
The tariff package (KAI + MTI + JICT) was increased in May 2001 and again, by an average 66% by each party in February 2003; both increases had a significant impact on rail container traffic



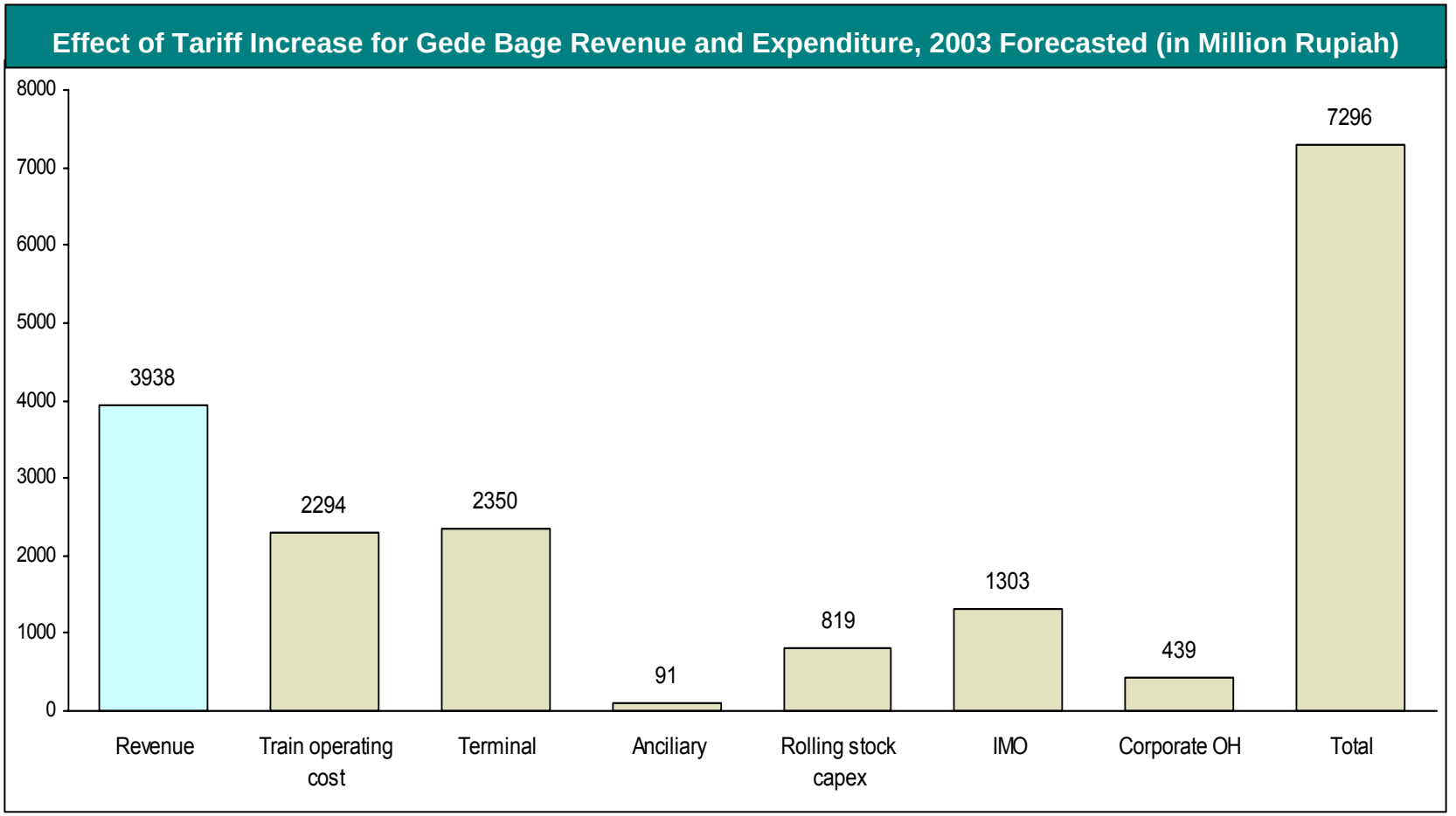


Tariff increased in May 2001 and again in February 2003

The current tariff structure causes the rail-based service to be less competitive than the road-based service; even more so when the comparative travel time and flexibility are taken into account



After the latest tariff increase revenue now cover train operating and rollingstock renewal costs but still not its terminal costs



There are at least three alternatives for an improvement strategy to create an avoidable cost that is less that market price

ALTERNATIVES

Review the operating plan and unit costs

- Train operation (schedules, train consist etc)
- Rolling stock maintenance (loco, wagons etc)
- Station and terminal operations etc
- Review unit costs
- Should plans be based on actual or future/efficient costs?

Review the business model

- Gede Bage container traffic – should PTKA be a wholesaler or a retailer

Factors which justify support by Government ?

- Road congestion and damage
- General political/development considerations

As a last resort, prepare exit plan

- First decide objective (e.g. what should Gede Bage look like in 5 years time)
- Develop plan to achieve objective

Operation Plan Improvement

- Within the Gede Bage general cost, 77% are for the terminal operation that is being outsourced. PTKA should analyse and renegotiate (if required) for the outsourcing of the Gede Bage freight terminal management
- Establishment of Gede Bage as a business unit under the Divisi Kereta Barang that will be established as part of the KAI restructuring
- Gede Bage freight services as well as other units should be operated with clear performance indicators to ensure the traffic is not treated as second class after the passenger traffic
- High flexibility to be given to the Gede Bage unit in determining the business model
- Establishment of a separate account for the Gede Bage service in order to more easily identify financial information

In terms of its business model, PTKA should take more control over the overall chain in upstream and downstream

Upstream Possible Improvement

- Operate as a retailer
  - Deal direct with customers
  - Have direct contracts with local truck companies to collect and deliver locally
  - Have freedom to hire truclks if necessary to carry by road to the port when there are delays by rail

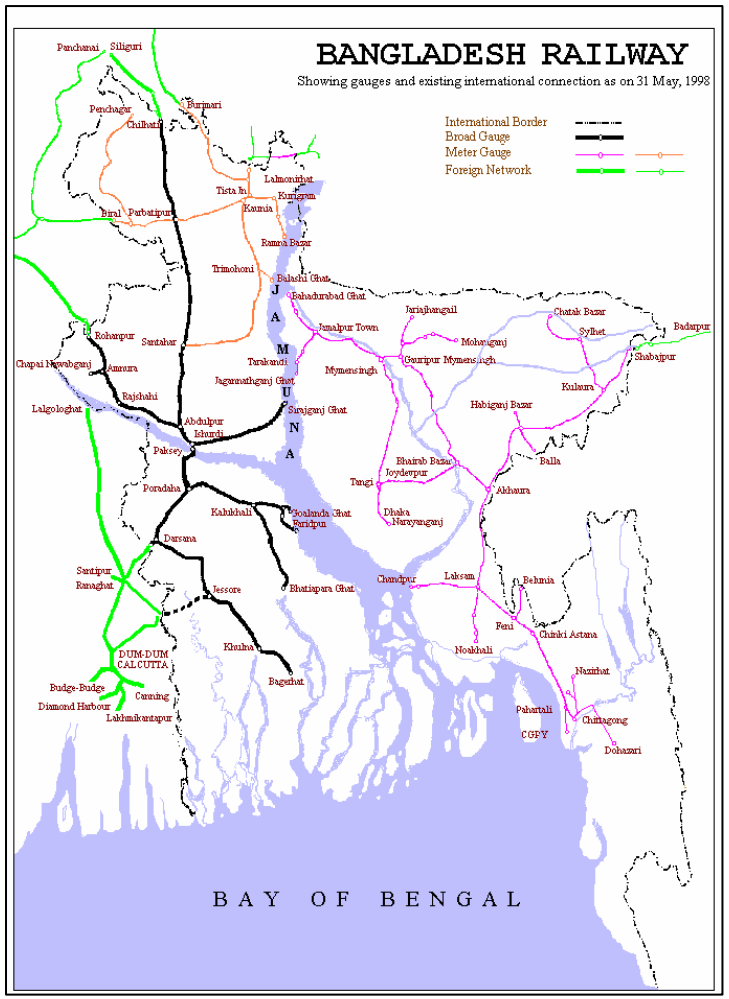
Downstream Possible Improvement

- Deal direct with JICT
- Employ contractors for local terminal handling and delivery in Jakarta
- Consider other container-related services
  - Repairs
  - Cleaning
  - Storage

- However, it will be very difficult for PTKA to successfully compete under public-sector constraints
- The container business unit must have considerable commercial freedom and should be clearly separated from the rest of PTKA
- While rail-oriented it should not be 100% tied to rail
- It could own or lease the container wagons with haulage provided by PTKA proper under a formal contract – probably on a take-or-pay arrangement

Controlling costs - passenger

Better ticketing systems can be installed at little cost to the railway



Bangladesh Railways installed one at little cost to itself

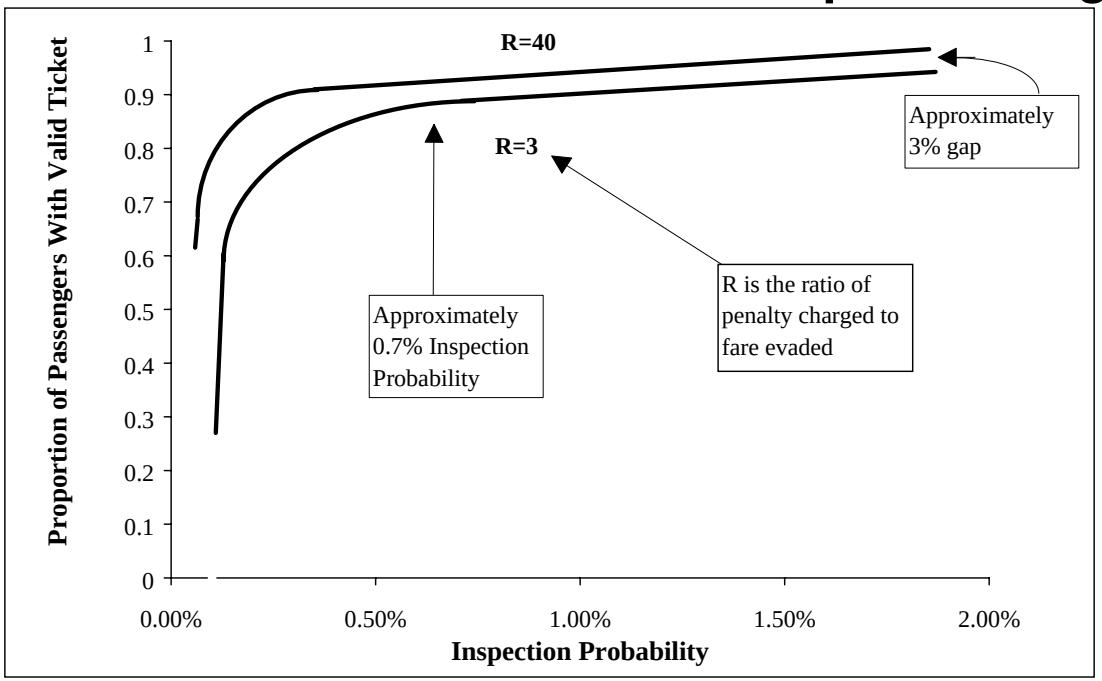
Contract awarded using two-stage process

The contractor:
- Designs, sets up and operates the computer network and terminals,
- Maintains hardware and software,
- Pays a fixed monthly stipend to BR booking clerks,
- Hands over the system to BR at the end of the contract period.

BR
- Pays the contractor at a rate per ticket issued
- Pays normal salary to the booking clerks

Contract duration
- 4 years after commissioning, or after a specified total number of tickets have been issued.

Fare evasion is often widespread – but it can be controlled by a suitable inspection regime



LONDON TRANSPORT POLICY

"Each passenger should have their ticket checked or see another customer's ticket being checked on one in every five trips. This seems to maximise the efficiency of ticket checking at lowest sensible costs."

Inspection probability (%)	Number of inspections		Likely level of evasion (%)	
	Annually	Frequency	Low penalty	High penalty
0.20	1.2	About every ten months	40	15
0.50	3.0	Once per four months	20	10
0.75	4.5	Once each quarter	13	9
1.00	6.0	Every two months	10	8
1.50	**9.0**	**Every 5-6 weeks**	8	**5**
2.00	**12.0**	**Every month**	**5**	2
3.00	18.0	Every 2-3 weeks	2	

Outsourcing can be an effective cost control technique

Wholesaling Local Passenger Trains in Bangladesh …….

Objective
- Curb unauthorized travelling and to reduce dependence on PSO
- Gain experience in a new area of PPP

Basic concept of scheme, the lessee
- Operates trains.
- Collects revenue directly from passengers,
- Pays BR on the basis of carriage-trips operated.

Pilot project:
- Dhaka-Narayanganj section were selected for the pilot project
- Award of contract in July, 1997
- 88% rise in BR's revenue from the trains
- Service quality improved and there was an increased demand for service
- Frequency of service then increased
- Further 28% overall rise in revenue

Now leasing out more trains - so far 44 more trains leased out (37% of non-intercity seat-km)
Result: An average 68% rise in BR's revenue

Outsourcing can be an effective cost control technique

……. and Outsourcing On-Board Services for Intercity Trains

Objective
- Improving quality of on-board services
- Preventing pilferage of fittings and fastenings of passenger carriages

Basic concept of scheme, the contractor provides stewards
- Take over the coaches before departure of the train
- Admit passengers in the coach & help them occupy the allotted seats
- Look after the comfort of passengers ;
- Hand over the coach to BR staff after the round trip

Typically
- BR pays the contractor at the agreed rate
- Contractor rents BR's buffet car

Results
- Pilot project achieved a 48% real improvement in contribution to BR

Outsourcing On-Board Services for Intercity Trains

Outsource Whole Business Segments Where Possible

Rail Services Provided by Private Operators

	Light Rail & Metro	Mainline Suburban & Commuter	Domestic Intercity Passenger	International Passenger	Freight
United Kingdom	X	X	X	X	X
France	X	X [1]			
Sweden	X	X	X		X
Germany	X	X			X
Netherlands	X	X		Planned	

1: Limited to local services operated under contract (by private operators) to SNCF

- **Concessioning and outsourcing have grown dramatically around the world**
  - **As a result, there are a number of qualified investors and operators**
  - **While often complex, concessioning can dramatically reduce costs and investment needs**

Competitive Tendering Has Reduced Costs Dramatically

Competitive Tendering of Transit Services to the Private Sector

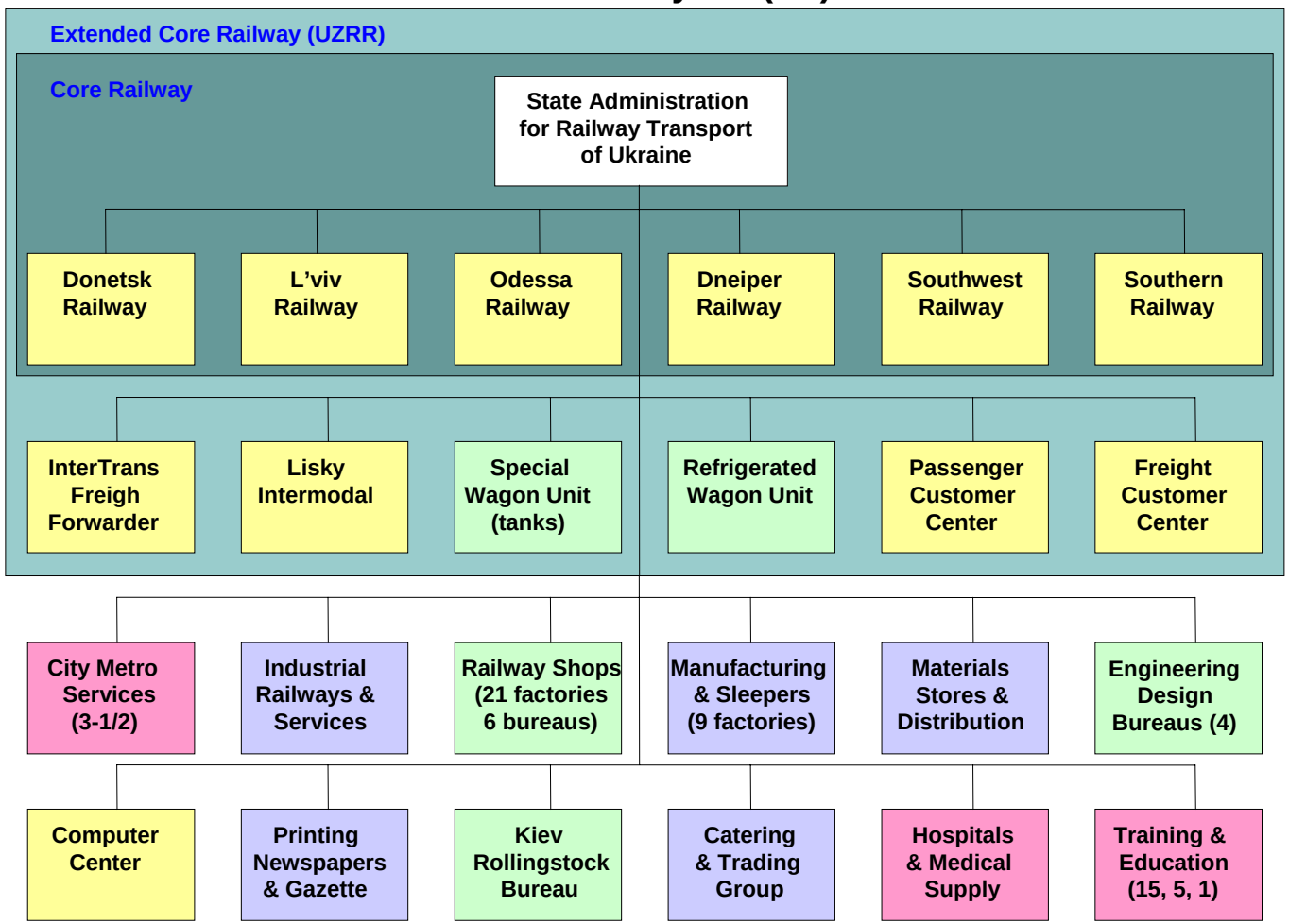
System	Period	% Converted	%Change Total Cost	%Change Service Level	%Change Unit Costs
Auckland	1990-1996	100.0%	-21.2%	16.5%	-33.5%
Denver	1988-1995	25.0%	3.0%	25.0%	-18.0%
Indianapolis	1994-1996	70.0%	8.5%	38.4%	-25.9%
Copenhagen	1989-1996	56.0%	-18.5%	5.0%	-22.3%
Las Vegas	1993-1994	100.0%	135.0%	243.0%	-33.3%
London	1985-1996	57.0%	-30.0%	28.7%	-45.7%
San Diego	1979-1996	37.0%	2.7%	46.6%	-30.0%
Stockholm	1992-1995	59.0%	-18.5%	2.8%	-20.3%

- Outsourcing provides the opportunity to bring private capital as well as new and more focused business practices-turning fixed costs and investment needs into variable costs

Controlling costs - freight

Simplify Business Structures

Ukrzaliznytsia (UZ)*



Administration

Railway

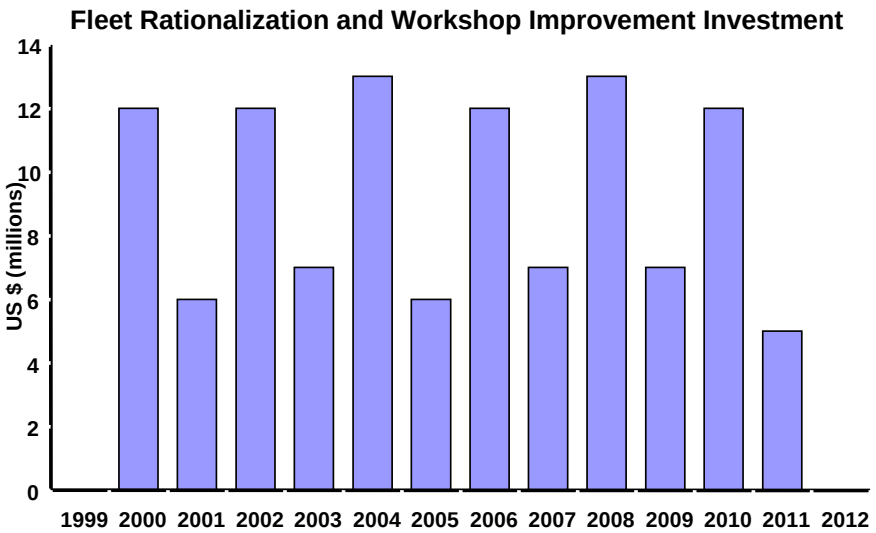
Commercial

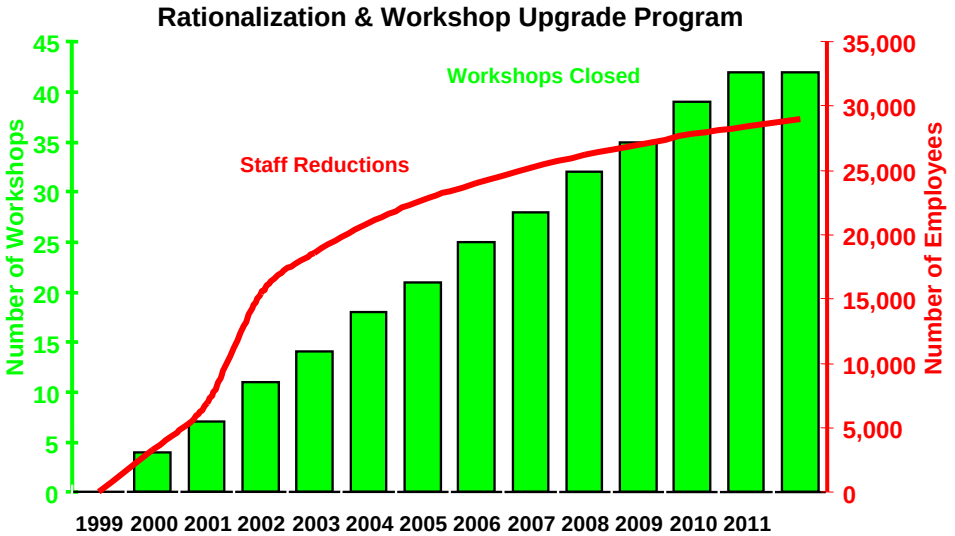
Rolling stock

Government

- UZ had over 440 business units and over 500,000 employees
- Cumbersome structures tend to make costs fixed
- Eliminate unnecessary business units, and consolidate others
- Business units should focus on defined markets with similar characteristics

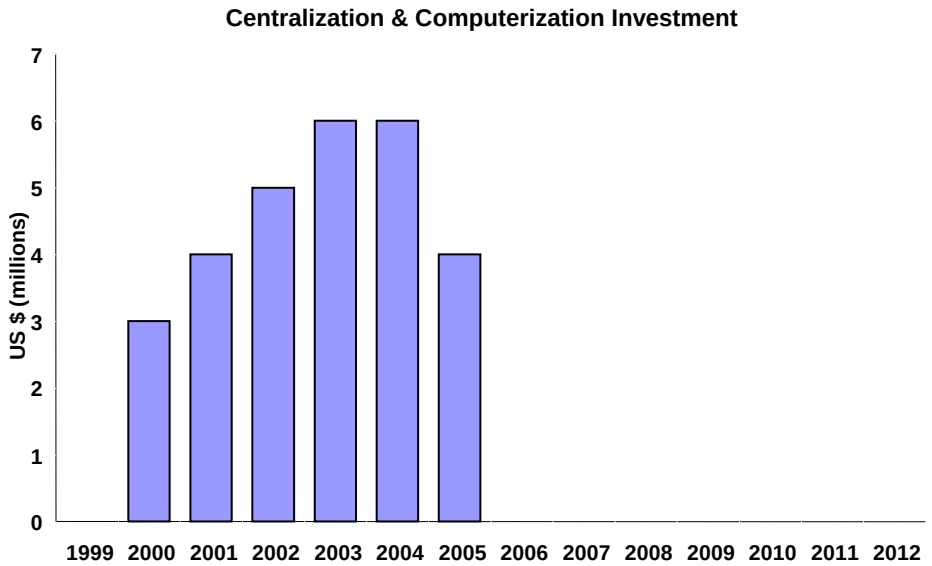
Look for ways to reduce assets

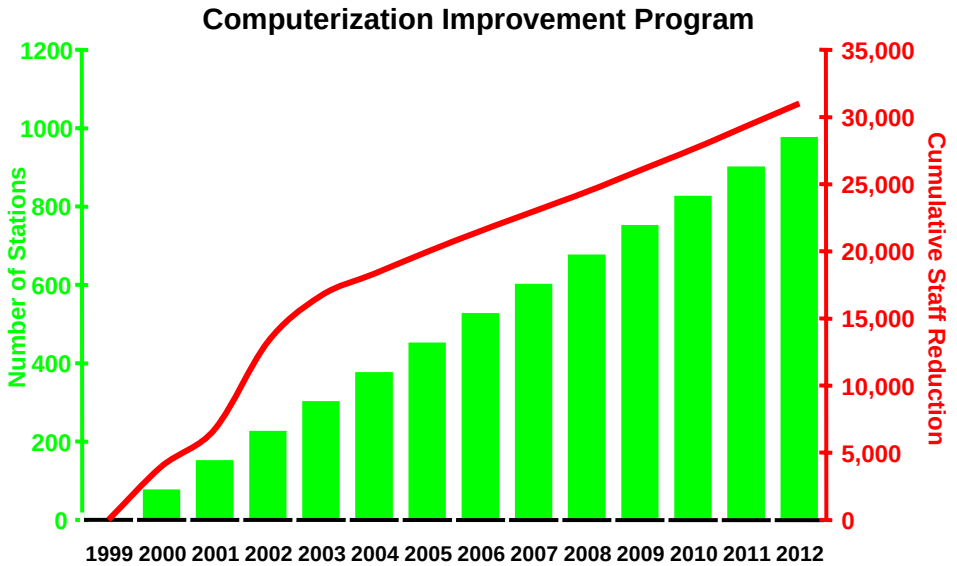




- Many state railways have multiple workshops for wagon, coach and locomotive repairs
- Most private operators, even big ones, have a single big workshop with a few smaller facilities located strategically around the system
- In part, this practice is often based on how assets are used and managed
  - Locomotives assigned to particular services and particular geographies are especially egregious
  - Common purpose equipment, managed across geographies, improves utilization and reduces assets required

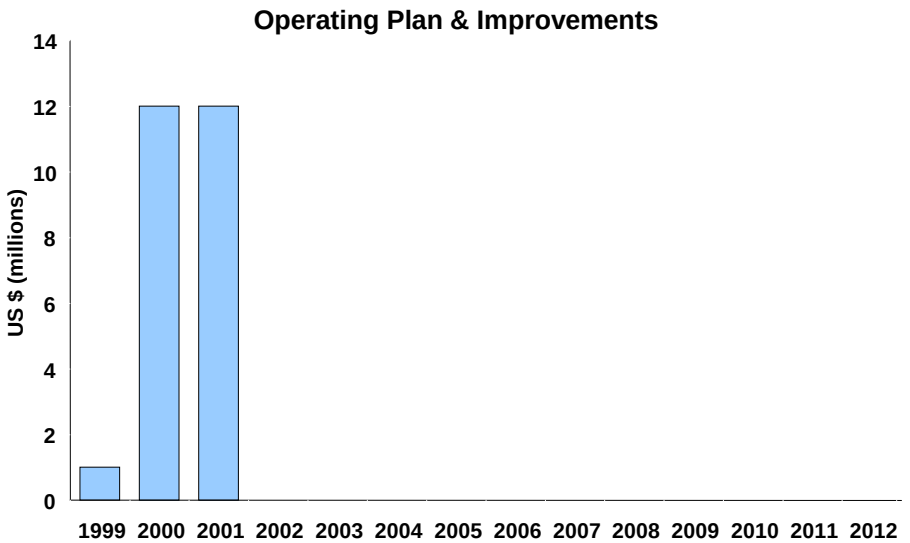
Look for ways to reduce assets

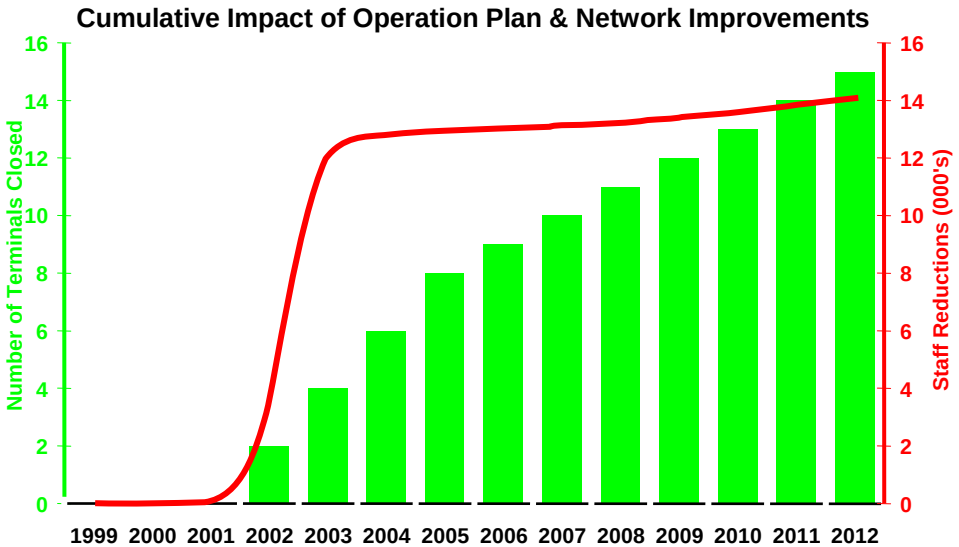




- Information technology can reduce operating costs dramatically by eliminating small stations, centralizing call centers, billing and accounting systems
- Improved train control systems, even for light density railways (through radio dispatching, for example), can reduce operating costs and eliminate unneeded assets associated with stations and mini-control centers
- Better traffic costing systems help identify opportunities and focus attention

Look for ways to reduce assets





- In railways where traffic patterns have shifted, a new operating plan can reduce the need for marshalling yards and terminal facilities and eliminate the need for locomotives
- Most major railways develop new operating plans every year and modify them intensively during the year
- CN, one of the best operated railways in the world, was able to eliminate over 300 locomotives and close 3 major marshalling yards, by developing a new operating plan focused on its best business segments

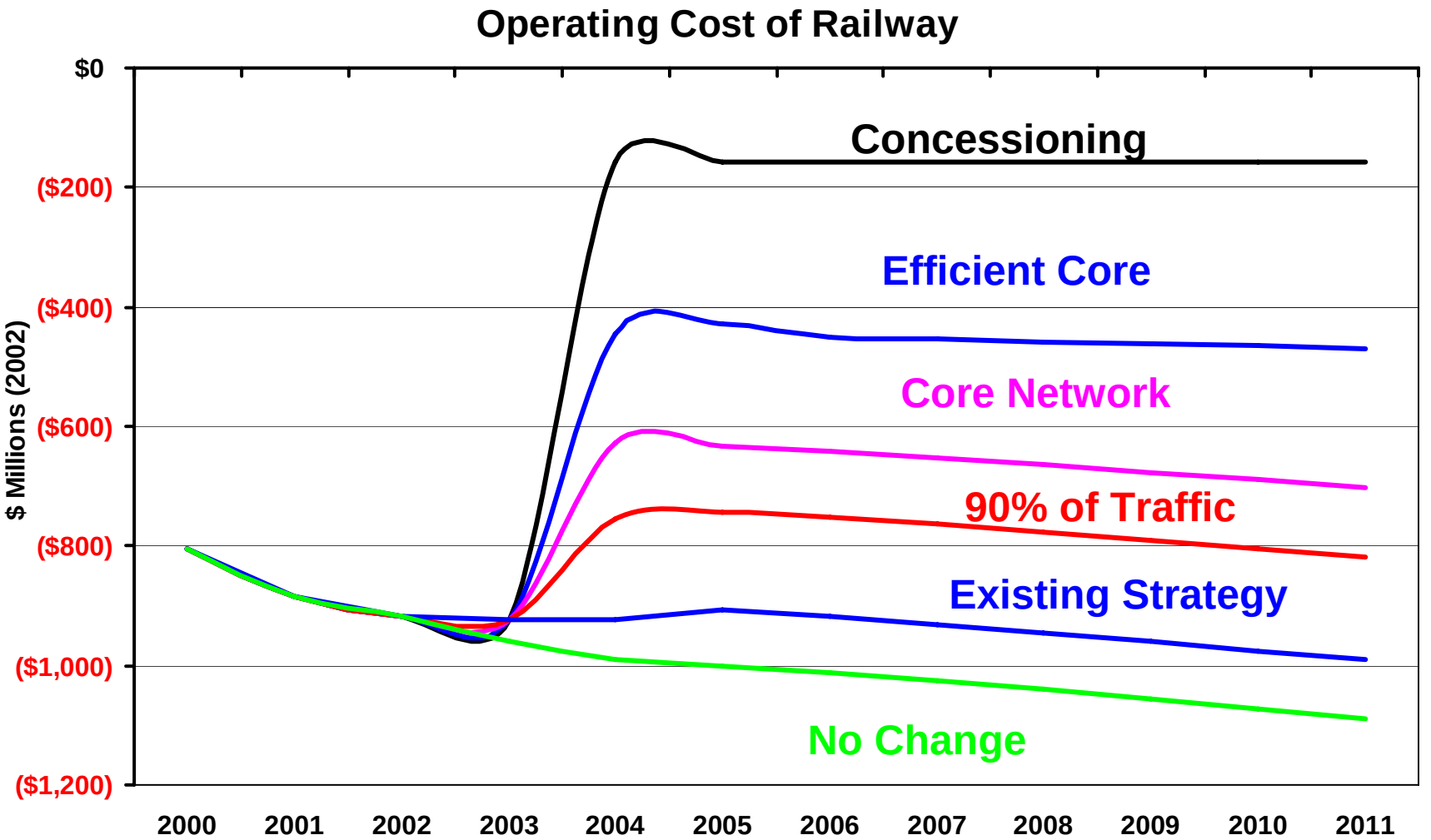
Concentrate traffic on fewer routes where possible

- TCDD, Turkey's national railway, has a very light density network
  - The largest density is near cities—suburban services mostly, about 20 million tonnes per kilometer
  - The rest of the network averages less than 2 million-tonnes per kilometer per year

Consider radical solutions

- A strategy of reducing TCDD's network to a core system (red), seeking subsidy for strategic pieces (purple), and concessioning the rest (green) is not enough to make TCDD self supporting

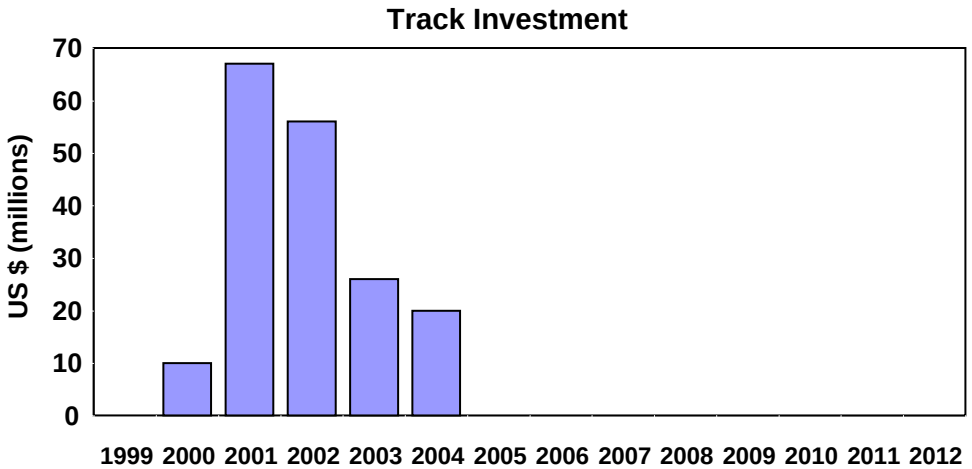
Sometimes, even that is not enough

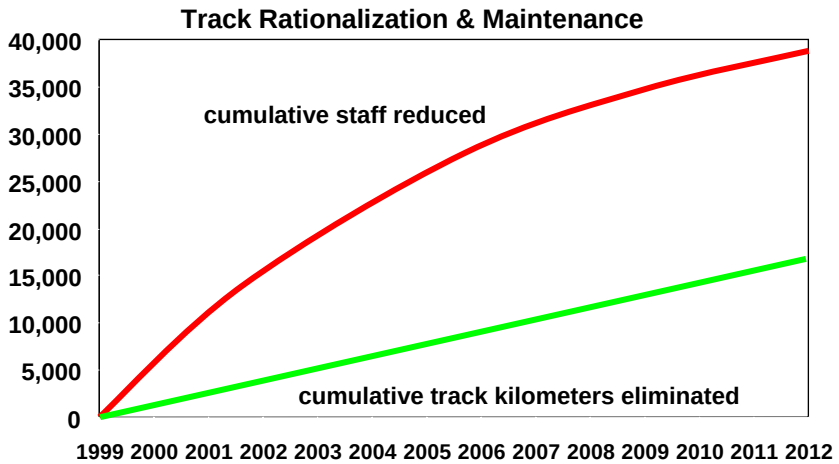


- Even complete concessioning requires ongoing subsidy

Controlling the costs - infrastructure

Look for programs that prolong asset life





- Many railways are able to achieve rail life of more than 2 billion tonne-kilometers while others persist with practices that have rail life of 500 million tonne-kilometers:
  - –Rail grinding, flange lubrication
  - –Maintenance practices based on replacement of track components rather than whole systems
  - –Substitution of lower cost components (e.g., the 12 piece Soviet style rail fastening system by the 5 piece Pandrol type fastening)
- Elimination of little used branches—either through sale (short-lining) or closure

COMMERCIALIZATION OF BR'S TELECOM SYSTEM

In 1987-89, BR established its own optic-fibre telecom network

BR equipped it with 120 channels for its own use but a large latent capacity remained untapped.

BR decided to exploit this capacity through PPP with Grameen Telephone.

Contract structure

Long term lease (20-30 years) of the system for commercial use

Existing telecom capacity and facilities used by BR retained and provided by the lessee free of cost

The lessee (Grameen Phones) :

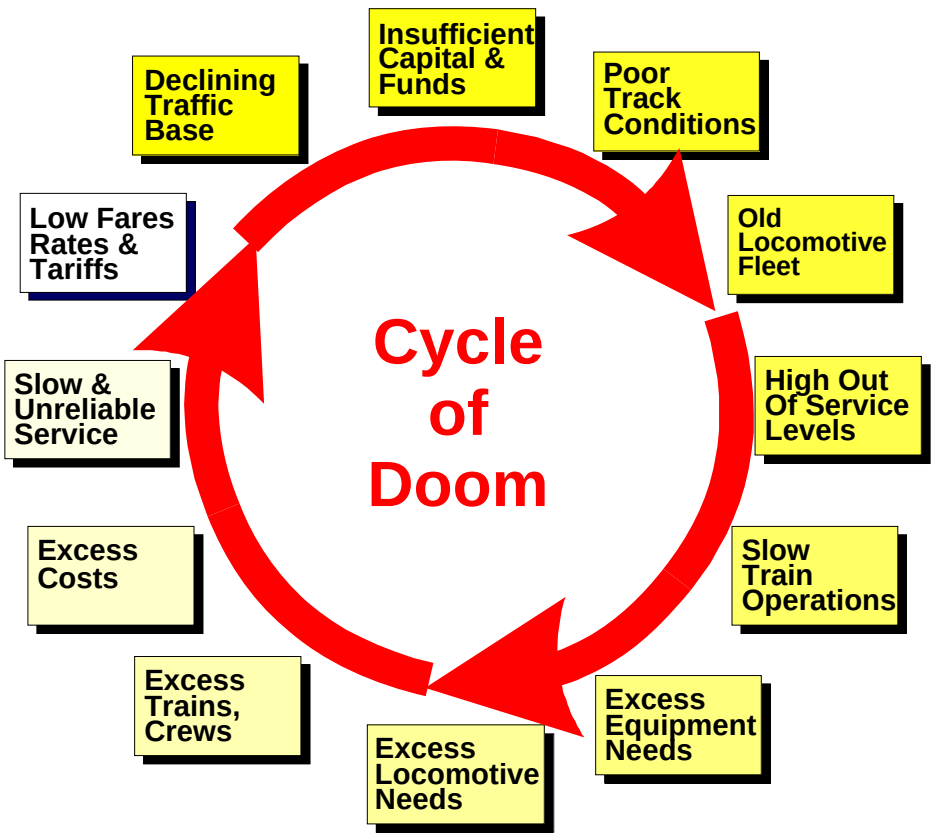
- bears costs of repair, replacement and upgrading of the system
- reimburses salaries and allowances of BR telecom personnel
- pays BR an annual rental for use of the system up to a specified limit;
- shares revenue with BR for any sub-lease of any channel capacity;
- shares revenue with BR for capacity utilization beyond the specified limit;
- makes an up-front payment to BR at the time of contract signing.

Lease contract for 20 years signed inSeptember1997 – payments currently being renegotiated

New contract is likely to represent about 10% of gross earnings - and 30% of passenger earnings – at no cost to BR

Summary

It is all too easy for railways to get caught in a cycle of doom



- Many railways are starved for capital, and spend what little is available on the wrong things
- Investments that expand profit making business segments will help brake the cycle of doom; investments that enhance the ability to lose money strengthen the cycle
- Investments that reduce costs also help brake the cycle: mechanizing track maintenance, replacing unreliable locomotives
- Eliminating divisions and assets with poor profit performance, especially those with private sector counterparts (e.g., advertising, printing, engineering design, construction, building maintenance, etc.) also brake the cycle

Restructuring in isolation may only rearrange the boxes – specific management measures are also required to escape the cycle

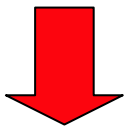
DRIVE REVENUE UP

Know your customers

Set the right prices and collect the money

DRIVE COSTS DOWN

Know your costs



Control your costs

And don’t forget about safety!!