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Editorial

Despite belonging to one of the oldest established industries, transport and logistics managers from different modes cannot be in the same room without fighting.

Highway managers would like to buy a sufficiently high powered tractor, and simply bulldoze railway tracks out of existence. Railway managers, on the other hand, look down upon road vehicles as puny “soap dishes”. Air and sea transport, of course, see themselves in a different league altogether, and reserve their opinions only for themselves.

It is therefore, no surprise when you can count on the fingers of one hand (if you do at all find any) organizations that seek to address transport holistically, and can boast of a truly multi-modal focus. Across the world, transport associations and their memberships reflect the elements of that country’s main mode of transport, with lip service to others.

If only the modal manager could step outside his role as a transport provider, and step into the shoes of his customers, he would realize the massive need that he leaves unaddressed. He would realize that to the customer, a mode means little more than an aspect of transport, and that all this modal warfare leaves the individual customer, and the collective economy, much poorer on account of the inefficiencies of imposed competition.

The modal transport sectors thus see themselves as incorrigible competitors, and are in a permanent “us or them” mould. In the absence of a coordinated approach to the issues of transport, it is not uncommon to see four-laned roads and double-track railways running parallel for hundreds of kilometers, giving each other unnecessary competition, and making each other sub-optimal. All this while, customers a little off these main arteries are crying for rudimentary services.

An example is the Golden Quadrilateral in India, connecting the four metropolitan cities of New Delhi, Kolkatta, Mumbai, and Chennai. Some of the country’s best highways, and best laid tracks already run along these routes. While one of the nation’s highest allocation projects is underway to build additional multi-lane national highways along this route, another proposal has been formulated to now step up the rail infrastructure along the same alignment. All this ostensibly in the name of “road rail competition”.

Its time to cut out this unnecessary fighting. Developing countries like India can ill-afford the luxury of unwarranted competition in the infrastructure sector. This will be tantamount to throwing in long term sunk resources in excess in some areas, while other regions face a shortage. The efficient growth of this sector is better ensured by moving ahead by a planning process.

Lets face facts— both freight and passenger customers only want transportation at least cost. Cost signifies all aspects of service—price, customized handling and comfort, security, guaranteed delivery, and long term commitments. Beyond this, the mode means little, and it is up to the logistics service provider to mix and match available modes, and answer requirements. It is time for transport managers to stop fighting, and start collaborating in supplementing each other, to ensure a level of service required by the customer.

Let us give up competition, and begin an era of Road Rail Coordination.

REGULATION POLICY IN LAND PASSENGER TRANSPORTATION IN EUROPE

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Paper presented to the Seventh International Conference on Competition and Ownership in Land Transport, Molde, Norway, 25-28 June 2001.

ABSTRACT

This paper draws on a number of projects undertaken recently for the European Commission. It reviews the changing regulatory policies toward bus, coach and rail travel in the member states of the European Union. It is found that although there have been substantial reforms in individual member states, reforms at a European level have been limited in both their scope and impact. This is despite considerable activity that has included regulation 1893/91 (on public service contracts in local public transport), directive 91/440 (on international rail services) and regulation 12/98 (on international coach services), as well as a number of Green and White Papers.

Estimates of the economic benefits of commercialising the passenger rail networks, introducing tendering for local public transport and deregulating express coaches are made. These are contrasted with estimates of the benefits that might be achieved through investing in infrastructure to improve interoperability and interconnection.

Organisational issues are also considered. Evidence is presented that European railway companies should be restructured, with some companies being fragmented and others consolidated, with networks re-configured. The evidence on vertical separation is re-assessed. For the bus and coach industry, trends towards horizontal integration are noted and the anti-trust implications assessed.

It is concluded that continued regulatory and organisational reform is required and that this should probably be based on competition for the market for both the operation and the planning of most scheduled bus and rail services.

1. INTRODUCTION

This paper draws on four projects that have been undertaken for the European Commission in recent years. The first two projects, which both ran from 1996-99, examined competition and ownership issues in inter-urban transport. The first of these projects was entitled Strategic Organisation and Regulation of Transport – Inter-Urban (SORT-IT). The second, parallel, project was entitled Managing Interoperability by Improvements in Transport System Organisation in Europe (MINIMISE). These two projects had the following objectives:

· To develop policy measures addressing the organisation of the European transport system in order to improve the efficiency of the transport sector.
· To design measures to promote interoperability and interconnection, economic efficiency and spatial co-ordination of pan-European transport systems.

For those unfamiliar with Brussels-speak, a word of explanation is needed here. Interconnection refers to the physical links between transport systems at a variety of geographic scales (international, European, national, regional and local). Interoperability refers to the technical, economic and organisational efficiency of these interconnected links. For example, European rail systems are plagued by technical constraints, including differences in track gauge, loading gauge, traffic control systems and electrical supply systems. However, even where these technical constraints are overcome, rail services may be economically inefficient in that service levels are too low and fares too high. Furthermore, even if rail systems are technically compatible and the fare:service level mix is optimal, there may be problems with service delivery because more than one operating company is providing the service. This is an example of an organisational barrier. To cut a long story short, what the above suggests is that the European Commission is not solely interested in the economic efficiency of national transport systems but is also inter-

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ested in the network benefits that might emerge from an interconnected series of efficient national transport systems. Arguably this is an externality that is neglected by many transport economists, but equally the emphasis on interconnection and interoperability may represent a misdirection of policy stimulated by various vested interests and their lobby groups.

The second set of two projects concern competition and ownership issues for urban public transport. The first project was entitled the Improved Structure and Organisation for Urban Transport Operations in Europe (ISOTOPE) and was undertaken between 1995 and 1997. The second, follow-up, project is entitled Managing and Assessing Regulatory Evolution in Local Public Transport in Europe (MAREOPE). It commenced in 2000 and is due to be completed at the end of 2002. The aim of ISOTOPE was to undertake economic and political analysis in order to determine efficiency in urban public transport. It was essentially an exercise in comparative statics. Although it did, at least to my mind, identify efficient organisational forms, it failed to identify the dynamic processes which produce these organisational forms. This shortcoming is being addressed by MARETOPE which is identifying barriers to change in urban public transport and the tools required to overcome these barriers.

The structure of this paper is therefore as follows. In Section 2, we examine the policy background to competition and ownership issues in land passenger transport in the European Union, highlighting the key issues and reforms. In Section 3, we assess the policy impacts of introducing competition. In Section 4, we assess the policy impacts of reforming ownership. Lastly, in Section 5, we draw some policy conclusions based on the evidence amassed by the four projects.

2. POLICY BACKGROUND

Articles 74 to 79 of the 1957 Treaty of Rome provided for a Common Transport Policy (CPT) which has been ratified by subsequent treaties (e.g. Maastricht, Amsterdam). However, it required a sustained legal challenge in the 1980s before a White Paper on the CTP was produced (European Commission, 1992). This was preceded by Directive 91/440 which introduced a limited form of open access for international rail services and required the separation of accounts for rail operations and rail infrastructure. This in turn was followed by directives 95/18, on rail operator licensing, and 95/19, on rail infrastructure access and pricing. This was in preparation for the further expansion of open access envisaged by the Railways White Paper (European Commission, 1996), even though the White Paper highlighted the limited application of 91/440.

For inter-urban road passenger transport, the most important measure was regulation 12/98 that introduced cabotage (the ability of an operator in one EU country to ply for trade in another EU country) for regular coach services by June 1999. This followed earlier measures that introduced cabotage for non-regular tourist services in 1996 and liberalised tour packages in 1992.

Given the principle of subsidiarity – that political responsibility should be devolved to the lowest level of governance possible, the European Commission was initially reluctant to intervene in urban public transport. However a precedent was set by regulation 1893/91 which outlined procedures for public service contracts in local public transport, itself building on the earlier regulation 1191/69 on public service obligations. This was taken further by the Citizens' Network Green Paper (European Commission, 1995) which suggested that urban public transport should be subject to standard European procurement legislation. This was re-iterated by a follow-up paper (European Commission, 1998) which stated:

"Well designed procedures which introduce an element of competition into the awarding of exclusive rights can lead to better services and better value for money."

The proposed revisions to 1893/91 take this further by attempting to extend contracting-out and sub-contracting to the bus market and, to a lesser extent, the urban rail market (European Commission, 2000). However, there are a large number of possible derogations and the proposals are still being discussed.

Hartley et al. (1991) present a useful framework for analysing the impact of regulatory changes. They consider product market competition to consist of five broad types: perfect competition, monopolistic competition, oligopoly, duopoly and monopoly. Furthermore, capital market competition (or ownership) is viewed as consisting of six broad types: private manager owned, private-stock exchange listed, public sector company, mixed (public and private), government agency and government department. Figure One presents the result of this framework for road and rail infrastructure and for rail, inter-urban road passenger and urban road passenger transport operations. Further details are given in Beaumont and Preston (1998) but Figure One refers to domestic European transport between 1980 and 1997. It shows that although rail infrastructure remained a national monopoly its ownership status, mainly as a result of 91/440 changed from a Government department to a public sector company, with only Great Britain having privatised rail infrastructure. However, similar changes were also reported for road infrastructure, although here there was a long tradition of private sector involvement in some countries (notably Spain, France and Italy).

With respect to operations, for rail a similar change can be observed as for infrastructure, namely a change from government department to public sector company. Operations remained monopolised except in Great Britain and, to a lesser extent, Sweden, the Netherlands and, at least notionally, Germany (Link, 2000). For interurban road

passenger transport (i.e. coaches) there are a large number of providers of regular and irregular services, exhibiting features of monopolistic competition. Mixed ownership is important in that the coaching subsidiaries of state owned rail and municipally owned bus companies are important players. Regular express coach services are most important in the two countries that have deregulated and privatised the sector, namely Great Britain and Sweden, although it is reported that a number of other countries (Ireland, Italy) have de-facto deregulation (see, for example, the annex to the report of the European Commission, 2000).

For urban public transport (covering buses, light rail and urban heavy rail), the industry has remained monopolised but with a change from Government Department to Public Sector Company. The 'classic' model of regulated, publicly owned monopolies remains the dominant organisational form in ten European Union member states but with a number, including the Netherlands and Germany, preparing for substantial change, particularly for bus services. In four countries, limited competition (or competition for the market) has become the dominant (although not exclusive) market form. For three of these countries (Denmark, Finland and Sweden) this is based on route tenders, whilst for France this is more usually based on network management contracts. Lastly, there is the well known case of Great Britain outside of London that remains the sole example of a deregulated free market, at least for buses. For light rail in Great Britain, limited competition models in terms of long term concessions are the norm, whilst for urban (i.e. non national) heavy rail the 'classic' model still predominates, although an interesting form of privatisation is being proposed for the London Underground. However, it should be clear that the above is a gross simplification. An alternative taxonomy, suggested by Van de Velde (1999) distinguishes between those systems where the right of service initiative rests with an authority and those where it rests with the market. Figure Two gives some examples.

The Hartley gram of Figure One can be reformulated to examine changes in international operations at the European level by replacing the product market competition categories with no cabotage, partial cabotage and full cabotage. Figure Three shows the results of such an analysis for all the key transport sectors and suggests that rail is something of a lagging sector. Moreover, Button (1998) has noted that Europe has not exactly gone in for a 'big bang' approach to public transport reform. Whilst there may be some advantages of a softly, softly approach in terms of minimising the transitional costs of disruption, there is a suspicion that the extend prevarication with respect to public transport reforms may be prolonging substantial disbenefits. It is this issue that we will attempt to consider in the rest of this paper.

3. POLICY IMPACTS - COMPETITION

We estimated that in 1994 in the European Union the rail passenger market had a turnover of around 21 BECU and the bus and coach market had a turnover of 28 BECU out of a total passenger market turnover, including car of 381 BECU (Preston, 1999a). Thus land-based, public passenger transport had a 13% share in terms of turnover, compared to 16% in terms of distance travelled. It was also estimated that bus, coach and passenger rail services had costs of around 94 BECU suggesting 51% cost recovery and total annual subsidy of around 45 BECU (or around 0.7% of total EU GDP).

The main impacts of competition in the market have occurred in the bus and coach markets. Experience from both Great Britain and Sweden suggests that the unbundling and privatisation of bus and coach services can lead to cost reductions of 40%, whilst deregulation could lead to increases in demand on competed inter city coach routes of up to 50% (Thompson and Whitfield, 1995, Fagring, 1999). On the road competition has had less of an impact on the local urban bus market. In Great Britain, doubling of bus service often only led to a 10% increase in bus patronage, suggesting a market that is inelastic to service changes, at least in the short run. However, in the few cities where competition has been sustained in the long run more substantial patronage increases have been detected – for example as much as 80% in Oxford (Preston, 1999b). Overall, bus usage in Great Britain outside of London has declined by 34% since deregulation in 1986, whilst over the corresponding period bus usage in London, where a system of comprehensive tendering was introduced, has increased by 13% (Preston, 2001a).

Simulation work undertaken in Sweden as part of the SORT-IT project indicated that the main benefit of coach deregulation was that it stimulated the lowering of fares by the monopolist passenger rail operator. This led to a net economic benefit per annum of 0.3B Swedish Crowns (SEK) (Berglund and Edwards, 1998). A similar result had been found for Great Britain (Douglas, 1987). It this result is extended to the European Union as a whole, on a pro-rata population basis, a possible benefit of 1.5 BECU per annum is identified.

The main source of evidence on competition in the market for European railways comes from simulation models. Preston et al. (1999) in studies of the Leeds to London and Gatwick to London routes conclude that head-on competition is not feasible because one or both parties make losses but for high-density routes limited entry, in the form of cream skimming, may be feasible. This work has recently been replicated in Sweden for the Stockholm – Gothenburg and Gothenburg – Karlstad routes with broadly similar results. Simulation work on the Piacenza-Milan corridor in Italy indicates that competition will be stimulated if the infrastructure manager adopts an objective of maximising social welfare rather than maximising profits, with an approximate doubling of passenger train services, assuming no capacity constraints (Shires et al., 1999). Simulation work has also been undertaken for the Stockholm-Arlanda route as part of the ISOTOPE project (European Commission, 1997). It was found that welfare was maximised when services were provided by express bus, by the A-train, by SL and by SJ (operating an hourly service from Central station and a 20 minute service from Södertälje). However, this configuration was not sustainable as SJ suffered operating losses.

For urban bus and light rail, the main form of competition has been competition for the market. Table One shows some oft-quoted, and somewhat contentious, results from the ISOTOPE project that show that the deregulated bus systems in Great Britain have much better cost recovery (85%) than either the classic regulated systems or the limited competition systems (both 47%) (European Commission, 1997). However, this is a bit misleading as the calculations for Great Britain exclude fuel duty rebate, which is around 12% of operating costs net of this rebate. Moreover, revenue includes concessionary fares support which constitutes around 17% of revenue. If these adjustments are made then cost recovery becomes 63%. (Data derived from Bristow et al, 2001). Moreover, the deregulated British system appears to have much lower costs per bus kilometre, 36% lower than limited competition systems and 51% lower than regulated systems. This research was reinforced by modelling work (Preston, 1999c, Wunsch, 1996) that found that unit costs in Great Britain were around 50% lower than those in the rest of Europe. ISOTOPE speculated that if higher factor prices and labour rigidities were taken into account, the cost reductions achievable elsewhere in Europe would be around 15%.

Furthermore, Table One shows that limited competition systems have 8% higher staff productivity than deregulated systems and 18% higher than regulated systems, if measured in terms of vehicle kilometres per member of staff. However, this is a partial measure. In order to know whether this was efficient or not one would need to know about relative factor prices, in particular the price of labour and of capital. Moreover, if productivity is measured in terms of passenger kms then different results are obtained, with regulated systems appearing to have 62% higher load factors than deregulated systems and 126% higher load factors than limited competition systems. This reflects both exogenous factors (such as population density) and endogenous factors (such as fare structures and levels), but also may reflect data problems with passenger km calculations.

MINIMISE, in a detailed modelling exercise, estimated that the franchising of urban and regional transport could have annual net benefits of 6.5 BECU (MINIMISE, 1997). Assuming a local and regional bus market with a total cost base of 39 BECU (but revenue of only 20 BECU – see Preston, 1999a), this is equivalent to a cost reduction of around 17%, a figure consistent with the findings of ISOTOPE and with a detailed study of tendering of bus in Sweden (Alexandersson et al, 1998). It should be noted that the MINIMISE study also included light rail and metro systems but these only carried around 12% of the traffic of bus systems at the European Union level.

4. POLICY IMPACTS – OWNERSHIP AND ORGANISATION

We have seen that the main reform with respect to passenger railways in the European Union has been commercialisation so that railways are now operated as public sector companies rather than government departments. Another contentious set of findings, this time derived from Shires and Preston, 1999, are presented in Table 2. The key result (which was also found to be statistically significant) was that in 1994 the more commercially oriented railways had 32% higher productivity than the more directly state controlled railways. It was speculated that given total rail costs of 67 BECU per annum, extending commercialisation throughout the European Union could lead to benefits, through cost savings, of 10 BECU, although some of these benefits would accrue to freight operations. Table 2, however, suggests that, between 1994 and 1997 the productivity gap reduced from 32% to 25%, suggesting that some catch-up was occurring.

Shires and Preston (op. cit.) also develop a translog operating cost model of European railway operations. It suggests that the industry exhibits a U shaped average cost curve with respect to both scale and density. It was estimated that the mean returns to scale of European rail operations is 0.78 (suggesting decreasing returns – the average railway is too big) and mean returns to density of 3.22 (suggesting increasing returns – the average railway's traffic is too sparse). Substantial horizontal separation and/or network reconfiguration is required, given findings that the optimal sized network is estimated to consist of around 2,900 route kms and 23,000 train kms per route km per annum. This work suggests that, for example, the British railway network should consist of around four or five network operators. It is somewhat gratifying to see that this is what is happening, with the top four groups controlling 78% of the industry (see Table Three). Conversely, some smaller rail networks could usefully merge with neighbouring networks (e.g. Ireland, Luxembourg, Denmark).

Evidence with respect to the vertical integration of railways is mixed. Cantos Sanchez (2001) has shown that track infrastructure and passenger operations are cost substitutes (higher track costs will lead to lower operation costs by permitting faster services) but track infrastructure and freight operations are cost complements (higher track costs lead to higher freight operation costs due to higher maintenance costs). Although this is further evidence of the diseconomies of scope of joint passenger and freight services (at least above a certain output level), it also suggests the possibility of benefits of vertical integration. The only empirical evidence on vertical separation comes from Shires et al., (1999) who found that, all other things being equal, operating costs in Sweden have reduced by around 10% since separation. Separation in Sweden is based on a publicly owned track authority utilising marginal cost pricing principles. The situation in Great Britain is substantially different, being based on a privately owned track authority utilising a variant of average cost pricing. In both countries there is a problem in that the track authority is a monopoly. Else and James (1994) suggest the problem may be more severe than this if the operations are provided by area monopolies. This leads to the coexistence of bilateral monopolies (between the track authority and the operators) and complementary monopoly (between operators). This results in multiple marginalisation and a situation where prices are higher and output lower than that which would be provided by an integrated monopoly. In Sweden this situation is avoided by regulating Banverket so it charges for access according to marginal

cost principles and providing lump sum subsidy to cover the deficit. In Great Britain this situation is arguably exacerbated by requiring Railtrack to act commercially although it is moderated by price and output regulation of train operators (who are also provided with lump sum subsidy for any deficits), quality incentives for both Railtrack and the train operators and price regulation of Railtrack. However, the form of regulation chosen (RPI-X, also known as price capping) may lead to a dynamic inconsistency where capital costs are sunk. If such a cost minimising investment is made, it is likely that the regulator will ex-post tighten the price cap (i.e. increase X). Knowing this, the regulated firm will be reluctant to invest in sunk cost schemes (Helm and Thompson, 1991). In Great Britain there appears a strong theoretical possibility of under-investment, although the empirical evidence is more mixed – at least for track, although for rolling stock there is stronger evidence of under-investment (Preston, 2001c).

An important advantage of vertical separation is that it creates a level playing field for competition in the market, although problems concerning the determination of access rights and charges remain. Moreover, it is argued by some that with appropriate anti-trust policy, competition for the market is possible for vertically integrated structures. Important regulatory information may be provided by the amount a vertically integrated company charges itself for using its own infrastructure and the amount of revenue (and operating costs) foregone if it allows the infrastructure to be used by another operator. This is the basis for the efficient component pricing rule (Baumol, 1983), although this assumes, amongst other things, efficient behaviour by the incumbent monopolist and transparent accounts (Jahanshahi, 1998). Overall, the jury on vertical separation remains out, although there is some evidence that the way the British have dealt with this issue has been particularly problematic. SORT-IT's preference was for vertical integration, but with vertical separation as a possible transitional stage used to help determine railways' true capital costs.

ISOTOPE developed a similar translog model of operating costs for urban bus operations (see Preston, 1999c). U shaped average cost curves were again suggested, with returns to scale for the mean operator found to be 0.71 and returns to density found to be 0.86. This suggests diseconomies with respect to both scale and density. In other words, on average, European bus operations are too big and too dense. Strong substitutability between capital and labour was found, whilst input price elasticity for labour was estimated at -0.34 and for capital was estimated at -0.18. Overall, it was found that the optimal bus operation's size was a fleet of around 100 vehicles. If this were true, then the British bus industry might consist of 780 equally sized bus companies (Preston, 2001). Table Four shows that this palpably is not the case - the top five big groups currently control 68% of the British bus market. Similar levels of concentration are exhibited elsewhere in Europe where markets have been freed up (France, Scandinavia).

Our explanation is that large bus firms have some advantages that do not show up in conventional econometric studies of returns to scale. There may be advantages of being big in terms of purchasing power, with respect to new vehicles, fuel and capital in general. There may be human capital advantages in terms of the recruitment and retention of key staff (particularly managers and drivers). There may be demand side complementarities related to timetable and route coordination, integrated ticketing and product differentiation which can only be achieved by large firms. There may also be market power advantages for large firms who can deter competitive entry by threatening predation. This has important, but difficult, anti-trust implications (see, for example, Mackie and Preston, 1996, Chapter 7).

In short, there are advantages of being big. In addition, there are also advantages of being small related to more hands-on, locally responsive management, cheaper, non unionised labour and, once a critical mass is reached, efficient scheduling of crew and vehicles. Our view is that the bus groups attempt to reap the benefits of being both big and small at the same time. The British public transport conglomerates tend to maintain a lean headquarters focusing on strategic functions, with tactical and operational functions devolved to the local level. For bus, this is often the depot level of around 100 vehicles or so (Preston, 1999c). For rail this devolved unit may be somewhat larger, but the same broad principle seems to apply.

5. CONCLUSIONS

The reform of land passenger public transport in Europe has been relatively slow. In part this is due to the principle of subsidiarity which, influenced by the seminal work of Tiebout (1956), suggests that much of the responsibility for public transport should rest with local and regional governments. However, this assumes that there are no external effects between jurisdictions. With the emergence of a pan-European public transport industry, led by British and French conglomerates, this is no longer the case. By early 2000, UITP reported at least nine companies acting as public transport operators in more than one EU member state, whilst in only four Member States was the provision of public transport services restricted to home country services (European Commission, 2000). There is a risk that an unregulated public transport monopoly in one member state could compete unfairly in other member states where public transport markets are more open. Such international spillovers are clearly of concern to the European Commission, but are difficult to deal with through competition law. This has led to calls for the establishment of a principle of reciprocity – there should be reciprocal arrangements for market entry throughout the European Union. Unsurprisingly, this is being resisted by protected monopolists such as SNCF and RATP,

Dudley and Richardson (2000) note that four variables are important determinants of 'third order' (i.e. major) policy change: namely ideas, interests, institutions and individuals (after Peters, 1996). Of these four Is, there has been little convergence of transport policy ideas, interests and institutions at a European level, so that policy exhibits something of a hollow core. There may be a possibility that this empty core has been occupied by vested interests,

not least from industry, including civil engineering firms and manufacturers of public transport equipment. This in part may explain the policy emphasis on transport infrastructure and in particular on the Trans European network (see Sichelsmidt, 1999). It may also explain the obsession with technological solutions to problems concerning interconnection and interoperability. Work by the MINIMISE consortium (1999) suggests that such investments may have only modest returns, at least for land-based public passenger transport. Table Five indicates that a series of measures to remove interoperability and interconnection barriers in public transport at the European level were estimated to amount to 6.7 BECU. By contrast, the continued removal of organisational barriers was estimated by SORT-IT to lead to annual benefits of 18 BECU.

We should also not forget the importance of individual agency. Many domestic reforms were championed by particular individuals, whether they be politicians (for example Nicholas Ridley with respect to British bus deregulation) or policy advisors (for example Christopher Foster with respect to British rail privatisation). Transport has lacked such policy champions at the European level. Somewhat surprisingly, at least from a British perspective, the person who has come closest to fulfilling this role has been Commissioner Neil Kinnock.

Overall, our review of the theoretical and empirical evidence leads us to conclude that for scheduled urban passenger transport both competition in the market and for the market will promote productive efficiency. However, competition in the market will neglect the importance of user economies of scale at both the route and network level. For frequent, turn up and go services there is a case for price and quantity regulation. This may be best achieved within a tendering or franchising framework. We are attracted by systems in which there is competition for the market for the strategic and tactical, as well as operational, functions but experience from Adelaide, the British rail franchise re-negotiations, Helsingborg and Sundsvall indicates how difficult this may be to do in practise (Preston, 2001b).

For scheduled interurban public transport, where passengers can book in advance and pre-plan their journey, user economies of scale are less important and can be more easily internalised. Price/quantity regulation is probably not required, although residual regulation concerning safety, environmental performance and competition policy is still needed. For rail, there is however the problem of the interface between urban and interurban operations. This will be exacerbated where inter urban services are of a high enough frequency to encourage turn up and go behaviour. This suggests that competition for the market might also be appropriate for high frequency, short distance inter urban routes. This might be accompanied by the possibilities of some fringe competition, particularly to stimulate technological innovation through product differentiation. It is likely that the potential for this is greater in inter urban than urban markets. Open access competition for passenger rail might be limited to long distance, inter urban (often international) services. This might be stimulated by extension of the Rail Freight Freeway concept to passenger services, although hopefully with a bit more success.

We thus conclude in favour of competition for the market but we agree that:

"…. it is necessary to resolve questions about the geographical scope of the exclusive right, the duration of the contract, its financial structure and assignment of risk." (European Commission, 1998).

For urban bus, we would recommend shortish (3 to 5 years), route based contracts based on gross costs but with patronage bonuses and with minimum quality standards concerning vehicle age, size and reliability, enforced by penalties. Consideration should be made of contracting out the planning function at the network level. Where there are serious land shortages, the Authority should consider providing terminals and depots, whilst in extreme cases the Authority should perform the role of a residual service provider, particularly where there is concern about market concentration.

For rail, we would advocate longish (around 15-20 years), area based, vertically integrated contracts based on net costs with minimum quality standards concerning overcrowding, punctuality/reliability and cleanliness, enforced by penalties. Regulation of fares in markets where rail is the dominant mode of travel would be needed. Variants of this regime would be required for new heavy and light rail systems based on Design, Build, Operate and Transfer (DBOT) concessions.

However, for the above to happen requires a coalition of policy entrepreneurs at the European and national levels who are prepared to overcome the policy barriers erected by local politicians, incumbent operators and trade unions. Despite the best intentions of projects such as MARETOPE, there seems little prospect of such a coalition emerging at the European level in the immediate future.

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Abstract

The Indian transport sector has shown high growth. The growth pattern has been varied in different modes. There is a need for coordination, both from the wider economic requirement and from the, needs of shippers and carriers. Transport activity generates externalities in the form of air pollution, congestion and accidents. This paper attempts to highlight these effects and suggest that how coordination in various modes can reduce it. It also underlines some of attempts at the policy level to internalize externalities of transport and shift traffic to the combined transport mode.
Transport carriers are attempting to move from being mere transport providers to logistic providers. Also important is the perception of shippers and how they make their mode choice and how synergy between different modes can be achieved. The paper underlines the strength of the Railways in bulk sector and how, combined with flexibility of road transport, it can provide a customer focussed service.

1. INTRODUCTION

Transport is a fundamental economic activity. Although it provides value to customers, transport activity consumes important natural resources and gives rise to externalities like congestion, pollution and accidents. It has a direct bearing on inventories tied up in pipeline, cost of production and distribution and growth of GDP. Therefore mode choice or coordination between different modes is called for so that optimisation can take place in wider economic interests. Similarly a shipper's mode choice is linked with requirement of warehousing, inventory carrying cost, consumption pattern etc. and he would like to keep his distribution cost least. In most cases, mode choice varies along with the size of cargo, which becomes smaller further down in the distribution channel. Therefore, the shipper too may like coordination between different modes if it can give him economy of scale without compromising on reliability, fast transit etc. Carriers too would not mind coordination, if it improves quality of operation and gives them benefit. A very common example is that of courier services, where many of them combine and use the airlines or railways as a carrier. Courier companies work as front ends and basically work as a front line office and work for consolidation and distribution. Therefore, it may be in the wider economic interest and in the interest of shippers and carriers also, that different modes should coordinate and serve the interest of economy together.

This is especially relevant when the transport sector is continuing to grow. To give an idea of its growth in India, total freight output in terms of Billion ton kilometer (BTKM) has grown from 184 in 1970-71 to 1087 in 1996-97 and in passenger area it has grown from 328 Billion passenger kilometer (BPKM) in 1970-71 to 1784 in 1996-97.

NEED FOR COORDINATION:

The need for coordination between different modes of transport in order to reduce costs and improve service conditions is being felt both by carriers and shippers. It is also in the wider interest that coordination between different modes takes place to reduce the impact of externalities.

2.1 Shift in the Perception of carriers

In the recent years, a shift in the perception of both shippers and carriers is visible. Shippers want to move from mere transport provider to logistics providers world over. Carriers too have started positioning themselves as logistics provider, rather than mere transporters. Indian Railways is now trying to focus on logistics as there corporate objective. CONCOR (Container Corporation of India), a corporation of Ministry of Railways, describes itself as a logistics providers. CONCOR is now not only working as a terminal operator and a transporter provider, but is also moving in the direction of providing bonded warehousing and other logistics services. The Railways too, with the help of CWC (Central Warehousing Corporation), are planning to use there good-shed space as warehouses.

Many trucking companies, in their brochures and web-pages, offer specialised logistics services to different segments. Some have even floated new companies to meet complete logistic requirements. For example, Transport Corporation of India has started two subsidiaries, Express Cargo and Logitra to meet requirement of small cargo and provide for complete logistics solutions, respectively. Express Cargo, which started as a Rs 7o crore company a few years back, is projected to be a Rs 500 crore company by 2005. Other trucking companies also are offering specialised services to suit various segments

This shift in perception is a positive step, as it will make them think how to integrate different modes to provide a value-added service to shippers.

View of the Trucking Industry

In a workshop organised in Railway Staff College [7] where many representative of trucking companies participated, suggestions were discussed about road-rail coordination. Representatives of trucking organisations suggested that road-rail coordination would offer the following advantages :

Economies of scale
Competitive product offering
Win-win situation for both road operators and Railways
Decongestion of National Highways
Fuel savings/conservation of foreign exchange
Control of pollution level

They suggested that trucking industry has the professionalism and better understanding of customer needs to offer in this coordination. Their view was that even at present, trucking industries have started planning for specialised services, warehousing and inventory management, trucking and that with coordination of railways, they will be able to improve further. They also suggested that rail flats of lower heights, network of easily accessible road-rail exchange hubs, composite insurance cover, flexibility in routing and scheduling be railways would make this alliance stronger.

2.3 Shippers Perception

To understand the shipper's perception, a survey was done using SERVOQUAL (an instrument for measuring service quality), for railway freight users [2]. As per these findings, the most important dimension for the customers was the ability of a transporter to provide safe and fast delivery. The dimensions 'cost of transportation' and 'attitude of officers and staff'. The advantages offered by road transport include lack of claims, credit facility, door to door delivery, clubbing destinations. This report suggests that reduction in communication levels and inherent delays, flexible rake length, empowerment of divisions and stations, and faster claim settlement will go a long way in increasing claim settlement. Earlier studies done by IIM Ahmedabad and Railway Staff College have shown that regularity and reliability are the two important conditions for freight customers. Order processing delay is another important problem area. However with IR now surplus in wagon requirement this delay can be reduced.

2.4 Social Requirement

The effects of transport activities on energy consumption, environmental pollution and safety are discussed in this section.

2.4.1 Energy consumption

Looking from the wider economic point of view and external costs also railroad coordination requirement will be felt. The World Bank, in a report [10] has highlighted the high-energy consumption, pollution and poor public safety record of road sector. The report mentioned that in 1990, transport sector was the second largest consumer of commercial energy (22%) and out of this Indian Railways accounts for only 4.3%, that means about 18% of energy consumption takes place in road transport. Therefore, the greatest potential for energy saving lies in the road transport sector. Secondly, transport sector is the largest consumer of petroleum based energy (43%), and petroleum imports were likely to be of 30% of total imports bill. Therefore, from the balance of payment scenario too, it becomes important. The Railways too have to take many steps by inducting more fuel efficient locos and lighter wagons, but even now they are six times more energy efficient than the trucking sector.

2.4.2 Environmental Pollution

Transport is a major contributor to environmental pollution. Both urban transport and inter city transport cause pollution. Even inter city traffic has to move through urban areas affecting environment [5]. The study quotes a survey of 36 cities in India having population of 1 million or more, showed that in 1991-92, it involved in 40,351 premature deaths. Combining the effect of higher morbidity and mortality together, the estimate of damage rose in the range of $517 and $2102 million only. The share of transport sector in urban pollution in Delhi is 64%. If we look into issues like greenhouse gas, acid rain or ozone hole, it does not make much difference whether pollution has been caused in urban area or inter urban area. Asian Institute of Transport Development has conducted a study on comparative impact of rail and road on pollution in certain sectors as given below:

Change in Daily Emission Levels for Increase in 10440 Tonnes of Freight (Grams per NTKM) [5]

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Change in Daily Emission Levels for Increase in 5220 Tonnes of Freight (Grams per NTKM) [5]

These studies clearly indicate that IR is more ecofriendly and rail or rail based multi modal services can go a long way in reducing pollution.

2.4.3 Safety

Roads in India are dangerous by developed country standards, with annual fatal accident rate of about 2.65 deaths per 1000 registered vehicles. This compared to a range of 0.15 (Japan) to 0.38 (France) is quite high [10].

The generic reasons for this are poor roads, mixed traffic, unsafe roads, driving habits and poor emergency services [1]. The results are an annual accident cost estimated at approximately 0.5% of GDP and an unquantifiable amount of suffering. Nearly 70,000 persons are reported to be killed and over 3 lakh injured due to accidents on roads in a year. The heavy commercial vehicles, which comprise only 2% of the total vehicles, are involved in 50% of the road accidents. About half of the truck accidents occur during the night.

Therefore, for better energy consumption and for reducing pollution and accidents, requires proper modal split and coordination between rail and road. The National Transport Policy Committee has stipulated modal share between rail and road, but it went haywire as no modalities were provided. More over, in this post competitive era of liberalization, important part is coordination, synergy and how it can be achieved.

2.5 European experience

The problem of coordination and handling externalities is not peculiar to India. In Europe, where with Autobahns and Express highways, MAVs (Multiple Axle Vehicles), and where road condition is far, far superior, ECMT (European Council of Minister of Transport) has made efforts to ensure success of combined transport. ECMT has adopted a declaration [8] on combined transport at the council session in Budapest on 29th to 30th May 1996, which stipulates:

road to be used for initial and terminal hauls only
rail and/or island waterways and/or short sea to be used for the major part of the journey. The choice of roads depending upon itinerary, whereby the transfer between the different transport modes must be handled as efficiently as possible.

The ECMT declaration further states that 'Combined Transport', therefore, is an example of rational network which combines the benefits of the various transport techniques and can be understood as a candidate for all evaluations or adaptations which help to improve the transport chain. Since combined transport is a means of shifting traffic off the road it also helps to achieve the aim of sustainable mobility, as already pointed out in the white paper on Transport issued by the European Union.

The Council of Ministers adopted the Annexy Resolution in 1994. This resolution contains general recommendations such as the need to take action to establish true costs in transport. Furthermore, it recommends the national programme to promote combined transport be reviewed and updated regularly.

It also stressed the following points:

liberalization of access to initial and terminal road hauls in combined transport
the exemption of combined transport from road infrastructure taxes
tax incentives for combined transport
investment grants for combined transport.

A further resolution was adopted by ECMT in Berlin in 1997, where it was stated that combined transport increases necessary mobility and offers a reliable and safe form of transport to markets.

2.6 The Indian Scenario

In the Indian scenario too, a better coordination between rail and road will not only reduce energy consumption, pollution and accidents, but will also provide better logistic solution to shippers and reduce costs for carriers in

the long run. A study on cost of inter modal transport [4] has shown that in the case of inter modal services, the break even distance on marginal cost basis, is about 500 km and for volume constrained commodities is about 800 kms. Rail services break even for distances less than 500 kms on CMRS and less than 800 kms on fully constrained commodities. The study has revealed that rail based services can be highly competitive for high value and damage prone commodities like electronics and electrical equipment, auto parts, food products. Faster services, using new wagons, can be quite profitable. The study has also highlighted that terminal handling, collection and delivery costs for distances of 30 kms at either end constitute more than half of the marginal cost and more than a 1/3 of the fully allocated costs, of door to door movement over a distance of 500 kms. Inter modal solutions with an integration will be able to make a dent in this area.

Before further going into details, it will be better to take an overview of the rail and road scenario, their strengths and weaknesses and areas where they can complement each other and with better coordination create a synergy between them.

3. RAIL SCENARIO

The Indian Railways has a vast network, rich managerial expertise and carries most of the bulk traffic. It works as a government department. Its network consists of 62,000 KM. track, about 7000 stations and it runs about 11000 trains per day. Since 50-51 its loading has gone up by 6.5 times and net tonne kilometer has improved by about 7 times. Its share in bulk commodities like coal, fertilizer, iron and steel is quite high.

3.1 Strengths

The strengths of IR include right of way, better fuel efficiency, more environmental friendly impact, better control, vast land resources and faster transit. Its right of way prevents delay due to tolls at districts, state boundaries, congestion and leads to faster transit time. With the introduction of new wagons, containers (on CONRAJ) are taking 38-40 hours, between Delhi and Mumbai while time taken for a truck is almost double of it. It has also easy access to the heart of city. Reduced transit time not only reduces pipeline inventory, but also cuts down uncertainties affecting cycle time and production costs.

With the FOIS (Freight operation information system) in place, it will be possible to keep a track and inform customers about expected time of arrival of cargo. At present one of the weakness of the system is that cargo tracking, even of full rakes will be difficult while many trucking companies offer tracking directly through there web page. However, this will enable customers to prepare for unloading and take necessary action at their level. Similarly, IR has already developed a railnet and is going for optical fibre in a big way. This communication backbone linking terminals and passing information through FOIS will be a great boon, to consignor/consignee and other logistic providers.

Another advantage that IR can leverage is the use of land space, which can be leveraged by development of warehouses, which can be used by transport companies also for consolidation. At present, most of the trucking companies (except a few large and middle ones) do not have or have adequate space and many transshipment, transfers or unloading takes place on roads, leading to congestion, damage or delay. Some part of warehousing can be utilised by customers also. It will reduce secondary transportation costs. Combined with communication network it may help customers to track and control there inventory better.

3.2 Weaknesses

However, what is the strength (heavy fixed cost, low marginal cost) for weight constrained cargo becomes a weakness in case of small cargo. The railways offer advantage in case of bulk offering economy of scale but cost of consolidation using rail mode is very heavy. In such a situation, unitisation, consolidation and synergy with road transport will be able to overcome this weakness.

Section: New Delhi-Mughal Sarai (Plain Terrain with Electric Rail) Road Length: 825 km.					Section: Lucknow-Gorakhp Diesel Rail)		
	Rail	Road	Ratio of Rail to Road Levels	Percentage Savings due to Substitution of Road by Rail	Rail	Road	Ratio o Rail to Road Le els
Energy Consumption (Mega Joule per NTKM)	0.115	1.086	10.59%	89.41%	0.179	1.113	16.08%
Pollutants							
CO_2	15.55	80.41	19.34%	80.66%	6.57	82.48	7.96%
CO	00.00	03.92	00.03%	99.97%	0.05	04.03	1.36%
NO_x	00.08	05.14	01.50%	98.50%	0.16	05.28	3.05%
NMVOCs	N A	01.08	---	---	0.01	01.11	1.05%
CH_4	00.00	00.01	00.91%	99.09%	0.00	00.01	7.44%
N_2O	00.00	00.00	02.14%	97.86%	0.00	00.00	4.87%
SO_x	N A	00.17	---	---	N A	00.18	---
TSP	N A	00.07	---	---	N A	00.07	---

4. TRUCKING SCENARIO

The trucking sector is discussed in more detail, since it is not as well documented as the Rail sector in India.

4.1 Growth

The growth of the trucking industry has been exponential. The number of trucks have increased from just under 2 lakh in 1961 to 22 lakh in 1996-97 [1]. The working group on the road transport for IX five-year plan made projections based on the trend data for the period 1966-96 and assumption of differential growth rates (6%, 6.5% and 7%). While the LCVs (Light commercial vehicles) are projected to grow in the range of 1 to 1.4% by 2002 and further from 1.2 to 3.1 million by 2007. The growth of Heavy Commercial Vehicles (HCVs) is estimated at 2 to 2.5 million and 2.6 to 4.2 million respectively. The trucking industry provides employment to over 20 million people and the total revenues in form of central taxes (Customs and excise duty on motor vehicle and

Section: Ratlam-Godhra (Rolling Terrain with Electric Rail) Road Length: 285 kms					Section: Secunderabad-Wadi (Diesel Rail) Road Le		
	Rail	Road	Ratio of Rail to Road Levels	Percentage Savings due to Substitution of Road by Rail	Rail	Road	Ratio of Rail to Road Levels
Energy Consumption (Mega Joule per NTKM)	0.169	1.461	11.57%	88.43%	0.372	1.488	25.00%
Pollutants	25.46	108.22	23.53%	76.47%	27.30	110.23	24.76%
	00.00	05.10	00.04%	99.96%	00.23	05.22	04.36%
CO_2	00.13	06.76	01.87%	98.13%	00.67	06.90	09.71%
CO	N A	01.48	---	---	00.05	01.50	03.22%

accessories, tyres and tubes, HSD and motor parts) and state taxes (motor vehicle tax and sales tax on motor spirit and tubes) has grown from Rs 47.4 crores in 1950-51 to Rs 18297.9 crores in 1996-97.

4.2 Ownership

The ownership pattern in trucking industry is highly skewed [1]. The majority of goods transporters in India are small operators owning one or two trucks. About 77% of truck operators own only up to 5 trucks and about 50% on only one truck. Only 6% trucking companies own 20 and above trucks. However, operators acquire additional fleet under different names, in order to avoid provisions of Motor Transport Workers Act. Another important feature is that most of the operators run it as a family business. Truck operators can be classified on the basis of speed and extent of their operations into local, regional and national carriers. They can also be classified as small truck operators (ownership up to 5 trucks, mostly owner cum operator), medium size fleet operators with a fleet size of about 40 to 50 trucks and large size fleet operators, with more than 50 trucks. Most of the small truck operators (owning 77% of total fleet) are involved only in the physical movement and depend on big transport companies, booking agents for obtaining business. Medium size fleet operators work only in a particular line or region and operate with the help of their associates.

Trucking companies often transfer their consignments to another company for onward journey, which is known as crossing [9]. Similarly, cargo for the purpose of consolidation and disposal is transshipped and here too transfer between companies may take place. Large fleet operators have wide networks and branches across the country. However, both medium and large operators normally charter trucks 10 to 12 times of their own fleet. They get the supply either through the lorry suppliers or contact single truck owners through booking agents. Some trucking companies finance and encourage their own employees to own trucks and get them permanently attached to the company. Thus hiring of truck remains a major activity for trucking companies, but it gives them the advantage that when traffic is slack, they are not saddled with excess fleet. As the trucking companies carry a brand name, they are able to provide business guarantee they, inspite of owning a fraction of fleet, are able to garner most of the traffic. In terms of goods consignment note (GCN) they account for as much as 87% of the business, their corresponding share of business was 80% in 1994. However, only 12% to 15% of transport is conducted in their own fleet and rest on hired trucks.

4.3 Operation

In the hiring of trucks, booking agents or brokers play a very important role. A trucking company, when he has some cargo to offer either directly or through a lorry contractor, will contact brokers who are normally located near octroi, production centre or port, for hiring a truck. A trucker when he comes to a city with cargo contacts a broker for return traffic. Brokers will fix rates with truckers and inform the Transport Company. The trucker will pick up the cargo and documents from the trucking company's ware house or factory. There is no relation between the truck, hiring charges and the rate which trucking company charges from consignee. In the trucking business, there will be wide variation of rates in both directions. It will also depend on the availability of truck on that particular day towards that direction. On the other hand most of the trucking companies have annual contract with bigger customers. The broker or booking agent also gets a fixed commission.

A copy of the set of documents for a truck is kept by the booking agent. Although modes of payment may differ, but most of the time, major part of payment is made after receipt of a copy of proof of delivery or '*pahunch*', which can be a faxed copy of lorry receipt signed by consignee. Many times when truckers require advance money, some of the transport contractors provide certain cash to truck operators, on payment of certain amount as discount. The persons engaged in this business of discounting '*pahunch*' are called *Angarias* [1]. *Angarias* collect 200 to 600 on a freight amount of Rs.10,000 for 15 to 60 days, depending up on the credit rating enjoyed by the contractor. Booking agents sometimes also are in the business of collecting, forwarding, distributing or even providing godown facilities. In certain cases there can be long term agreement between broker or transport company and truck owner for a fixed period during which the former arranges guaranteed freight at rates fixed in advance.

Thus, in the trucking scenario, although medium and big transport companies provide interface with customers but brokers play a very important role and actual transportation is carried out by small truck operators. This structure provides strengths and weaknesses. For shippers, trucks provide an advantage when size of shipment is small and the operation requires flexibility. Another advantage can be in case of Less than Truck Load (LTL) consignments. Shippers also feel more in control and feel relatively themselves to be in a stronger position when they are dealing with comparatively smaller companies, especially if the transport requirement is not of regular nature. However, the disadvantage is that as ultimately operation is done by the small operators, quality suffers. Most of the time cargo is not insured and, in case of high value loss, delay or damage totally throws their logistic plan out of gear. Trucking industry itself suffers from the inadequacy of finance, dependence for business on unlicensed bookers and booking agencies, multiple checking of vehicles enroute, problem related to insurance, wayside amenities, legislation and regulation and overloading etc.

Overloading and excessive working hours of truck drivers are two main areas where shortsighted approach leads to long term problems. Most of the fleet is 4 wheel rigid body and the GVW permitted is 10.2 tonnes. However, carrying one and half times is commonplace and, sometimes even twice than permissible load is also carried. It is done by tampering with spring and extending length of chassis. A study in [1] has shown that a pavement that can last for 10 years without overloading will last only for 6.5 years with 10% overloading, and with 30% overload it may last only for 3.5 years. The study indicates that strengthening of pavements for Delhi-Mumbai stretch will require an investment of 700 crores for a design life of 10 years, 30% will lead to accelerated investment as the road will last only for 3-5 years. Damaged roads in turn affect speed of trucks, fuel consumption and even reduce life of truck. But as many operators enter the business with second hand trucks, with heavy interest payment rate, they have short-term goal of repayment of loan within a year or two and replacing the vehicle after 3-4 years, which ultimately affects long term performance.

Similarly, overworked drives also affect road safety. A survey conducted in 1998 showed that about 21% drivers conceded that they work for more than 12 hours and about 45% agreed that they work for 9 to 12 hours. And even while they took rest, there are no proper facilities. Most of them rested at roadside food outlets on cots which double up both as dining tables and beds. Second preferred place was petrol pump. Apart from long hours, about 21.4% mentioned that they return to their house after more than 8 days and 47.2% said that they come back after 5-8 days. It leads to high tension, alcoholism and aggressive behaviour on the road. The poor work conditions affect safety.

Thus, though road transport offers flexibility, door to door transport, accords multiple handling and provide long-term contract, its cost to economy is heavy. Shippers too would prefer to shift to combined or multi modal transport, if it provides safe and fast transport, reducing time total logistic cost. Transport companies too would not mind combining modes, as even now for operation they are using individual operators and in many areas, crossings and transshipment take place with their associates. A few trucking companies have vessels transporting cargo from Chennai to Port Blair. Gati had entered into an alliance with Indian Airlines and has leased SLR from Indian Railways. Therefore, considering strengths and weaknesses of both the modes, a synergy can be created.

5. COORDINATION BETWEEN MODES

Can Indian Railways in coordination with road transporters provide the basic framework for rail based multi modal services for non-bulk consignments, which in the interest of shippers, carriers and economy as a whole? This will depend on a shift in perception and development of strategic alliances between different players in the business.

5.1 IR's role in co-ordination

In pre 1980 days, IR's focus was on smalls and wagons, with unit of loading being a wagon and unit of operation being a train. However, this lead to staggering delays in terms of consolidation and asset productivity was very low. In post 1980 era, this dichotomy was removed or at least reduced, and both unit of operation and unit of loading were made train, which gave a boost in terms of all indices of productivity. But now especially in non-bulk segment, where shipper wants unit to be transported smaller and smaller, loading unit has to be changed back. As IR cannot go back to the days of piecemeal loading, wagon consolidation and marshalling yards, which will be too costly, unit of loading can be containers, trucks or trailers and consolidation can be done in co-ordination with service providers. IR have an unparalleled success story in terms of bulk transport and its lesson can be used in providing a rail based multi modal transport.

In the bulk segment, railways have a classic example of relationship management, where it participated from the time of project planning to even monitoring inventory levels and deciding distribution patterns (coal, POL). Can it evolve such a relationship with customer, directly or indirectly through CONCOR? At the same time, some differences between bulk and non-bulk segments also have to be clearly underlined. In the case of bulk it is in the interest of customers also that shipment size is large, as material consumption is huge, while in the case of distribution, or non-bulk, segment size have to be small. In the case of bulk sector, most of the value is added by the transporter, while in case of non-bulk, value is added by manufacturing, marketing, brand building and distribution. In the case of bulk, IR offers better service quality as tracking of rake is easier, mechanics for coordination exist (Oil Co-ordination Committee, inter ministerial groups.) from planning. stage to actual use of transport (as most of it is in govt. sector). In the case of non-bulk, it has to be evolved. For pricing also, it may not be possible to charge heavily from the non-bulk segment, where unlike bulk segment, it may lead to mode shift or location shift.

IR wants its trailing load to be larger and larger to increase throughput and gain economy of scale, while customers want it to be obviously small. This divergence is nothing special. In the international trade too even in break bulk category, where shipper want their unit to be smaller, carriers have grown and ship are becoming bigger and bigger. A compromise has been achieved with the use of containers, concept of hub ports, bigger

mother vessels working between hub ports and smaller feeder vessels working between smaller ports and hub ports. To what extent, we can transfer this experience to domestic scenario and provide interfaces as seamless as possible, on that will depend the success of railroad coordination. This can happen where loading unit can be container or trailer or contrucks.

5.2 Containerisation

Containerisation can provide a successful link for railroad coordination. Success in the export-import area will have to be replicated in the domestic sector too. In international trade, as importers and shipping lines will accept cargo in containers only, containerisation has got a great fillip. Secondly, hinterland Inland Container Depots (ICDs) help in completion of custom formalities and getting exporter realise a good portion of money. Similarly, in domestic business, service will have to be designed and positioned looking into specific requirements of that particular segment. For a few products, where good quality warehousing is required, the product is carried out by container rakes (giving economy of scale), warehoused by Container Corporation and daily requirement is supplied. In another scenario, a company which was averse to rail mode because of multiple handling and uncertainty in wagon supply, decided to go for container as container were brought inside the factory for factory stuffing. Similarly, in many cases short haul is done by the road, the container is stuffed, carried by the rail and again the container is either destuffed at destination terminal or is carried to factory where it can be destuffed and used for carrying back finished products. Therefore, containers can provide a good linkage and may be used for providing safe, reliable transport. With the introduction of new high speed wagons, speed can further be increased up to 110 km/hr, achieving faster average speeds than Mail/Express trains. Many companies have already shown inclination for such mode, as it appears more reliable, safe and ultimately helps them in monitoring the inventory better.

5.2.1 Problems of containerisation

Containerisation has some problems, too. As it presupposes lift on lift of operation, handling equipment is required, which sometimes may be costly or may not be available. Many times small consumers would like to take delivery or offer cargo in destuffed form. It has been found that the door collection and delivery charges were more than the cost of destuffing containers at the terminals and moving the goods from/to warehouse/factory by road. This has led to customers preferring to take delivery at terminals. It happens because mainly city roads are closed for heavy vehicles operation during day times. Even if one uses a tractor-trailer, because of congestion normally not more than one delivery is possible. Location of terminals also is an important issue. Many transport companies prefer to locate their warehouses outside the city limit, so that at least on that traffic which is not going to city, octroi can be saved. At present, many states have systems that even if cargo is passing through, octroi is levied and later on, refund can be claimed. Railways, by providing warehouse space to consolidators (IR also has a system of commercial plots, where regular customers on a rent will consolidate their consignments before loading), who can use it for stuffing and destuffing container. A minimum level of traffic offering can be made a condition.

For the Railways, a problem in the container segment is that a container has poor volume to weight ratio. A comparison can be made that a rake of cement may give more money to IR than a rake of containers of white goods. Containers do earn more than a rake of parcel service. However, these are all different segments, where service requirements, competition and sensitivity to price is very important. Therefore, if the Railways are able to provide good quality service leading to reduction in logistic costs,. it can certainly price them and this segment can be made a lucrative segment. For this, it has to provide more value-added services like warehousing, consolidation, cargo tracking, maybe through agencies like CONCOR

5.3 Roll On-Roll Of

RORO (Roll on, Roll off) or piggyback or truck on flat cars (TOFC) services too provide a multi modal solution of bringing coordination between road-rail. The advantage in comparison to container is that at interface points, no handling equipment is required for loading or unloading. Similarly, facilities for consolidation and stuffing may not be required. It appears much more flexible. However, there are disadvantages too. Height of truck includes tyres, and therefore even normal flat wagons may not be good on electrified routes. Net weight carried by a truck is almost half of a container, therefore, a rake load of RO-RO will be approximately half. Therefore, cost saved to economy i.e. external costs (fuel consumption, pollution, and congestion) will also be only half. It has a human dimension too. Most of our trucks are not MAV trailer type, but rigid body structures and owned by the drivers. Therefore, even in RO-RO operations, drivers not only prefer to accompany their trucks but like to sit in their cab, as if they are actually running it. It has been proposed that a sleeper coach may be attached with RO-RO train, where drivers can rest, but this is still not finding favour amongst the drivers. Another reason for the drivers sticking to their truck is safety of their truck and cargo. In most of the trucks, cargo is secured only with ropes and covered by tarpaulins. These could be only initial hiccups and with more containerised body trucks, and more experience, drivers can shift to sleeper coaches provided by the railways, for longer runs. Even now, Konkan Railway's experience is that truckers prefer to go by rail mode, especially on graded ghat section

or congested routes.

5.3.1 Pricing of RO-RO services

A central issue in the RO-RO area is pricing. Konkan Railway is running their trains on a marginal cost basis as they are running very few freight trains and ample capacity is available. Initial trials have been made from Sabarmati to Ludhiana and efforts are being done in Chennai-Howrah section too. Pricing can result in a win-win situation only when a truck operator will have to pay less than what he incurs when he runs his truck on the road for that stretch. Even if he is using railway wagons for transport, he is incurring capital cost on truck, repayment of loan and interest, salary and allowance of driver. Saving will include fuel cost, depreciation of tyre, octroi and other enroute costs (both official and unofficial). Similarly, IR also has to price it in such a manner that they should be able to recover at least long run marginal cost, which will include fully allocated cost of wagons (as they are going to be of special type) cost of loco, fuel, crew, a small proportion of infrastructure cost (based on actual occupation) may be taken into account.

A study by AITD [1] has shown that enroute expenses between Mumbai-Delhi for a typical truck is about Rs. 8,100. This counts the only direct costs (not including depreciation of tyres). Therefore, we can assume Rs.9000 to be a ceiling limit of price on this route. However, there are certain hidden factors, which should also affect pricing. With a faster transit time, turn round and utilisation of truck will improve so that the operator may be 'priced' for that.

Similarly, as a more reliable and faster service will affect levels of inventory, transport companies will certainly charge consignors for a higher level of service. However, at present, the ceiling is being fixed on the basis of money which the lorry operator is getting which has no relation with the rate which transport company has negotiated with the customer. Therefore, transport companies (and not just the truck operator) should be brought into the picture whereby Railways can ask for a share in the pie.

Another aspect about the cost incurred by IR will be that wagon utilisation improves. A five-day turn around between Delhi and Bombay gives a wagon km/wagon day of 500 kms, compared to the present average of 170 km. At present, the CONRAJ service between Delhi and Bombay takes 36-40 hours each way, with very little terminal detention and examination at one side only, leading to a total be about 100 hours. Therefore, while working out wagon km cost, this improved figure should be taken into account.

It will be better that CONCOR with its experience in providing logistics service may be encouraged to run this service for getting domestic traffic also. However, it will be advisable that on the same rates and conditions, IR may offer its services to other third party logistic providers also.

5.4 Strategic alliances between rail and road

At present, the road leg of journey is arranged either by CONCOR (by hiring trucks) or by the shipper. It may be better still, if strategic alliances can be forged with transport companies, who should be treated by IR as strategic partners rather than mere freight forwarders or road haulers. Even now most of the time transport companies who have access to traffic use booking agents to contact small operators. Consignments are transferred to associate's trucks or transshipped enroute. This business environment can be leveraged, if transport companies collect or 'get collected' consignment from customs and bring it to Container Freight Stations (CFS), where it can be stuffed in container. At the delivery point again, consignment can be destuffed and carried by the transport company or if need be can be carried to customer.

For this, if necessary, space may be leased out at the CFS to the transport company. This will help transport companies by saving their investment in warehousing. Secondly, as the consolidation point is close to terminal even after late stuffing, it can be cleared by scheduled services. It may lead to a situation where IR may be able to offer overnight service up to 500 kms. (Delhi-Lucknow, Mumbai-Vadodara) 2 days service for a point up to 1000 kms, and 3 days service from (any point to any point) with few exceptions. These services will be much better than any service available. Therefore, it can be priced also separately. Container Corporation can have long term contract like transport companies, with bigger manufacturers, but it can mop up traffic of 'less than container load' or of small manufacturers with the help of transport companies. At present, between many centres, services are infrequent because traffic offering is low and vice versa. If there is only a biweekly service, then customers will have to wait for 2-3 days, but if service is on alternate days, he may be attracted. On the other hand, as IR will prefer to run full rakes and if sufficient containers are not available frequency cannot go up. In such situation such arrangements with road transport companies may help.

Thus, both RO-RO and Container can play a major role in effecting coordination between road-rail consolidation and disposal can be done by road and long haul can be carried out in form of rail based multi modal mode. This will require development of hub. It should not only involve IR and most state governments but also major shippers, consolidators, and transport companies, all the stake holders must be involved in development of common facilities. As this will reduce burden from the roads and will save on fuel consumption, pollution and road acci-

dents, some funds from road sector can be deviated both by state and central government. As it will increase economic activity in that particular city, local bodies should exempt traffic moving in and away from hub from any local taxes or octroi. It should have modern warehousing facilities, CFS, Container Park, facilities for maintenance of truck and amenities including resting facilities for drivers. A hub and spoke system, if fully functional, may even lead to locational shift of the industry.

TECHNOLOGICAL IMPROVEMENTS FOR CONVERGENCE

Technological developments and the use of IT for convergence, in addition to change in operational practices and managerial perceptions, in both the rail and road sector, will facilitate the pace of coordination.

6.1 Rail sector

Railways will have to go for low height high-speed wagons, which can be used both for containers and truck/trailers. In this direction standards have to be fixed. ECMT provides fixed standards for different European countries for development of combined transport [8]. A check list for rail infrastructure stipulates that (i) RO-RO operation with road vehicles 4000mm height (ii) piggy back transport of semi trailers with a 4000 mm height, rail transport of containers and scrap bodies with a height of 2900 mm on standard flat cars. In most of the cases system are compatible. Maximum axle load varies from 20 to 22.5 tons and speed is also 120 km. Maximum trailing weight varies from 1500 to 1800 tonnes. In India also when we are thinking of using a new technology we can go for at least 120 km. Axle load required for these wagons should not be very high, therefore it may be possible to run them on the existing routes especially on Golden Quadrilateral without investing heavily on track .

6.2 Road sector

In the road sector too, trucks design require major changes. Impact of RO-RO can improve with tractor-trailer combination so that more trailers can be loaded on flats and cost of carrying of moving units and drivers can be saved. At least some logistic providers or bigger transport companies can procure it. Financing by banks also can be encouraged for such trucks. High power to weight ratio engines, retarders and better braking systems, standardisation of truck body construction will reduce fuel consumption, pollution and accidents. Along with technological innovations in rail and road, introduction of swap bodies will also make handling and interface easier.

7. ROLE OF INFORMATION TECHNOLOGY

Role of IT in transport industry is growing in a big way. In the case of rail, development of railway and FOIS will increase use of IT. In the case of trucking industry, computerisation is being used for booking procedure, goods forwarding and receiving, tracking and delivery, fleet maintenance and management, and other costing and accounting packages. In the case of booking, major trucking companies are using IT for customer query monitoring, booking of consignment, and sending despatch information and enquiry of reaching destination information. Fleet arrangement for loading plans, information of delivery to booking place, fleet monitoring, route plan monitoring and tracking is also being done in computerised manner. In future, bar coding, use of hand held terminals and even wide area networks are being planned. Many trucking companies are using web technology in a big way and consignment can easily be tracked through their web pages. However, the challenge will be to converge IT applications in railways and trucking industry with shippers, so that a dynamic monitoring of inventory levels can be done.

For convergence and better coordination, leveraging of IT is highly important. Many trucking companies are using IT in a big way for their fleet management and even tracking. FOIS will integrate information about rail operation. Further B2B or B2C integration will help in cutting down costs and providing better service quality. One of the reasons for the success of Federal Express has been the use of COSMOS (Customer Operations Service Master Online System) [11]. This system helps them in cargo consolidation, despatch and providing information to customer about cargo. It also helps them in better asset utilisation. At present, many logistics solutions are available which create convergence between carrier and shipper. Two factors which are further going to increase the role of IT in logistics related services are the development of big chain stores and opening up of the economy which will bring issues of global logistics.

The growth of communication, Internet and dot coms will provide web-based solutions to logistics problems. Before this, companies have invested in business practices and supporting technologies designed to optimise their ability to make products, made to order, assemble to order, JIT and mass customisation. It allowed organisations to produce higher quality lower cost products. Now many Internet based solutions are available which facilitate value addition and better customer satisfaction through efficient delivery process. Their software solutions are based on web based operation and provide a step ahead of integration from ERP and EDI. This in-

cludes e-logistics, platform infrastructure, global intelligent routing logistics execution etc. Some software solutions (like gocargo.com) provide common platform to shippers and service providers. Shipper can go for complete time bidding, reach multiple service providers and service providers can improve the yield management, and productivity of assets. Some companies even advocate c-logistics (collaborative logistics). Some of the principles are to allow markets to dynamically create, reassure and evolve collaborative partnerships, must support co-buyer and co-seller relationships, must provide a flexible security model, must support collaboration onward around all five of essential logistic flows – information, products, authority, documents and capital. Thus use of IT will go a long way in encouraging flexibility, transparency and coordination not only between different modes but also between all players of the supply chain.

In the post competitive era, where cutting down of logistics costs may be the last frontier in cost reduction, where competitors in market are sharing their manufacturing and logistics facility, where products of washing powder and synthetic tank decide to go together to reduce these costs, different transport modes, must use their respective strengths to create a seamless supply chain, which will not only reduce distribution cost, facilitate economic growth but will also reduce external costs to economy as a whole.

8. CONCLUSION

1. Transport is a derived demand. A good quality transport infrastructure is highly essential for sustained growth of economy.
2. Shippers while selecting mode of transport look for total logistic solutions. Mode choice affects and is affected by issues like location, warehousing, and pipeline inventory and total level of inventory amongst other things.
3. Transport providers perceive this shift and are trying to reposition themselves to develop long-term customer relationship and to become an integral part of seamless supply chain.
4. Transport consumes scarce non-renewable resources and creates externalities like pollution, congestion and accidents. This impact on society varies from mode to mode. In the wider interest mode choice or combination of modes should be made in such a manner that it is in sync with sustainable development.
5. Rail has traditionally been favored for bulk transportation. It's cost structure of heavy fixed cost, lumpy investment and operational practice of emphasis on throughput favors it. It has advantage in huge volumes and in long distance. However shippers especially in non bulk segment want to keep their size of dispatch small. Consolidation through railway by yards, shunting train is tardy costly and affects asset utilisation.
6. This will necessitate emergence of consolidators and of hub and spoke systems where long leg of journey is carried by railway and short leg is done by road. Even today trucking companies offer their cargo to their associates for further journey in the region where they do not operate.
7. Trucking industry is highly unorganized. However a few national and regional companies hire out or engage small truck operators to carry most of the cargo. Brokers and booking agents also play a major role.
8. Trucking industry is favored for small cargo size, flexibility and door to door delivery. For LTL (less than truckload) it is specially preferred.
9. Congestion, octroi, toll and bad road conditions of roads cause heavy delay to trucks. As small operators do most of operation sometimes even reliability is low.
10. One of the reasons for poor conditions of road is overloading. Combined with long duty hours of drivers' poor wayside amenities, it leads to accidents.
11. Combination of strengths of both rail and road can not only reduce external cost but also provide better service to shippers, by providing economy of scale (over long leg) and flexibility (for consolidation and dispersal).
12. Containers and Roll On-Roll Off can be two methods to achieve this coordination.
13. Technological innovations like low floor high-speed rail wagons, separate trailers and MAV trucks, use of swap bodies will provide a fillip in this direction.
14. IT revolution too can provide a platform for convergence.

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INDIAN RAILWAYS - FREIGHT STRATEGIES AND DRAFT CORPORATE PLAN

-A.K. Srivasatava

Scope and limitations: This paper is an attempt to look into vision, corporate objective and strategies suggested with specific reference to freight strategies. This will also try to highlight some general issues which need to be addressed before any strategy can work in the changed environment. However, it does not intend to be a critique of draft corporate plan. It has also not attempted to analyse in detail growth projection given by corporate plan except for some general remarks. It only tries to emphasise some basic issues and suggest few specific measures for repositioning different services in different segments rather than all encompassing generalities.

2.Corporate Plan: Indian Railways had a 15 year Corporate Plan (1985-2000). Many of its objectives have not been achieved. It estimated about 370-400 BTKM freight traffic by 2000, it planned for a 10% real time reduction in cost and we are far from target. Maybe the draft plan could have started with the review of previous corporate plan and its success and failure. Corporate plan should have been followed with specific business plan for each segment of business coupled with detailed strategy to achieve it. There should have been machinery for monitoring its implementation, specific performance parameters (not only physical or financial but productivity measuring) could have been set up, involving field units, communicating very clearly what is expected of them. Maybe even some mid course correction could have been done, if necessary and annual plans should directly have had a linkage with corporate plan. In absence of all this, it remains a statement of intent. And as many times, time table is used to know how late a train is running, such plans only end up in discussions that how far we are from target and how we failed.

The present Draft Corporate Plan does not appear to be better than the previous one in this respect. Draft Corporate Plan presents IR's vision as 'To become the leader in the nation's transportation services sector by providing modern, reliable, safe, customer-led and customer focussed, value added services by building synergistic multimodal partnerships with transport users, transport providers, financial institutions, private sector and other stakeholder to create business advantage for the state holders.'

It would have been much better if it could be more focussed and simple. In 'paradigm shift' draft plan advocates 'high growth path', and suggests that, improving operation, reducing non-labour cost and better customer relationship, are within internal resources and organisation restructuring is affected by external environment. This dichotomy seems much laboured. Both labour and non-labour costs are dependent upon specific operation and maintenance practices. Decision to move from steam to diesel or manual to machine maintenance of track certainly will have bearing upon the labour costs too. Similarly, unless we shift our focus and try to reposition ourselves from command economy to market economy, we will not be able to succeed. Transport being a derived demand, and Indian Railways with its major share in bulk segment, any recession in power, mining and manufacturing sector will affect growth rate. Therefore, what is required is specific road map, better understanding of customer's needs, an understanding into what other service providers are offering, and what type of service had to be designed and placed for specific segments, to achieve corporate objectives.

3.Some basic issues: Before we look into strategy related with freight, it is essential to look into some factors which shape and influence all strategies. There are the issues which have to be answered and solutions found.

Cost of Service: Indian Railways is energy efficient, more cost effective for land use, but these things matter to shipper only when it is translated into price. IR has the advantage of economy of scale, right of way and that should mean low cost. For a shipper, his logistic cost includes not only freight but also warehousing cost, secondary transportation cost and inventory cost too. In case of railway, as the size of shipment is much larger than truck, warehousing costs and inventory cost will be much higher. Therefore, it is normally used for transport of cheaper raw material, where IR's freight rates are low, as advantage in freight outweighs inventory cost. Along with this, where huge quantum of raw material are required for production, like in power sector steel or ore for export, IR becomes a preferred mode. Important point here is that IR's freight should be low enough to compensate for warehousing and inventory costs.

Therefore, it is imperative that IR will have to leverage its energy efficiency and economy of scale to produce service at low cost, if it wants to increase market penetration. However, historically, IR's sensitivity to cost has been low for two main reasons. Firstly, its role has historically been perceived as a necessary infrastructure for Eco-development. It was more like provision of irrigation facility or public distribution system or road connecting to remove village. Certainly, in all these cases, focus was more or less to provide facility rather than the cost. Secondly, in the days of command economy, IR was run not only by the government but also for the government. In the days of administered prices, coal, power, iron and steel, petroleum, every sector used to pass the

cost. However, with the lowering of barriers even SEBs are sensitive about inventory of coal and price of not only landed coal but also of calorific values. As all of them are facing stiff competition, they become sensitive to cost, and started shifting to those methods of operation or procurement which become cost effective. Coastal power houses started shifting to imported coal (which became cheaper with lowering of tariff barriers), petroleum companies formed petronet and so forth.

What happened to the cost scenario in 90's to Indian Railways? Let's take a look.

Table 1

It clearly reveals in 7 years cost per NTKM has moved up from 28.2 to 51.9 To offset this, freight rates had to be enhanced. Even in 'subsidised' commodities like salt and fertiliser, earnings went up by 20% or more. While discussing subsidies, one should not forget that subsidies are the only difference between cost and earning. If our cost of operation and maintenance keeps on going up, for many commodities which cannot bear it even with increased prices, modal shift will take place. In some industries, government wants finished product at fixed price, and the difference between manufacturing cost and market price is subsidies. Many times it even works as incentive for inefficiency.

It is often complained that government's contribution to IR has gone down drastically. However, even in those years plan size has not reduced*.*

Table 2

Not only that, when freight earning have been utilised for keeping the plan size intact, share of traffic facilities in plan went down*.*

Table 3

Year	Average Cost/ NTKM	Average E/ NTKM	Average E/NTKM					
			Salt	Fertil-iser	Coal	Ce-ment	POL	Av cos
1990-91	28.2	35.0	19.7	29.7	36.3	37.5	63.3	
1991-92	29.4	37.1	20.0	32.3	38.9	39.7	66.3	
1992-93	32.9	42.2	21.8	32.4	43.8	48.6	73.7	
1993-94	35.3	48.6	22.9	33.9	49.9	53.1	88.4	
1994-95	39.0	53.8	25.0	34.3	53.5	58.9	99.1	
1995-96	39.6	55.4	25.7	34.7	57.2	64.8	103.7	
1996-97	43.3	58.9	24.7	35.0	61.5	67.9	109.2	
1997-98 (approx.)	51.9	69.9	24.7	32.4	66.9	74.6	121.8	

Cost of operation in last 7 years have almost doubled. It will be interesting to compare it with price increase for other commodities, WPI and CPI.

Table 4

It clearly indicates that increase in cost of IR is much more than not only WPI and CPI but to any other commodities including fuel.

We have seen earlier that IR's freight has to be lower enough to compensate for warehousing cost, pipeline inventory cost etc. Now with increased cost of operation freight prices are increased (and they are made to take care of plan works, many of which are non-remunerative). This will certainly lead to modal shift.

So, therefore first importance for IR is to reduce cost of operation. It is 'not one of those things', but the heart of the matter. Therefore, some cosmetic austerity measures will not do. What is required is a detailed strategy, determination and commitment to achieve it. And for that, it is essential to know how we perceive the issue of cost and which perceptions may be the biggest barrier.

One common belief is that most of the cost is manpower cost where, because no retrenchment can be done, not much saving is possible. Fuel costs are again beyond control, electricity tariff is increased by Electricity Board. Therefore, very little can be done. Only step one can take is to control expenditure as per budget provision. Another common mindset is that expenditure means only out of pocket expenses. So somebody may strictly try to ensure that lights are switched off in time, consumption of xerox paper is reduced, telephone bills and fuel bills for official vehicles are cut by 10%, will nonchalantly order detention of few trains at interchange point for hours, will delay a decision making increasing in time over run and cost over run. Therefore, the first important steps which planners should have done is to design specific performance parameters to ensure we must a very lean operation and performance is appraised not only on physical or even financial parameters but on productivity parameters.

3.1.1 Manpower Costs: Manpower situation is given in the table below:

Table 5

Year	Plan size	Budgetary su
1992-93	6162	42
1993-94	5860	17

It appears that there is a decline. However, comparison will show that from 1998-99 reduction was only 398 and from 1999-2000 numbers dropped by 1,242, nowhere close to 1.5% to 2.5% targets talked about. It is generally agreed that out of retirements 50% posts should not be filled up. In 1998-99, 26,955 staff retired (13,899 Gr. 'C' and 12,826 Gr. 'D'), and in 1999-2000 number was 23,313 (13,984 Gr. 'C' and 9,118 Gr. 'D') and staff reduction is much less.

Normally, unless Pay Commission comes with a stagnant work force, wage bill should remain almost stagnant with the exception of D.A., increment or any change in composition. In 1999-2000, wage bill rose by 4.34%, and average wage per employee went up by 4.3%. One of the reasons for increase of wage bill is that surrender of posts are nowhere near targets. If we take a close look across departments, picture becomes much more clear or confused. Engineering department's (having maximum manpower) manpower came down slightly in 2000 (from 418,814 in 1999 to 417,548 in 2000). But if we compare it with 1998, when it was 415,000, it is much higher. At the same time, during the same year, 52,104 km mechanised tamping. has been done out of 3006 km of track renewal, 1094 km was done with machines. Even in R.B. (including associated offices) number rose from 17,347 to 17,642. Therefore, we can certainly reduce growth in wage or even cap it if we sincerely try to fully ensure that 50% posts vacant are not filled up.

Another change which is affecting wage bill is composition of staff strength.

	Percentage to total plan la	
	VI plan	VII plan
New lines	4.9	5.53
Gauge conversion	4.58	1.64
Doubling	4.33	4.97
Traffic facilities	2.59	4.00
Rolling stock	36.1	46.7

Table 6

Thus, between 1998-99 and 1999-00, although number of Gr. 'D' staff did come down by 9.8 thousand, strength of Gr. 'C' category went up by 8.6 thousand. Strength of Gr. 'C' did come down from 902.4 to 893.9, but next year it went up to 900 again. Average wage for a Gr. 'C' employee is 1,19,818, while it is 74,395 for a Gr. 'D' employee. With induction of technology, it is incumbent that skilled Gr. 'C' category may increase, but then a group 'C' staff should replace at least 2-3 Gr. 'D' staff. It is essential that whenever investment is made for newer technology its impact on manpower planning should be clearly assessed and, if possible, suggested number of posts which are likely to be reduced should be kept in suspense for a fixed year, and after that posts should cease to exist. We can fix total wage bill including growth and everything else should be worked backwards.

Draft Corporate Plan only records current scenario, makes projections based on it and presents a doom day scenario. A proactive approach would have led planners to suggest specific intervention which will not only keep IR financially sound, but increase its market penetration.

And that will require reduction in cost as a basic cornerstone of our policy. The shortest chapter in Draft Corporate Plan is on cost reduction.

Description	93-94	94-95	95-96	96-97	97-98
Whole price index - all commodities	100	112.6	121.6	127.2	132.8
1.1 Primary articles	100	115.8	125.3	135.8	139.4
2.0 Fuel, power and lubricants	100	108.9	114.3	126.4	143.8
3.0 Manufacturing products	100	112.3	121.9	124.4	128.0
WPI of important commodities required by IR					
Coal	100	106.4	106.1	115.4	139.3
	100	114.7	134.3	134.8	148.7
Electricity	100	104.5	113.6	118.3	129.2
	100	108.8	108.6	120.9	145.2
And certainly what cannot be measured cannot be monitored. Statement HSD					
5.0 Consumer price index	258	284.0	313.0	342.0	366.0
6.0 IR's unit cost	100	110.7	125.4	137.6	173.0

Table 7

3.2 Asset reliability and asset productivity: Along with the price, a customer always looks for a regular and reliable service. Market survey conducted by A Ferguson quoted in Draft Plan very clearly affirms the need for 'reliability and regularity of service'. A customer will not mind 4 days in place of 3 days as long as he is sure that it will not have a range from 2-6 days totally, throwing his warehousing, inventory and other plans out of gear. For a 'reliable and regular' freight service, important thing is reliable and regular assets. Freight being the most underprivileged amongst totem pole of trains suffers most. If the power of a passenger train fails, its power of first goods train which has to be detached if a block has to be given, freight train certainly can be regulated, if because of some failure, bunching takes place, freight train certainly will be detained. These delays not only reduces the productivity of important assets but also detains cargo of customer and his pipeline inventory goes up.

One of the biggest problems in asset failure or equipment failure is reporting. A study done by Board has revealed that a big gap exists between failures which are reported to zonal headquarters and which zonal headquarters decide to report to Board Headquarters. And certainly what cannot be measured cannot be monitored. Statement 41(A) to (C) of Annual Statistical Statements mentions equipment failure for some railways, which is listed below.

Anybody who has some experience of railway will realise what these figures indicate. May be we can rename the chapter as 'Humour' or albeit, 'Black Humour'.

LRDSS has found after their study of Mughalsarai-Sonenagar section, that about 20% of line capacity is lost because of equipment failures. By affecting productivity, it affects cost.

Asset productivity has shown improvement. However, here also a lot can be done with better operation and maintenance practices. Average speed of goods trains linger around 22 km. and even with that, wagon mobility is only about 40% i.e. 177.4, for rest of the time wagons are detained in terminals, yard, sidings and mainte-

nance depots. One single step which can improve wagon performance is to reduce speed differential by introducing 100 km speed wagon. However, time taken from drawing board to actual induction is immense. And 100 km speed BOXNHA is a good example.

3.3 Leveraging strengths: Cutting down of cost and improving reliability of service will certainly make freight service more customer friendly. But, apart from this, Railways have certain facilities which can be leveraged to provide value added services, specially in non-bulk segment. Many customers spend a good deal of money in warehousing. As these warehouses are situated away from railway premises, cost of secondary transportation is also involved. Therefore, IR can use the land at its disposal for developing warehouses and charge them as ancilliary services. Some trucking companies have even gone to the extent of collecting price of cargo on behalf of their customers. In another form, IR was using land as communal plots to attract customers. However, now procedures are so complex that it deters many potential customers.

Similarly, connectivity provided by FOIS too can be used in advantageous fashion. It may lead to provision of tracking facilities or with B2B communication, linkage with ERP system of customs may be provided. Unlike trucking industry, which is highly fragmented with mostly individual ownership, IR can provide a better quality of service, with facilities of consolidation, warehousing and information availability.

Thus, the platform for launching successful freight strategy can be based on reduced cost, better reliability and leverage of strengths.

	1998	1999	
Numbers	15,78,802	15,78,404	1
Gr. 'C'	08,93,854	09,00,052	0
Gr. 'D'	06,70,817	06,63,827	0
Engineering	04,15,000	04,18,814	0
Mechanical	03,84,122	03,84,155	0
Traffic	01,79,432	01,78,306	0
Electrical	01,68,232	01,67,445	0
Railway Board and other associated offices	17,892	17,347	

Freight Strategy: Freight earning constitutes about 67 to 70% of gross traffic receipts. Therefore, understanding problems of freight business, designing strategy to solve it and give it high priority is essential for health of IR. Like everywhere, Draft Plan does look into malady, but it fails when it comes to the remedial measures, as it misses wood for tree. It mentions first reason for declining share in report on "All India Shipper Survey" as 'the unit of transport is inconsistent with the market demand'. It also militates adversely with the concept of 'just in time' inventory. It also mentions that 415 million tonnes medium to long haul non-bulk high value and 70 million tonnes medium to long haul bulk traffic is being carried by truck, with lead over 450 km and suggests that part of which could be attracted to rail with 'innovative strategies.' The important question here is what is size of shipment of the traffic being moved by truck. In Chapter VIII which deals with freight strategies, there is no inkling of 'innovative strategies'. It talks about higher axle load and higher payload to tare ratios, self discharging bogie design, specific wagons for HR coil, car carriers, bulk cement carriers, truck carriers,

It is a common desire on the part of shippers to reduce their size of shipment or match it with consumption, while carriers like to increase the size of shipment for reducing unit cost. If this reduction is good enough to absorb logistic cost of consolidation and interface delay, still customers will be attracted towards this option. But a fine balance has to be struck. And it will require a change from productive mindset to market driven mindset and we must recognise that what a customer wants is transport or better still, logistic and not rail transport. Therefore, our strategies should be geared for that.

We must ask ourselves few questions. Is our cost growing at the same pace as cost of other consumables. Are our technology upgradation leading to reduction in cost (even by better asset reliability or better asset availability), which can be passed to customer. Are we sensitive to the changing environment. Can we become part of Supply Chain and provide value addition and better integration. Can we develop long term partnership with even non-government customers.

Along with this, we must realise that as need for different business segments are varied. Separate strategies will be required for bulk and non-bulk segments. Draft Plan starts with commodities into 7 groups, but when it comes to projections and strategies, it follows old routine. Only about half page is devoted to 'other goods traffic' and there too it is a discussion about CONCOR. It gives emphasis on EXIM traffic without mentioning two important facts that most of foreign customers will accept cargo only in containerised form, and exporters have the advantage of getting their money after despatch from ICD itself. In domestic scenario, containers are still moving as a rake, or two point rake. Strategies required to attract LCL cargo to provide reliable value added services have not been addressed. Even in freight strategies, although it does mention that IR must become a total logistics provider, but it fails on 'how to achieve it.'

Strategy for bulk segment: Bulk traffic suits both railway's and consumer's requirement. For IR, with increased trailing load, unit cost of operation becomes lower and in case of consumers like power house or integrated steel plants, huge requirements of raw material can easily be provided by railways. In fertiliser industry, as production is continuous and consumption is seasonal, regular despatch from factory is essential. However, even in this industry, customers face many problems and they may not have concern over main areas but practices prevailing like sidings, ancilliary charges are always a thorny issue. It has gone to the extent that many producers are not going for sidings at all. There are disputes about various costs which siding owner's are made to bear and it has led to the situation that even traffic which could have come from them has gone to roads. Draft Corporate Plan suggests 'a complete revamp of our policy towards sidings has to be undertaken urgently'. A working group of Executive Directors has already submitted a report on management of sidings in March 1999. The issue is of implementation. Many major commodities are making modal shift and corrective

Year	Number of staff (000's)		
	Gr. 'A' + 'B'	Gr. 'C'	Gr. 'D'
1990-91	14.3	891.4	746.1
1995-96	13.7	891.9	681.1
1996-97	13.9	892.4	667.3
1997-98	14.1	893.9	670.8
1998-99	14.6	900.0	663.8
1999-00	14.6	908.6	654.0

action is required.

5.1 Coal: In 1999-2000, coal constituted 46.0% of loading, 45.64% of freight earning and 41.54% of NTKMs generated. Rail share of coal is around 65.5% of coal production. However, reduced import duty, high calorific value of imported coal, high transportation cost went in favour of choice for imported coal. Slippage in new capacity addition in power sector, better hydel generation, recession in steel and cement, new power houses or capacity augmentation on pit.heads is affecting and going to affect IR's share more severely. Therefore, projection of 410 million tonnes in Corporate Plan looks too optimistic. What is called for is use of some innovative strategies like ensuring transport of imported coal from port, reducing taper and planning a joint strategy with Coal India to offer special package for power houses located far from the mining area.

5.2 Steel: Iron and steel constitute 3.09% of loading, 6.62% of earning and 4.50% of NTKM. Difficulty in moving piecemeal, hike in freight rates, excise duty on 'depot price' being inclusive of railway freight, are few issues which have led to diversion of this traffic. Many new steel plants like ESSAR, NIPPON, DEMRO, VIKRAM ISPAT are not offering steel to railways. Heavy terminal costs leads to reluctance of smaller plants to invest in rail infrastructure.

5.3 Cement: Uncertainty of wagon supply, lack of smaller shipment size is affecting this sector too. Coastal shipping has led to shift in plants located in western region. IR requires aggressive marketing strategies, including smaller rakes in close circuit, warehouse or dump facility, of wagon supply, lack of smaller shipment size is affecting this sector too. Coastal shipping has led to shift in plants located in western region. IR requires aggressive marketing strategies, including smaller rakes in close circuit, warehouse or dump facility, better covered facility at inward locations. Cement production is likely to reach 140 million tonnes in 2005. If IR can carry 50% of it (present coefficient is 42%), it will be 70 million tonnes, marked improvement from present 43.6 million tonnes.

5.4 POL: Formation of petronet, setting up of new refineries, power houses close to refineries, may lead to decline in rail coefficient. Consumption of petroleum products has a compound growth rate of 6.2%, which is further likely to increase. To fulfill it, import is going to increase. IR may get some share in incremental traffic, but ports are linked with pipelines and new refineries are closer to consumption centres, lead will fall further.

Non-bulk sector: With reduced growth of mining and heavy industry, and growth of consumer goods, IR will have to design and position special services which can attract non-bulk goods. IR has certain advantage vis-à-vis road, like right of way, no toll barrier or inter-state barriers, unified control of cargo, which can make it attractive to shippers. However, there are some issues which need to be addressed:

Consolidation: At present if a customer has to send one tonne or two tonnes of traffic, he only has to contact transporter, who will get it from him, either with LCV or tempo, depending on size. He will consolidate the goods at his warehouse and send the truck, which may be having 3 to 4 point loads. He may not even carry it to final destination. He may transfer it to some other transporter mid-way. Suppose if a trucker is sending consignment to south and he can get a full truck load to Bangalore, he will hand it over to some other transporter, who will combine it with his own cargo, and send it to destination. Even if we try to attract this traffic through container route, we have to plan for less than container load (LCL). At present in domestic sector, containers are moving mostly as rakes or two point rakes. Therefore, either railway will have to enter into strategic alliance with third party logistic provider or even trucking companies, who can stuff the container at rail terminal at originating point and destuff it at unloading point. Trucking industry can carry it for shorter distances, and Railways can haul it to longer distances, which is its core strength. Other option can be that Container Corporation can be asked to do the consolidation, provide road linkage and operate container terminals. However, it will be profitable only when the rail haulage cost, terminal and consolidation costs are less than marginal cost of trucks. As no shipper would like to increase the inventory, it may be desirable to reduce trailing load size. ECMT provides 1500 tonne trailing load for combined transport trains.

Railway	Failure of P Way		Failure of OHE		Failure of Signalling	
	1999-99	1999-00	1998-99	1999-00	1998-99	1999-00
Eastern	25	26	2	3		
Northern	68	45	--	--		
Northeast Frontier	1	--	--	--		
South Eastern	36	12	1	13		
Western	44	20	1	9		
		0	9			
		2				

Weight-volume ratio: Many consumer goods are lighter and occupy more space. If we compare them with commodities with higher loadability, freight/tonne is certainly lower. Therefore, a rake of cement may give more money than a rake of container. However, as prices have to be segment specific, it will be better to compare containers with VPUs as both are meant for smaller cargo. A look at Delhi-Madras freight rates will show that containers are comparable.

Table 8

Pricing of the service are going to be very important. In many sections Ro-Ro remained a non-starter because of our concept of fully distributed costing concepts. It is better to use LRMC cost for the segments, where IR has to make an entry. Even CONCOR many times feel that haulage charge hikes are disadvantageous.

Table 9

Therefore, non-bulk segment too will require evolution of specific strategies which can answer issues raised above.

Conclusion:

Reduce cost of operation, by putting a cap on growth on wage bill, by reducing asset failures, by going for appropriate technology rather than state of art which may lead to higher cost of operation and by improving fuel efficiency.

Reliable constant and committed value added services

Freight earning should not be used for plan works, especially non-remunerative projects. Plan size be limited by the funds provided by the government.

Work for new markets

Strategic alliance with road operator, third party service providers to offer logistic package.

Leverage land and information system for providing value added services.

Plan specific pricing strategy and position specific service to attract non-bulk traffic.

References:

Annual Statistical Statements 1998-99 and 1999-2000

Indian Railway Year Book 1999-2000

Presentation made by AM(Traffic) in MMT workshop

Presentation made by GGM(Domestic)/CONCOR in MMT workshop

	1993-94	2000-01	% Increase
DSO rate (LD)	3.80	8.50	124 %
DSO rate (E)	2.80	6.40	141 %
IR cost /wagon Km	3.86	7.06	83 %

Per VPU/TEU Freight	VPU Rs 57,991
TRAIN LOAD	22 VPU