

Roadmap for Logistics Excellence: Need to Break the Unholy Equilibrium

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This white paper attempts to provide a roadmap for India to move towards logistics excellence. Apart from raising issues that are currently relevant, it also draws from the issues that were raised in the previous three logistics summits and continue to be relevant today. As a departure from the earlier summits, it was felt that some of the issues could be presented even prior to the summit, to enable discussions and prioritization during the summit. The paper begins with an assessment of the overall performance of logistics in India, followed by a framework of an “unholy equilibrium” that seeks to explain where we are and why, and then provides actor wise action agenda as the roadmap towards logistics excellence.

1. Logistics Performance

The logistics performance of any economy needs to be assessed in totality, by examining the quality of service provided and the costs incurred. Even though Indian economy has done quite well in the post liberalization phase, the role of logistics in this has not been significant. A major contributor to the economy has been service sector, which has not really made demands on the logistics sector. The contributions through manufacturing sector have happened in spite of the state of the logistics sector. But what one claim is the heightened awareness of the potential facilitating role this sector can play.

1.1 Poor Logistics Quality

In spite of the well-intentioned efforts of various actors involved in logistics in the country, India suffers from poor logistics quality. This affects the growth of the economy, apart from providing a less than possible quality of life for the citizen. Some of the parameters and consequences of logistics quality are outlined below:

- Product Availability
 - Efficient Consumer Response (ECR) study [Business World, 2002] shows that product availability is low, with 30% stockouts. Inter regional comparison might show this to be a bigger problem in rural areas, leading to regional disparities.
 - The consequences are quite significant, especially in the context of medicines and food.
 - There is an overall reduction in choices, leading to lower quality of life.
- Product and Service Quality
 - There is reduction in choices, poor functionality and repair mindset, leading to lower quality of life.

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- Responsiveness
 - We have export disadvantages [Ananth, 1995] and higher inventories. The average inventory level of grocery stores is 45 days of sales in India, compared to a range of 11 to 22 days in developed countries [Business World, 2002]. This is caused by higher lead times [Sahay, Iyer, and Gupta, 2002] due to lower speed of transport, number of check points, turnaround time at ports [Government of India, 2003], etc. A truck in India averages 250 km per day, while in the developed countries the average is closer to 600 km per day [Rakesh Mohan, 1996]. The average turnaround time at Indian major ports was 5.9 days in 1998-99, compared to an international average of 2 days [Raghuram, 2001]. During 2001-02, the average turnaround in the major ports was 4.5 days [Indian Ports Association, 2002].
 - There is loss of life, injuries and loss of property in disaster management situations (Gujarat earthquake, cyclones, railway and road accidents).

1.2 Significance of Logistics Costs

This is a useful measure to assess the overall logistics performance of an economy. A proper analysis of this, component wise and over time, and benchmarked with other countries can enable policy directions. However, in the Indian context, the research base is insufficient to claim reliable assessments for a meaningful discussion.

At a broad level, the nature of costs can be classified as

- Direct (transportation and handling)
- Indirect (inventory, losses within a system, etc)
- Hidden (costs borne by other systems like infrastructure wear and tear, safety, pollution, distortions due to side payments, losses outside a system, etc)
- Opportunity (foregone sales transactions)

As outlined in the previous section, there are significant hidden and opportunity costs, resulting in value foregone. In this context, an attempt at only examining the measurable direct and indirect logistics costs (which is easier) has limited value to the extent of assessing conscious spends on logistics. Exhibit 1 provides such an assessment, based on CSO statistics. This analysis uses an overall figure of 26% to arrive at inventory carrying costs as a function of inventory held. This figure is expected to include measurable losses and support activities like warehousing. As per this assessment, the logistics cost as a proportion of GDP has been in the range of 11.8% to 13.4% between 1995-96 and 2000-01. There has been a declining trend till 1998-99, followed by a marginal increase. Issues that remain open in this analysis are to what extent costs related to packaging and trade services should further be included.

Exhibit 2 gives the results of an attempted analysis by one of the authors in 1987 and then updated in 1994. (The background to this is given in [Raghuram, 1992]). The share of the logistics costs as per this was 10% and 12% respectively. Exhibit 3 provides a comparison with US data [CASS Information Systems, 2002], which gives a share of 11.4% in 1987, 10.1% in 1994, and 9.5% and 8.7% respectively and 2001 and 2002.

There have been a few other attempts, and several numbers of the logistics cost share have been floating around. In exhibit 4, the authors attempted a simple method of arriving at the logistics cost share, driven by the total freight earnings of the Indian Railways, a figure which is reliably available. Given the recent trends and an understanding of the rail market share, total transportation is taken at five times the Indian Railways freight earnings. Viewing the total transportation cost as a 45% component, we derive at the total logistics cost. This yields a logistics cost share of 13% for 2001-02.

We have not found any paper where a rigorous methodology is explicitly discussed. In the absence of a good and sustainable methodology, with a clear definition on the cost components, it is difficult to use the logistics cost share for meaningful discussion.

Comparing the estimated Indian figures and the US figures, India has higher logistics cost share compared to USA. It can be argued that reduction in logistics costs is desirable. However, on comparison with countries like China and South Korea (Exhibit 5), we find that India's logistics costs are lower, even though such countries have better infrastructure and practices.

We suggest a framework, which explains this paradox. We introduce two other variables: "quality of logistics service" (high versus low) and "nature of economy" (manufacturing intensive versus service intensive). Figure 1 provides the relative positioning of the four countries. Quality of logistics service (as outlined in section 1.1) essentially prevents direct comparison, since it has implication on the hidden and opportunity costs resulting in differential quality of life. Hence US and India, and similarly China and South Korea cannot be directly compared. Between India and China, and similarly US and South Korea, the nature of economy explains the difference in the logistics cost share.

2. What is Unholy Equilibrium?

The poor logistics quality in India, as outlined earlier, is a result of equilibrium of the supply and demand expectation that have evolved over time. These are as a result of distortions due to policy measures and the inability of industry to deal with them. We call this an "unholy equilibrium". Every actor recognizes that they are not in the desirable state, but is unable to do anything that would significantly change the state.

Descriptions of the states of the unholy equilibrium of some logistical activities are provided below:

- Disaggregated Semi-organized Road Transportation (Figure 2): Three actors are primarily involved in this equilibrium: Government, service providers and shippers.

The core attributes of the equilibrium are price based (rather than service based) competition, poor logistics service quality, low transportation cost, and no commercial entry barriers.

These attributes are a result of the industry structure attributes of this equilibrium, wherein there is disaggregated (truck) ownership structure and a separation between ownership (truck owner) and marketing (trucking company).

The industry structure has been caused by various government policies including:

- Large number of check points (inter-state, octroi, etc)
- Motor Transport Workers Act (duty hours, rest requirements, etc)
- Financing incentives for small sized truck owners
- Motor Vehicles Act (driver licensing, over loading, emission norms etc)

Due to the non-existent entry barriers and price-based competition, the truck owner often resorts to overloading of vehicles, poor truck maintenance, and making side payments to the frontline regulatory functionaries. These actions of the truck owners result in induced externalities of the equilibrium, wherein larger systems bear costs of safety, pollution, and damage to roads. Such externalities have caused the government policy statements to be strict, but resulting in incentives for the frontline regulatory functionaries to compromise on policy implementation and create a vested interest for status quo.

The trucking companies add value by providing marketing services to truck owners and scale economies to shippers. But given the supply side, they hire on the lowest rates and have no monitoring of service quality.

The shipper sustains this equilibrium by focusing on direct transportation cost and reduced service level expectation.

Net cause and effect of this equilibrium is decreasing sensitivity to the direct, indirect, hidden, and opportunity cost sequence by the concerned actors, while in reality the costs have increasing significance to the economy. The implications are outlined in the earlier section.

However, there are exceptions. For example, the time definite express logistics market, which addresses a niche market requiring time sensitivity. There are also shippers who have worked with specific service providers to achieve required service levels including customized product movement and handling (automobile companies) at a higher direct cost.

- Non-scientific Warehousing: An unholy equilibrium in this is sustained by a similar cost perspective as described in the previous logistics activity. This is aided by the availability of low cost labour and the disaggregated intermediary (distributors, wholesalers etc) industry structure.
- End of Planning Period Syndrome: Attributes of this equilibrium are skewed level of activities in the intermediate segment of supply chain towards the end of each planning period. This distorts the material and information flow, leading to higher inventory and imbalanced asset utilization. This is sustained by the planning period driven target measurements and longer planning time buckets.
- Unwanted Movement of Goods: This equilibrium is sustained by the tax structure, especially the central sales tax and differential sales tax. For example western Tamilnadu, which could be better served by Bangalore on pure logistical considerations, is often served by other interior points of Tamilnadu, just to

reduce the tax incidence. Sometimes goods are taken into a low tax zone and then sold from there just for the tax benefits.

To summarise (and as shown in figure 2), these are largely driven by the nature of the interface between the actors (in logistics) and the consequent internal practices of the actors.

3. Breaking of Unholy Equilibrium

Shippers (any firm adding value to a product by conversion) and service providers (including infrastructural services {transportation, warehousing, third party logistics}, trade services {carrying and forwarding agents, distributors, wholesalers and stockists, and retailers}, information and communication technology services {hardware and software}, consultancy {fourth party logistics} and branded Aggregator), on their own, would be limited in what they can do. Government can play a significant role by appropriate policy changes. “Industry,” as a larger body, can also play a proactive role. Industry would include bodies like CII, which cut across verticals, associations of firms within a vertical like AMA (Automobile Manufacturers Association), SEA (Seafood Exporters Association), AIMTC (ALL India Motor Transport Congress) etc.

3.1 Roadmap for Logistics Excellence

We discuss the roadmap for breaking the unholy equilibrium and moving towards logistics excellence using an idea of a cost quality frontier (figure 3). The current equilibrium is at specific frontier. Movement could take place along this frontier through efforts of the shippers and service providers in their own domains. The implication is that better service levels can be achieved through higher spends in logistics and conversely lower logistics spends would result in lower service levels. There is also a limit to the achievable service levels. But the need is to shift the frontier itself so that we can achieve higher service levels with lower long run logistics spend. This can be facilitated by industry ensuring better logistics practices using standards as a means for this, and by government facilitating better infrastructure and regulation using appropriate policy. We illustrate this by discussing possible movement between four points in figure 3.

- Point A: Current position. In the absence of major structural changes (changes in infrastructure and regulation, and logistics practices) it may be possible and desirable to move to point B.
- Point B: Quality of logistics service would improve and logistics costs would increase and may be comparable to China or may be even higher. This would be a consequence of increased sensitivity to the hidden and opportunity costs discussed earlier.
- Point C: If India is able to improve on either infrastructure front or on practices front, or a moderate mix of both, we can shift the cost quality frontier downward and we would be able to move to Point C. This has higher quality of logistics service and lower logistics costs compared to Point B. However, Point C would have higher logistics costs compared to Point A.

- Point D: If India is able to make substantial changes in infrastructure and practices front, we can shift the cost quality frontier further downward and we would be able to move to Point D where in there would be lower logistics costs and substantially higher quality of logistics service compared to the current position A.

Our long run target should be to break the unholy equilibrium at point A and move to point D. In this context we outline the actorwise action agenda.

3.2 Actorwise Action Agenda

- Government
 - Review provisions of Motor Transport Workers Act and Motor Vehicles Act.
 - Streamline inter-state and intra-state movements by avoiding regulatory check points. Replacing the current sales tax structure by a value added tax would be a great facilitator [Avittathur and Shah, 2001].
 - Continue the focus on physical infrastructure development (like the current National Highways Development Project). An integrated transport policy is imperative.
 - Have more mature frontline regulatory functionaries to ensure better compliance with the law.
 - Review incentives that create the small sized operator, since it creates distortions in the industry structure.
 - Facilitate the build-up of quality human resources infrastructure through education and research.
- Industry
 - Evolve standards and certification systems for practices in transportation, warehousing, handling and contracts (for each vertical). (The appendix gives a sample perspective on a few standards adopted in the US and in India for certain exports).
 - Insist on members complying with the law and standards.
 - Benchmark for tracking progress on logistics maturity (by using a Capability Maturity Model) [Singh and Shah, 2001].
 - Facilitate the sharing of best practices and benchmarking against performance indicators (including costs) by supporting research on a sustained basis.
 - Invest in the build-up of quality human resources infrastructure through education and research.
 - Organize the “people” sector: small suppliers, distribution intermediaries, transporters, and retailers.
- Shipper
 - Be sensitive to long run cost and value due to better logistics services. If commercially viable, work with service providers to insist on and improve logistics quality. Third party logistics service providers could be an opportunity.
 - Insist on compliance with standards and the law.
 - Develop appropriate performance measures, both for own performance and the service providers’ performance, and systems to monitor them.
 - Build the compliance requirements and performance measures into contracts.

- Service Provider
 - Be sensitive to long run cost and value due to better logistics services. Identify market segments that have value for quality and make appropriate investments. Scale and scope of operations would be useful instrumentalities.
 - Comply with standards and the law.
 - Develop appropriate performance measures and systems to monitor them.

However, there are limits imposed by fundamental cultural and socio-economic factors, as to what extent the unholy equilibrium can be changed.

- Soft attitude towards time: driven by philosophy and culture.
- Significant role of small player: driven by “forced entrepreneurship” due to surplus labor, need to drive down costs, easy entry/exit, and the ability to bear demand risks and transaction risks.

In the long run, it is possible that these would also change.

In conclusion, a methodology is required to be in place to measure logistics cost and quality of logistics service on various dimensions. Apart from the imperative focus on standards and practises, it is useful to have a prioritisation for infrastructure improvement, possibly starting with the cluster concept provided in the theme paper of this summit [Vishwanadham and Gaonkar, 2003].

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<http://www.hwtc.org/PDF%20Files/Korea%20Economic%20Briefs%20July%202014.pdf>

<http://www.sitl-china.com/en/business.jsp>

Exhibit 1

Logistics Costs for the Indian Economy

93-94 Prices

Year	Inventory		Inventory Carrying Cost*		Railways	Transport by Other Means	Total Transport Cost		Administration Cost **		Total Logistics Cost
	Rs Billion	Rs Billion	%	Rs Billion	(A)	(B)	Rs Billion	%	Rs Billion	%	Rs Billion
95-96	2573.64	669.15	55.70	106.57	379.35	485.92	40.45	46.20	3.85	1201.27	
96-97	2451.58	637.41	52.85	111.69	410.54	522.23	43.30	46.39	3.85	1206.03	
97-98	2556.87	664.79	52.72	113.67	434.05	547.72	43.44	48.50	3.85	1261.01	
98-99	2543.17	661.22	51.58	115.77	455.74	571.51	44.58	49.31	3.85	1282.04	
99-00	2775.99	721.76	51.97	126.20	487.55	613.75	44.19	53.42	3.85	1388.93	
00-01	2921.73	759.65	51.86	131.63	517.13	648.76	44.29	56.34	3.85	1464.75	

Year	Total Logistics Cost	GDP	Logistics Cost/GDP
	Rs Billion	Rs Billion	%
95-96	1201.27	8995.63	13.4
96-97	1206.03	9700.83	12.4
97-98	1261.01	10163.99	12.4
98-99	1282.04	10824.72	11.8
99-00	1388.93	11485.00	12.1
00-01	1464.75	11939.22	12.3

* Inventory carrying cost calculated at 26%. The [CASS Information Systems, 2002] report uses 22 % for the US economy and since India has higher financing cost by about 4%.

** Administration cost is taken as 4% of transportation and inventory cost for the year.

Source: [CSO, 2002]

Exhibit 2

Logistics Costs for India

Nominal Values

Organized Sector	1987	1994
Transportation	38%	45%
Inventory	28%	25%
Warehousing	20%	30%
Packaging		
Losses	14%	
Total Cost	10%	12%
Logistics Cost (Rs billion)	250	800
GDP (Rs billion)	2,500	6,700

Source: [Raghuram, G, 1992]

Exhibit 3

Logistics Costs for the US Economy

Nominal Values

Year	Values of All Business Inventory	Inventory Carrying Rate	Inventory Carrying Cost		Transportation Cost		Administration Cost		Total Logistics Cost
	\$ Billion	%	\$ Billion	%	\$ Billion	%	\$ Billion	%	\$ Billion
1987	875	25.7	225	41.67	294	54.44	21	3.89	540
1988	944	26.6	251	42.76	313	53.32	23	3.92	587
1989	1005	28.1	282	44.41	329	51.81	24	3.78	635
1990	1041	27.2	283	42.94	351	53.26	25	3.79	659
1991	1030	24.9	256	40.31	355	55.91	24	3.78	635
1992	1043	22.7	237	37.26	375	58.96	24	3.77	636
1993	1076	22.2	239	36.21	396	60.00	25	3.79	660
1994	1127	23.5	265	37.22	420	58.99	27	3.79	712
1995	1211	24.9	302	39.07	441	57.05	30	3.88	773
1996	1240	24.4	303	37.83	467	58.30	31	3.87	801
1997	1280	24.5	314	36.94	503	59.18	33	3.88	850
1998	1317	24.4	321	36.31	529	59.84	34	3.85	884
1999	1381	24.1	333	36.12	554	60.09	35	3.80	922
2000	1478	25.3	374	37.29	590	58.82	39	3.89	1003
2001	1486	22.8	339	35.42	581	60.71	37	3.87	957
2002	1444	20.6	298	32.75	577	63.41	35	3.85	910

Year	Total Logistics Cost	GDP	Logistics Cost/ GDP
	\$ Billion	\$ Billion	%
1987	540	4740	11.4
1988	587	5110	11.5
1989	635	5440	11.7
1990	659	5800	11.4
1991	635	5990	10.6
1992	636	6320	10.1
1993	660	6640	9.9
1994	712	7050	10.1
1995	773	7400	10.4
1996	801	7810	10.3
1997	850	8320	10.2
1998	884	8780	10.1
1999	922	9270	10.0
2000	1003	9870	10.2
2001	957	10080	9.5
2002	910	10470	8.7

Source: [CASS Information Systems, 2002]

Exhibit 4

Logistics Costs for India: 2001-02

- ❖ IR freight earnings for 2001-02: Rs 250 billion [Indian Railways, 2003]
- ❖ Net transport earnings (estimated IR's share as 20%): Rs 1,250 billion
- ❖ Total logistics cost (assuming transport share as 45%): Rs 2,800 billion
- ❖ With GDP for 2002 estimated at Rs 22,000 billion, logistics cost share is about 13%

Organized Sector	
Transportation	45%
Inventory	55%
Warehousing	
Packaging	
Losses	
Total Cost	13%
Logistics Cost (Rs billion)	2,800
GDP (Rs billion)	22,000

Exhibit 5

Ratio of Logistics Cost to GDP for Selected Countries

Country	Japan	USA	Korea	China	India
Ratio of Logistics Cost to GDP	9.6 %	9.5 %	12.4 %	16.7%	12.3 %

Source: <http://www.sitl-china.com/en/business.jsp>
<http://www.hwtc.org/PDF%20Files/Korea%20Economic%20Briefs%20July%202014.pdf>

Figure 1

Analyzing Logistics Costs Across Countries

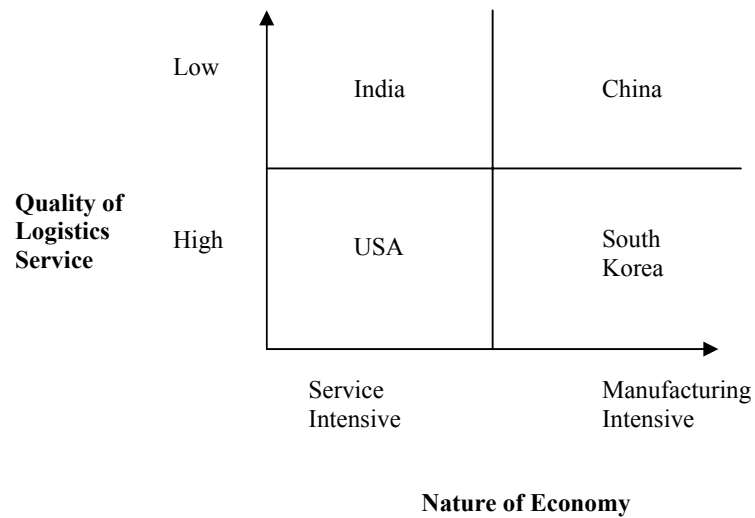


Figure 2

Unholy Equilibrium in the Road Transportation Sector

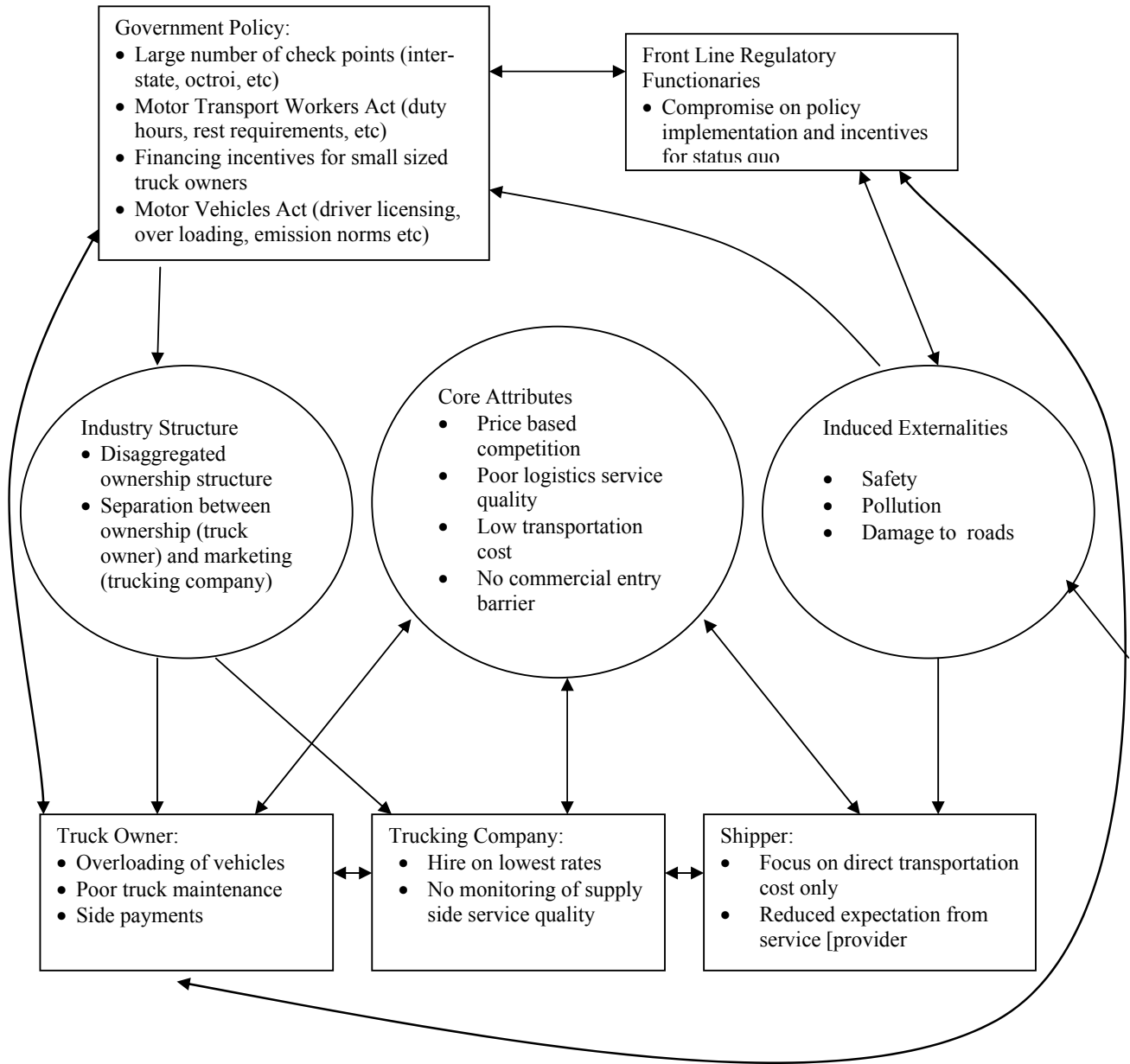
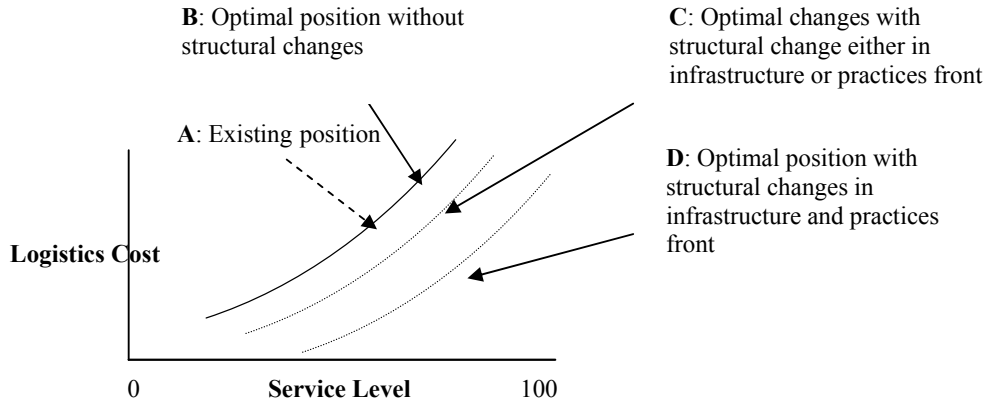


Figure 3

Roadmap for Logistics Excellence



Appendix

Examples of Standards

Standards are available internationally, generally in the developed country context. The European Union (EU) has developed standards, often with a specific focus on imports. As an example, in the context of marine exports, Indian exporters have adopted both the EU standards and Hazard Analysis Critical Control Point (HACCP) guidelines.

What is required is standards evolved within India, with an ownership by the specific industry verticals. We outline an example of the standards for air transportation of seafood in the US, as specified by Air Transport Association of America and National Fisheries Institute. One of the reasons we chose this example is because seafood availability (and consequently consumption) in the Indian hinterland is significantly lower than in the US. The primary reason is due to the poor logistics systems.

- Handling and Packing Considerations for all Seafood
 - Selection of appropriate packing materials according to durability, water-tightness and insulation.
 - Pre-chilling the product before packing to preserve low temperatures.
 - Pre-chilling live seafood to reduce body metabolism. Adequate air for live products must be checked, and thus the bags containing seafood must not be sealed.
 - Usage of proper coolant, eg gel refrigerant, wet ice in sealed bags, or dry ice (regulatory compliance for dry ice must be checked).
 - Coolants must be placed to absorb heat entering package from top and bottom.
 - The time between packing and shipment must be minimized.
- Packaging Design
 - Inside packaging
 - Sealed polyethylene bag of sufficient thickness to resist puncture and retain liquids.
 - Double packing with single polyethylene liner placed to the outside of the insulating material.
 - Adequate absorbent material or padding between sealed polyethylene product back and inner wall of outer packaging.
 - Size of polyethylene bag (sufficiently large to overlap and fold closed).
 - Outside packaging
 - Outer boxed made out of corrugated paper board or solid fiberboard.
 - Various plies of paperboard could be wax-saturated, impregnated, wax-coated or treated by other water-resistant processes in certain cases.
 - Box and container design developed after considering the density of the product to be transported.
 - Banding/other types of external sealing materials should be designed not to cut or damage the container or other packages

- Shipments in unit load devices
- Transportation from Packing House to Airport
 - The package design must provide conditions suitable for maintaining the product temperature (about 32⁰ F)
 - The packaged fish must reach the airport quickly
 - Transporting shipments in refrigerated and insulated vehicles is useful where packages maybe be exposed to elevated temperatures and/or when long trips to airport are expected.
 - Packages must be loaded in transport vehicles to minimize movement and susceptibility to dropping.
 - Stacks of seafood packages should be planned to avoid tilted or overhanging boxes.
 - Methods and equipment used to load and unload shipments must protect package integrity.

Source: [Air Transport Association of America and National Fisheries Institute, 2002]