

TRUCKING BUSINESS MANAGEMENT

Cases and Concepts

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**Debjit Roy, G. Raghuram, Rekha Jain,
Sanjeev Tripathi, Kirti Sharda**

IIM Ahmedabad



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GOVERNMENT OF INDIA

सड़क परिवहन और राजमार्ग मंत्रालय

MINISTRY OF ROAD TRANSPORT & HIGHWAYS

Foreword

It is heartening to note the significant initiatives taken by Indian Institute of Management (IIM) Ahmedabad and Mahindra Truck and Bus Division to engage with the Indian Road Transport *ecosystem*. The Management Development Program and the War Room that they have jointly conceptualized and implemented for the nextgen youth transporters are indeed driving a positive change in the transport community.

I am also glad that IIM Ahmedabad, with support from Mahindra Truck and Bus Division, is putting together the first ever *academic* book on the Trucking sector that will bring into focus the challenges of the sector and provoke thoughts on how to address these challenges. This initiative endeavors to highlight real life stories of transformation and excellence and will surely help professionalize the Indian transport business, engage with the youth, usher in fresh blood in the industry and more importantly, provide a formal academic platform to spotlight the sector.

I would like to congratulate IIM Ahmedabad and Mahindra Truck and Bus Division for their impact making and empowering efforts. My best wishes for the success of the book, *Trucking Business Management: Cases and Concepts* and would recommend that practitioners, policy makers, academicians, and students make use of the wealth of knowledge that has been assimilated in it.

(Vijay Chhibber)



Foreword

It gives me great pleasure to set the context for this book based on trucking business Case Studies being put together by IIM Ahmedabad and being published by McGraw-Hill.

As newcomers in the HCV Industry, we realised that the fragmented nature of the industry had resulted in many shortcomings, and was a big impediment in the progress of the stake holders - the unsung heroes of the Indian Economy. It was also dissuading the nextgen of transporters from joining their family business. This is a disturbing trend which made us sit up and take notice because as most of you know, the Road Transport Sector, especially the Trucking Segment, is the back bone of the Indian Economy contributing 4.5% to the GDP, employing lakhs of people and transporting over 60% of the goods being transported in the country.

We at Mahindra kick-started several initiatives to make the transport ecosystem more professional, outward looking, and vibrant. Among them, I would like to particularly mention two initiatives: the Management Development Program and the War Room targeted towards the next gen youth transporters. These initiatives are co-created with IIM Ahmedabad, our knowledge partners and were named as MPOWER initiatives, to signify youth transporter empowerment. I thank IIM Ahmedabad faculty for agreeing to co-create and drive this path-breaking initiative, which has just recently completed its eighth edition. The program was specially designed for the nextgen Fleet Owners to appreciate the contemporary management techniques and their relevance for better managing the daily challenges they face in their business.

The War Room is the next initiative in the total chain, which has given a chance to the youth transporters who attended the MDP to go back to the institute and share with their peers, their success stories, in implementation of their learning. We have just concluded the second War Room with a lot of enthusiasm and competitive spirit displayed in presenting Case Studies to the Jury comprising of the IIM Ahmedabad Faculty and Industry Experts.

This book is an attempt to share with the Student Community in the Logistics and Transport discipline, some of the nuances of the Road Transport Sector, the challenges involved and how

the industry is evolving. Many of the cases in the book are based on War Room stories that highlight how the nextgen transporters are changing the way they manage drivers and seeing tangible performance improvement as a result; using information technology differently, not just about installing GPS, but focusing on the analysis of the data and taking suitable decisions and action based on it; by bringing in more professionalism in the business; focusing on strategy and new business by delegating day to day operations to their teams; by focusing on business expansion, through new services, entering new segments, or expanding the geographical reach.

I hope that this book will also prompt more youngsters to participate in this Youth Transport Program at IIM Ahmedabad and also contribute case studies for the overall improvement of the sector besides being an excellent source of knowledge for student and teaching community linked to transport and logistics.

Best Regards,



Pawan Goenka

Executive Director – Mahindra & Mahindra Ltd.
& Group President (Auto & Farm Sector)

Preface

The trucking business in India deserves special attention. It is estimated that about 8 million goods vehicles ply on Indian roads, out of which about 25 per cent are heavy commercial vehicles (with a load capacity of 7.5 tonnes and above). More than 75 per cent of the trucks are owned by fleet operators with a fleet size of five or less. Fleet operators are mostly family-run businesses and hence they evolve with the ideologies and business principles of the family. Such evolution has led to varying business practices and levels of technology adoption. Decisions were not taken in line with modern business practices. Another trend was the relative reluctance of the next generation of these families to join their family business due to the perception that the trucking business was less appealing vis-à-vis the other options that they had after higher education.

To fill this widening business-practice gap and in an attempt to impart a professional approach towards enabling the trucking business to grow, the Mahindra Truck and Bus Division (MTBD) partnered with the Indian Institute of Management (IIM) Ahmedabad to impart management education to the next generation transporters in trucking business. This youth transport Management Development Program (MDP) was called MPOWER, signifying youth transporter empowerment. Typically, a second-generation transport entrepreneur (son and daughter of a transporter/truck fleet owner) in the age group 21 to 40 years was targeted to be a participant for the MDP. Most of the participants were well educated (many of them had obtained degrees from foreign universities), ambitious and progressive, keen to be the change agents in the road transport ecosystem, innovative, and technology savvy. They shared a common vision, which was to professionalize their family business and take it to the next level.

Till now, IIM Ahmedabad has offered eight batches of the MDP with participation from 221 transport entrepreneurs (including seven lady entrepreneurs) having a combined truck fleet ownership of 49,900 and a turnover of Rs.18,500 crore (cr). Together, they employed about 51,000 individuals (excluding the drivers). The average fleet size across the eight batches varied between 100 and 550. Likewise, the average trucking business experience of the batches was between 5 and 10 years. Further, the average turnover across the batches varied between Rs. 50 and 150 cr.

Based on the research during the development of the MDP, we recognized key decision areas such as choice of market segment, branding strategy, route structuring, fleet sizing, maintenance strategy, design of management information systems, and cash management. (A more detailed set of decisions is given as ‘Case Positioning Matrix’ in the start of the main text of the book.)

We understood the key business challenges that transporters encountered in their operations. These were primarily: volatile business volumes, driver attrition and management, unorganized data, lack of IT systems and data-driven decisions, workshop inefficiencies, insufficient focus on customer service, lack of attention to brand image, manual cash transactions, infrastructure issues, border delays etc.

The sessions in the MDP were designed and delivered with an attempt to address some of these challenges. In the MDP, case-based pedagogy was primarily used to discuss the decisions faced by the transporters.

After completing three batches of the MDP, the program faculty and the leadership team at MTBD felt that it was important to assess the impact of the program on actual practice. Towards this objective, a ‘War Room’ was launched, where the participants were invited to present the initiatives/new practices deployed in their business after attending the MDP. The War Room not only allowed the faculty to gauge the effectiveness of the MDP, but also gave the participants an opportunity to reflect upon what they had learnt at IIM Ahmedabad. It also helped faculty enhance their understanding of the nuances of the trucking business and identify the typical areas within the trucking business with potential for improvement. Also, the War Room offered the faculty several opportunities for case writing. These cases were used in the later batches of the MDP. The generation of these cases has led to the evolution of this book.

In this book, we include teaching cases based on real-life transport business situations that highlight some of the above-mentioned issues. Through these cases, the reader would be able to appreciate the decisions in the transport business, the challenges that are faced, and use appropriate decision tools to develop solutions. We include a collection of two chapters and 12 cases. The first chapter discusses the significance and structure of the trucking business. The second chapter highlights the HR practices in the trucking business particularly related to driver management. The 12 cases have been developed with close cooperation from several transport companies such as Agarwal Packers and Movers Limited, Navigators Logistics Company Private Limited, Shreeji Transport Services Private Limited, KM Trans Logistics, and Instant Transport Solution Private Limited. There are other companies whose names have been disguised to protect their identity. Apart from the new cases, we have consciously decided to include a few cases of earlier vintage, since the issues raised and the analytical approach adopted continue to be valid.

The first case, “Agarwal Packers and Movers: The Road Ahead”, highlights issues in strategic management with a focus on choice of market segment and branding. The second case, “Navigators Logistics Company Private Limited”, discusses the volatility aspects in the transport

business and the strategies to manage such situations including the appropriate customer mix. The third case “Agarwal Packers and Movers Limited” draws attention to the importance of understanding customer needs and how customer feedback can be utilized for developing innovative business practices, organization structure and increasing the market share. The fourth case “Shreeji Transport Services Private Limited”, discusses how route profitability can be improved through route structuring and pricing, using data from well-designed Management Information Systems.

Both the fifth and the sixth cases “KM Trans Logistics: Workshop Operations” and “Spare Parts Procurement Planning at KM Trans Logistics” highlight the issues in managing truck maintenance operations at a workshop. While the former case highlights the labour and workshop infrastructure related decisions, the latter revolves around optimizing inventory levels for spare parts. The seventh case “Novire Technologies: Automatic Vehicle Location” focuses on route structuring and fleet sizing, and brings out the importance of automated vehicle tracking with respect to three aspects: technology feasibility, flexibility, and scalability. The eighth case “Instant Transport Solution Private Limited” highlights the data elements that need to be captured in the IT system for better decision making towards improving operations.

The ninth case “Ispaat Parivahan Limited: Additional Fleet Acquisition” analyses the business viability of acquiring additional fleet to take advantage of return load market, while at the same time maintaining its alignment with the customer’s delivery expectations. The tenth case “XYZ Trucking Company: Misappropriation of Company Funds” discusses the issues related to cash management and related professional practices in the trucking business. The eleventh and twelfth cases show how logistics decisions of the customers of the trucking sector affect the trucking business. While the former case “FarmAid Tractors Limited” specifically shows the role of primary versus secondary road transport cost structures in developing the customers’ supply chain network design, the latter case “Laxmi Transformers” highlights the modal options competing with the trucking business and how multiple modes can be used synergistically to minimize logistics costs.

This book would have been a distant dream without the support of numerous people from industry and academia. We first thank Mr Vijay Chibber (Former Secretary, Ministry of Road Transport and Highways), and Dr Pawan Goenka (Executive Director, Mahindra & Mahindra Ltd. and Group President – Automotive and Farm Sectors) for supporting this book with their forewords. We take this opportunity to acknowledge the Mahindra Truck and Bus Division leadership team namely Mr Rajan Wadhwa (Chief Executive and President, Powertrain and Truck Division, Head - Mahindra Research Valley and Member of the Group Executive Board); Mr Nalin Mehta (Chief Executive Officer, MTBD), who has not only envisioned but also mentored the idea of this MDP right from inception; Mr Rajesh Mangal (Senior Vice President - Sales & Marketing, MTBD), and Mr Rajeev Malik (Senior General Manager – Marketing at MTBD) for supporting the trucking business ecosystem with such knowledge initiatives and giving IIM Ahmedabad this tremendous learning opportunity. In particular, we are grateful to

receive the support from Mr Rajeev Malik in developing and sustaining the knowledge initiative, and also supporting all phases of this book writing project: from its conceptualization till delivery.

We would like to make a special mention of the team from Anantara Solutions Private Limited who helped us with ideas during the design of the MDP.

We would like to thank IIM Ahmedabad faculty members, Professor Sobhesh Kumar Agarwalla, Professor Parvinder Gupta, Professor Dheeraj Sharma, Professor Sunil Sharma, and Professor Neharika Vohra, who, in addition to the five authors, have contributed to the youth transporter MDP through delivering content. We are grateful to Professor Dheeraj Sharma for his role in coordinating the first three offerings of the MDP. Several guest speakers from the industry also contributed to the MDP with their expertise in a particular domain. They are Mr Ashutosh Atray, Mr Vijay Batra, Mr Tushar Dave, Mr J. P. Gupta, Mr S. K. Krishnan, Mr Srinivas Iyer, Mr Rajat Proothi, Mr R. Raghavan, Mr Rajeev Rajadhyaksha, Mr Gopinath Ramakrishnan, Mr T. N. Seetharaman, Dr M. Sekar, Mr K. Shanker, and Mr Kaushik Somanathan.

At IIM Ahmedabad, we would like to thank our former director Professor Samir Barua and the present director Professor Ashish Nanda for their encouragement and support towards this MDP and War Room. We would also like to thank the team from the MDP office, who helped us in successfully delivering all the programmes. The IIM Ahmedabad faculty appreciates the support from Mr Shashank Patwa and Mr Vineet Nagotkar of MTBD in the execution of the MDPs.

Several research associates at IIM Ahmedabad helped in shaping the book contents. In particular, Ms Pooja Shrivastava helped all faculty members in case editing, coordinating the case collection, and providing the publisher with timely inputs. Mr Prashanth D Udayakumar, also helped in background research and case editing. We would also like to thank all co-authors of the cases, Mr Arindam Bandyopadhyay, Mr Souhardhya Chakraborty, Mr Aditya Goyal, and Mr Dilip Mathew, for their contribution. We thank the transport companies, who participated in developing the cases. We appreciate the support from Ms Jayashree Rammohan, who helped to edit the book contents and provide the authors with timely inputs. We acknowledge Interface Communications for the cover concept and image. Last but not the least, we would like to thank the publishing team at McGraw-Hill Education, for their efforts in copyediting and contributing to this book.

We hope this book will serve as a casebook for learning in courses related to trucking, transport and logistics management, both in graduate and executive education programs. We also believe that this book would be useful for managers in the industry to learn about good practices and for researchers to further knowledge in this important sector.

Authors

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Prologue

IMPORTANCE OF THE COMMERCIAL VEHICLE (CV) INDUSTRY IN ECONOMIC GROWTH OF INDIA

The Automotive Industry in general and the CV Industry in particular can be broadly described as the barometer of the economy. It is considered as a major contributor to economic growth, playing a vital role in the transportation of goods and people in a more flexible and efficient manner compared to other modes of transportation. Road vehicles can penetrate into wider and deeper areas which other modes cannot do easily, and hence help in integrating backward areas into the mainstream. The development of the automotive industry has also resulted in growth in employment, skills and entrepreneurship as is evident from the establishment of thousands of ancillary units spread across the country.

India ranks in the top seven markets in the CV industry globally, and is the fourth largest in the heavy commercial vehicle (HCV) segment after China, USA and Europe. The India market, with its fast growing middle class, related consumption and economic growth has attracted global OEMs (original equipment manufacturers) to the country in recent years, with investments in excess of over 100 billion in the CV industry.

The railways which has a huge network across the country today mainly carries bulk goods and handles only around 40 per cent, whereas road transportation accounts for over 60 per cent of the total goods transported. In the past sixty years the contribution of the railways to goods transportation has gone down from over 65 per cent to less than 40 per cent. A major reason has been the rapid growth in demand and the need to reach every nook and corner of India, which has over 8000 townships and over 600,000 villages. The urbanization of the rural areas,

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the advent of TV and the mobile network expansion have transformed the rural economy with most organizations wanting to market products to these unexplored territories.

The road transport industry contributes to 4.5 per cent of the GDP compared to the railways which contributes to 1 per cent of the GDP, according to the Planning Commission Working Group on Road Transport for the Eleventh Five Year Plan. This shows the heavy dependence on road transportation, which is likely to grow, given the fast pace of economic growth and the urbanization of rural areas. India has the second largest network of roads in the world. The estimated figures for CVs on the road will be in excess of 8 million, with over 45 per cent being LCVs and the rest being medium and heavy commercial vehicles (M&HCVs).

PHASED GROWTH OF THE CV INDUSTRY IN INDIA

The CV industry, which is nearly 87 year-old in India, has been through four phases, closely linked to the political, industrial and regulatory changes in the country.

Phase 1 – (Pre-Independence period) 1928 to 1947

Though the first motor cars came to India in 1898, the first manufacturing of CKD cars and trucks commenced in 1928 by General Motors, followed by Ford Motors and five others including Hindustan Motors and Standard Motors.

Phase 2 – 1947 to 1968

During this period, the government was keen to have a long-term Policy and commitments from OEMs to have a domestic manufacturing program to reduce reliance on CKD imports. The three Tariff Commissions appointed between 1953 and 1968 recommended that only companies with a manufacturing program should be allowed to continue, and this led to the exit of Ford and General Motors and later some others, who found the demand too low to have a manufacturing program in India.

This led Mahindra and Mahindra and Tata Motors, along with Ashok Leyland and Bajaj Auto, to establish multi-location units to manufacture LCVs. The Government resorted to huge concessions like ten-year protection to the automotive OEMs as well as component manufacturers. The import duties on components were progressively increased as their indigenous production commenced. The policy supported limiting the number of models, to control the import of components and loss of foreign exchange.

The foreign exchange crunch post-1957 prompted the government to discontinue the import of larger trucks and encourage LCV manufacturers to collaborate and start manufacturing of 7.5-ton and 9-ton trucks, which commenced between 1964 and 1966. Simultaneously, the government policies supported the supply of components and parts by independent manufacturers.

Through this period the Industrial Development Regulation Act and other regulations ensured that a license was required with regulated capacities and a growth of 10 per cent per annum permitted in the normal course. There were restrictions on new manufacturing equipment being installed which controlled expansions both in existing and new geographies.

Phase 3 – 1968 to 1996

MRTTP/ FERA and related regulations coupled with changes in the Industrial Policy from time-to-time resulted in restricting the growth of the CV industry as large business houses directed their attention to other sectors. The restriction of 40 per cent on foreign participation too was a constraint. In the early 1980s the rules started relaxing, and the applicability of the MRTTP Act to two- /three- and four-wheelers was removed in 1985. This was followed in 1986 by the government announcing a minimum economical scale of 25000 p.a. of capacity for CV manufacturers, simultaneously de-licensing the ancillary sector for non-MRTTP and non-FERA companies for items not reserved for the small scale and not located in the urban and municipal limits of cities. The government also allowed the broad banding of four wheelers, thus permitting the capacities to be interchanged across cars, jeeps, LCVs and HCVs, trying to optimize the capacity utilization based on the demand from the market.

The era of 1980s also witnessed the effort in bringing in technology, by allowing four new players in LCV manufacturing. This encouraged the existing players to modernize. The process was further assisted by the relaxation in import-export norms – allowing the import of capital goods, technology, components and raw materials.

The industry started with 6-ton payload vehicles which ran on petrol, and had to be started with manual cranking. The shift from petrol to diesel also saw a change in the payload to higher capacities, namely, 9 tons. Interestingly, the engine heads moved from cast iron to steel; however, during the winter, fuel lines had to be heated externally to warm up and start the engine. This also resulted in additives being added to the fuel depending on the geography, to overcome the problem with starting the vehicle. The industry has come a long way from engine and axle development to electronic start, inline fuel injection, and multi/dummy axles to improve loadability. Tyres have also evolved from rubber to nylon and from crossply to radials, which resulted in greater vehicle efficiencies on the road. While the roads had improved significantly, unfortunately the weight permitted per axle had not gone up substantially.

The period of the late 1970s and early 1980s also witnessed a major shift from petrol-driven LCVs to diesel-driven LCVs. Whereas in 1970 almost 100 per cent of the LCVs ran using petrol, by 1975 the percentage of LCVs using petrol had gone down to 23 per cent and by 1985 there was a total shift to diesel. The increase in international prices of fuel and the differential duties on petrol and diesel in India played a significant role in this shift.

Phase 4 – 1996 to 2015

This is the period in which the CV industry has benefitted from the liberalization of the Indian economy starting in 1991 and culminating in the Automotive Policy of 1993, followed by the New Automotive Policy 2002, and Automotive Mission Plan 2006.

The government has successfully aimed at creating a major automotive manufacturing hub in India. The Automotive Policy and the Automotive Mission Plan have allowed new entrants to bring in technology, establish new capacities, and import CKD/SKD units to quick start assembly lines, with requirements to export components and finished goods to offset the initial outflow of foreign exchange.

This prompted the entry of Volvo, Daimler Benz and Navistar to set up JVs for manufacturing facilities in the CV sector, and a number of other players entered India in the passenger vehicle segment. The insistence on export obligations from these new entrants prompted most OEMs to bring their ancillary component manufactures to set up units/joint ventures with existing Indian suppliers to replace the CKD/SKD units being imported, within the agreed timeframe. This has resulted in a huge growth in automotive component exports from India from around 13,000 crore in 2006 to over 68,000 crore today.

The CV industry today can broadly be classified into buses, LCV and M&HCV Trucks. The LCVs now have multiple gross vehicle weight (GVW) capacity vehicles as low as 1 ton going up to 7 tons. The higher capacity trucks have resulted in the traditional HCVs which were up to 9 tons being pushed into an intermediate category now referred to as MCVs. The MCVs have a GVW capacity of 9 tons and 11 tons. The HCV segment has HCVs which are multi axle, tippers and tractor trailers.

The new modern trucks from some of these new entrants, as well as the launch of upgraded vehicles by the existing OEMs, has brought a wide range of products, features and applications to the Indian CV market. In fact this period has seen the introduction of higher GVW vehicles starting with 16 tons and now having multiple capacities like 25 tons, 31 tons, 37 tons, 40 tons and 49 tons. There is also a slow but steady shift to containerization of cargo, and car carriers of up to 22.5 meter lengths. The truck-on-truck concept too is catching up and will spur demand for the same. There has been an upgradation in driver cabins from rigid seat cabins to adjustable seats and multi-level sleeper cabins with air conditioning.

The industry has thus seen restricted growth in the period between 1947 and 1995, controlled by various legislations and policies which was the need of the hour then. The uncertainties in policies also resulted in the limited entry of international players in the HCV segments leading to low GVW vehicles with basic features with inefficient output being manufactured in the country.

The high investments needed for the modernization of the HCV industry, varying models and capacities to match the requirements of applications in specific industries has happened post-1996, and is a continually evolving process today.

The improvement in infrastructure by introducing four and six lanes in the National Highways and the completion of the Golden Quadrilateral has further led to the demand for higher capacity vehicles going up. The 24–18 feet vehicles which were the norm during the 1980s have now given way to 32-/40-/50- feet long trailers. The need for time-bound deliveries from customers has resulted in truckers using the new highways and incurring toll taxes on these highways. The customers have started including these toll charges in their costing while fixing the transport charges, which is a very positive development.

CUSTOMERS DRIVING CHANGE

There is a distinct change in the composition and expectations of HCV buyers. Whereas till about 10 years ago, fleet owners constituted around 10 per cent of the truck ownership, the economic growth post liberalization has resulted in many younger players aspiring to be fleet owners and who have invested heavily in assets of their own. The new players not only have a higher risk-taking ability, but are also willing to serve customers in the new emerging industry sectors. The delivery of cars to dealers through drivers driving the same has been replaced by car carriers. The import/export business outside of India is mainly through containers and this is slowly converting the transportation of cargo by containers to the port. The car carrier is an excellent example of the same, and so is the EXIM sector where trailers carrying containers over long distances are a regular feature on the highways.

The fleet owners of today are more technology orientated, have invested in technology like GPS to track their assets, have no hesitation in investing in company-built cabins offering driver comfort and also have software to support measuring of efficiencies on various parameters.

Many seasoned players of yesterday have fast learnt from global best practices and have brought in efficiencies through establishing their own service centers for preventive maintenance, usage of OEM spare parts and own staff to repair the vehicles. This has helped them to achieve a faster turnaround of vehicles, higher asset utilization and managing of maintenance costs at reasonable levels. As against 6,000–7,000 km per month of average running, the fleet owners of today are able to run their vehicles for 10,000 plus km per month, and also have two drivers in some cases to achieve shorter transit times.

Fleet owners have also resorted to medium- and long-term growth strategies, helping them to grow and at the same time insulating their business from uncertainties. Some of the large fleet owners have grown to offer third party logistics (3PL) services adding value to their customers. They offer modern warehousing with racking, material handling equipment and warehouse management systems to integrate with those of their customers. Others have also expanded their operations into International Freight Forwarding and Customs Brokerage, thus making them an Integrated Logistic Service Provider.

As 3PL Service Providers, the fleet owners offer milk runs, consolidation services at their own warehouses, long hauls and JIT delivery to manufacturing units of their customers. The expansion in these areas also results in the fleet owners having a mixed fleet of LCVs and HCVs with varying capacities.

The end-customers of today have enhanced expectations from the fleet owners. The fleet owners are required to commit to time-bound deliveries across geographies without delays and breakdowns. The tracking of vehicles en-route is the norm, which has also made the fleet drivers accept GPS technology as a necessity. Even small fleet owners have installed GPS as it makes them easily acceptable as attached vehicle suppliers for very large fleet owners. The customers have resorted to reverse bidding for fixing long-term contracts with fleet owners which too drives efficiencies and demand for quality service. The customer orientation among the fleet owners has undergone a transformation in the past five years or so. The availability of a large number of fleet owners, the readiness of new entrants to be measured on Key Performance Indicators (KPIs), and the insistence in certain sectors like hazardous chemicals on safety-related regulations is fast creating a new breed of transporters.

THE TECHNOLOGICAL CHANGES BY OEMs TO OFFER SAFETY

Multi-Axle vehicles, Automatic Transmission, OEM built cabins, higher power engines with 210 and 260 HP to climb gradients, electronic engines to replace mechanical engines, power steering and power brakes are changes in the technology witnessed in the industry. The BS IV emission norms will also force improvements.

The CV OEMs have introduced many safety factors in keeping with both the government regulations as well as the demand from certain discerning end users in the hazardous goods manufacturing sector. These include safety belts for drivers, ABS systems, side mirrors, rear and side under-run protection devices (RUPD/SUPD), etc.

GOVERNMENT THRUST ON SAFETY

Road users in India are heterogeneous in nature, ranging from pedestrians, animal-driven carts and cycles, to multi-axle commercial vehicles, etc. Higher exposure to road accident risk may be mitigated by behavioral standards (adherence to road safety regulations) and policy intervention (enforcement). Accidents carry high economic and social costs, which are not easy to measure. The cost of road accidents is estimated in the range 1 to 3 per cent of GDP according to various studies.

The **Road Transport and Safety Bill, 2014** envisions providing a framework for a safer, faster, cost-effective and inclusive movement of passengers and freight in India, thus enabling the mission

of 'Make in India'. It is currently in the draft stage and is being prepared by the Ministry of Road Transport & Highways, Government of India, which will extend to the whole of India if enacted.

REGULATIONS FOR THE CV INDUSTRY

Two key laws governing the CV industry and related to road freight are the Motor Vehicles Act, 1988; and the Carriage by Road Act, 2007. The impact of these has necessitated changes in CV design and usage across OEMs.

- **Motor Vehicles Act, 1988** – This Act deals with the basic roadworthiness of the vehicle, the framework for vehicle ownership and governance during transport. It also covers aspects like the speed of vehicle, weight/overloading, etc. An Amendment to the Act was passed in 2012, which provided for quicker enforcement through the right authorities, especially pertaining to the overloading of vehicles.
- **Carriage by Road Act, 2007** – This Act was notified in September 2007, repealing the earlier Carriage Act, 1865. This Act helps regulate transport intermediaries/common carriers/logistics firms and determines the liability for loss/damage to such goods.

There are other laws and rules which govern the movement of goods across the country which affect the type of vehicle/its specifications at a broad level. The National Permit scheme introduced in 2010 by MoRTH (Ministry of Road Transport and Highways) has also helped in the smooth movement of CVs across states.

CHANGES IN THE MANUFACTURING OF CVs

The demand for different capacities and variants has forced OEMs to change their sourcing strategies. Earlier, OEMs had to deal with 400–500 suppliers and these were being sourced from across the country, leading to larger inventory holding at the plants. In the last 10 years, OEMs have started having Tier-1, Tier-2 and Tier-3 suppliers, with Tier-1 suppliers buying from the other tiers and manufacturing aggregates for supply to the OEMs. The OEMs have supplier parks in the new plants with suppliers either manufacturing or storing the parts and supplying JIT to the line.

The earlier practice of OEMs employing a large workforce, who did all the work, has been replaced by outsourcing some of the supply chain related activities to professional 3PL companies, who have tyre assembly units close to the plant. These initiatives have resulted in the de-cluttering of production lines and lesser workforce in the plants.

CHALLENGES FACED BY THE CV INDUSTRY

The major challenges faced by the CV industry in India are as follows:

1. In India, there is no legislation related to scrapping of vehicles after a certain number of years. This leads to the asset being flogged to death and being used for short hauls/intra city transportation, etc. The older trucks are fuel guzzlers, badly maintained and also add to the overall pollution in cities.
2. The implementation of emission norms has not kept pace with global norms and contributes to substantial pollution through running of old trucks.
3. Freight rates have remained low compared to the increase in the cost of fuel, tyres, and maintenance and road taxes. The overloading of trucks helps in keeping the cost per ton/km low. The end users push the truck owners to offer low rates; and with the fragmented market in India, there is no push from truck owner associations for higher returns. This also has a negative impact in terms of the salary and allowances paid to the drivers. The geographical imbalance in industrial growth also leads to the lack of back haul on routes and related inefficiencies.
4. The low salaries and allowances paid to the drivers results in making this profession less attractive to the next generation. The overall shortage of drivers in the industry is stated to be around 15 per cent and this is leading to idling of assets at the fleet owner end.
5. Lack of professional drivers who are well trained to drive the modern vehicles also affects the inclination to invest in expensive assets.
6. The insurance terms by many end users lay down a 100 per cent responsibility on the trucker, without any recourse, and this leads to stress on both the trucker and the driver.
7. OEMs have attempted to bring out fully built cabins, which have a much lower acceptance in India than abroad.
8. The modern powerful trucks capable of a faster climb on gradients, can lead to faster transit times across hilly terrains. However, negating factors like waiting for loading and unloading of goods for two to three days at the end user's location, results in no special advantage to the trucker.
9. The ill treatment to drivers by the end user, by the border check posts and the police and the social stigma attached to driving as a profession, are deterrents for new entrants to the industry.
10. Lack of training facilities for CV drivers is a huge issue, and the low skill sets and lack of proper education adds to the lack of trust the employers have for the driver. The trust deficit is the biggest challenge for most fleet owners leading to multiple compensation practices which do not necessarily satisfy the drivers.
11. Complex documentation requirements for transportation of goods across state borders and long waits for document and goods clearance at state border check posts leads to inefficiencies for all the stakeholders.

The Transport Ecosystem comprising various stakeholders like CV financiers, drivers, mechanics, emergency services and *dhabas* (*roadside eateries on the highways*) play a critical role in the smooth running of CVs on Indian roads.

FUTURE PROSPECTS FOR THE CV INDUSTRY

The Indian economy is expected to be one of the fastest growing in the world, and the GST introduction in the near future will further assist in its growing in double digits at least for some years. The CV industry is expected to register positive growth with the following developments in the offing:

1. The stricter emission norms are likely to phase out old trucks and lead to the demand for new modern trucks.
2. The GST regime will lead to easier cross-border trade and improve transit times for fleet operators.
3. The consolidation of warehouses by end users will lead to higher-sized consignments being transported from point to point, whether they are manufacturing or trading hubs. This will lead to the demand for higher capacity trucks.
4. The modern retail proliferation and the e-commerce revolution will lead to more demand for LCVs to support intra-city deliveries.
5. The improvement in infrastructure and further broadening of highways will lead to bigger trucks transiting more easily on highways.
6. The younger generation of drivers will demand more comfort and better conditions leading to higher acceptance of OEM-built cabins/air conditioned cabins leading to higher usage of assets and resultant revenues for the asset owners.
7. The government initiatives in the housing, road building and infrastructure sectors will increase the demand for CVs, especially tippers.
8. Consolidation in the transport industry will lead to more large fleet owners, an improvement in delivery of service and a wider range of options for end users.

There needs to be further improvements in the demand for the vehicles and more modernization in manufacturing processes and systems, and keeping pace with international standards, which will make India a major exporter of CVs. Recent investments in this sector have created large capacities as well as brought in technological improvements. These can be positively leveraged to increase the pace of overall growth in the economy while adding to the exports of CVs across the spectrum from India to new emerging markets like Africa.

An Overview of the Trucking Sector in India: Significance and Structure



The objective of this chapter is to provide an overview of the trucking sector. While discussing the significance of road transport and the structure of the trucking industry, it also explores the causes and consequences of the industry structure.

SIGNIFICANCE OF ROAD TRANSPORT

In this section, we will discuss the significance of road transport in India.

1. Road vis-à-vis Other Modes

Amongst all the modes, rail and road transport are the most significant. The modal share between these two has changed over the years, from the 80 per cent rail share in 1950–51, to the road share becoming 65 per cent in 2011–12. Road-share overtook rail in the early 1990s (Figure 1.1). This shift was observed because the Indian Railways were unable to provide the required capacity or respond with expected customer service; while road transport could provide door to door service. Further, during the last two decades, road infrastructure expanded rapidly on account of focused policies and investments.

However, it is important to note that apart from rail and road, there are four other modes that have a share of the freight transport of the country. Measured in billion tonne kilometers (btkm), rail and road account for 86 per cent of the freight transport while the other modes account for 14 per cent (Table 1.1).

Prepared by Professor G. Raghuram, Indian Institute of Management, Ahmedabad.

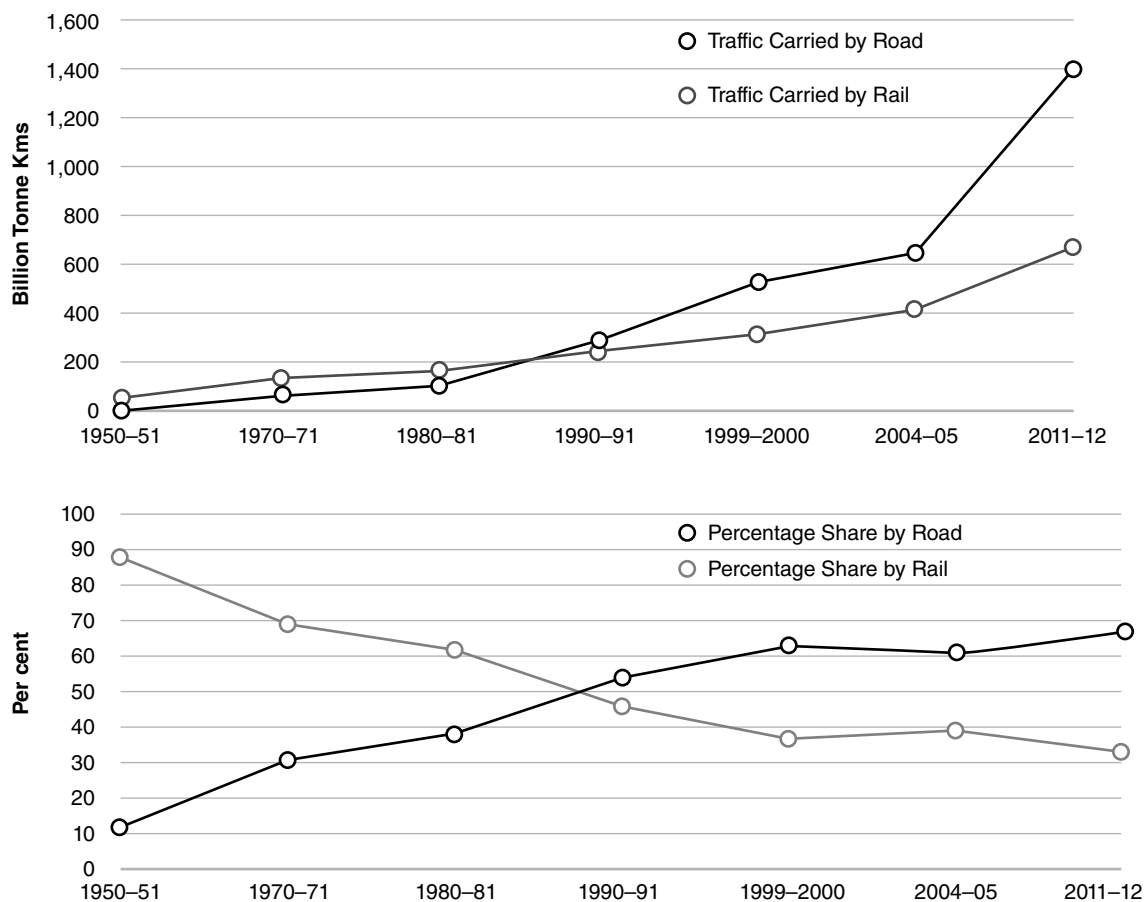
The author acknowledges the research and editing support from Ms Deepmala Pokhriyal, Ms Pooja Shrivastava and Ms Geetika Sarda.

TABLE 1.1 Modal Share of Freight Traffic

Mode	2007-08 (RITES)	
	btkm	% Share
Road*	706.0	50.11
Rail*	508.0	36.06
Pipelines	105.0	7.45
Coastal Shipping	86.0	6.10
Inland Water Transport (IWT)	3.5	0.25
Airways	0.3	0.02
Total	1408.8	100.00

Source: Total Transport System Study (TTSS) by RITES Limited, as reported in NTDPD 2013

*Excluding intra-regional traffic

**Figure 1.1** Freight traffic: Roads overtake rail

Source: Trends in Growth and Development of Transport, NTDPD 2014, Planning Commission; accessed from http://planningcommission.nic.in/sectors/NTDPD/volume2_p1/trends_v2_p1.pdf on December 14, 2015

One of the major concerns of transport infrastructure planning is the non-availability of authentic data, especially in the road domain. The last attempt at a scientific sample survey based study for freight transport was conducted in 2007–08 at the behest of the then Planning Commission by RITES.

It is time that we put into practice a mechanism for a scientific and periodic collection of road data. It should be noted that this information is electronically available with a large number of trucking companies and the shippers.

The National Transport Development Policy Committee (NTDPC) has tried to estimate the overall freight traffic until 2031–32, using a growth rate of 1.2 times the GDP growth rate. Based on this multiplier of 1.2, the expected freight traffic would be as shown in Table 1.2.

TABLE 1.2 Projection of Freight Traffic

Year	GDP growth (%)	(btkm)	Rail : Road share
2011–12	--	2053	—
2016–17	6.9	3056	35:65
2021–22	8.0	4834	39:61
2026–27	8.5	7856	45:55
2031–32	9.0	13118	50:50

Source: NTDPC. (2014). India Transport Report. Routledge. Retrieved December 15, 2015, from http://planningcommission.nic.in/reports/genrep/NTDPC_Vol_01.pdf

The NTDPC projects an increasing share of rail transport, from 35 per cent to 50 per cent based on policy measures towards savings in carbon impact. It is also expected that water (coastal shipping and IWT) would increase its modal share, with pipelines sustaining their share, bringing these environment friendly modes to at least 20 per cent. This would bring road share down to 30 per cent. This would imply that the road freight (in terms of btkm) would go up from over 1000 in 2011–12 to nearly 4000 in 2031–32.

2. GDP Share

The contribution of the transport sector to India's GDP has increased from 6 per cent in 2001–02 to 6.7 per cent in 2012–13 (Table 1.3). Within this, road transport has increased from 3.9 per cent to 4.9 per cent, being the primary driver of the increase in the transport share.

TABLE 1.3 Share of Different Modes of Transport in GDP (All values in %)

Sector	2001–02	2008–09	2009–10	2010–11	2011–12	2012–13
Transport	6.0	6.6	6.6	6.5	6.6	6.7
Segmental Breakup						
Railways	1.2	1.0	1.0	1.0	1.0	0.9
Road Transport	3.9	4.7	4.7	4.6	4.8	4.9
Water Transport	0.2	0.2	0.2	0.2	0.2	0.2
Air Transport	0.2	0.2	0.2	0.3	0.3	0.3
Services Incidental to Transport	0.5	0.4	0.4	0.4	0.4	0.4

Source: Indian Railways: Lifeline of the Nation, Ministry of Railways, Government of India, February 2015, accessed from http://www.indianrailways.gov.in/railwayboard/uploads/directorate/finance_budget/Budget_2015-16/White_Paper_English.pdf; last accessed on July 3, 2015; "Revenue from Road Transport in India," Harendra Mohan Singh, April 2015.

3. Classification of Roads

Roads are the primary infrastructure required for the trucking sector. As per the 2013 estimates, the total road length in India was 4.7 million kilometres, making the Indian road network the second largest in the world after the United States.

Indian roads are classified according to their primary source of financing. The Central Government finances the National Highways; the State Government the State Highways and the State and local governments finance the rest of the roads (Table 1.4). In the 2004–14, a lot of rural roads have been financed by the Central Government under the **Pradhan Mantri Gram Sadak Yojana** project. Under ‘other’ roads, there are categories like urban roads, project roads and border roads, which are financed by municipal administrations, major projects and the defence ministry, respectively.

TABLE 1.4 Classification of Roads

Type of Road	Length (km)	%
National Highways	93,051	2.19
State Highways	154,522	3.63
District, Rural and Other Roads	4,010,973	94.18
Total Length	4,258,546	100.00

Source: NHAI. (2014). Annual Report 2013-14. Retrieved December 16, 2015, from <http://www.nhai.org/Audit.htm>

The national highways carry about 40 per cent of the total road traffic, though constituting only about 1.7 per cent of the road network.¹ The National Highways Authority of India (NHAI) has been investing in a multi-phase National Highways Development Project to improve the capacity and quality of the national highways, significantly using the Public Private Partnership (PPP) model. Many state governments have followed the same for state highways, concessioning out on a PPP model often through a state public sector in the form of a Road Development Corporation.

4. Vehicles

The total number of registered vehicles in India was 173 million, as of March 31, 2013. Of this, goods vehicles accounted for 8.1 million. The largest share was held by two-wheelers at 125.7 million, followed by four wheelers at 23.5 million. A 60-year profile of registered motor vehicle categories is given in Figure 1.2. This shows the significant growth in the share of two-wheelers.

The truck population in India grew at a rate of 7 per cent per annum between 2011 and 2013. Around 75 per cent of the trucks on Indian roads are two-axle trucks with a capacity of nine tonnes. Two- and three-axle rigid trucks constitute the bulk of trucks in India. The share of three-axle trucks and light commercial vehicles is on the rise.

About 40 per cent of Indian trucks are less than six years old, while 34 per cent are older than 10 years. In India, the average truck is operational for about 20 years, after which it is scrapped.² There is an attempt by the government to cap the life at a reduced level, from the pollution perspective.

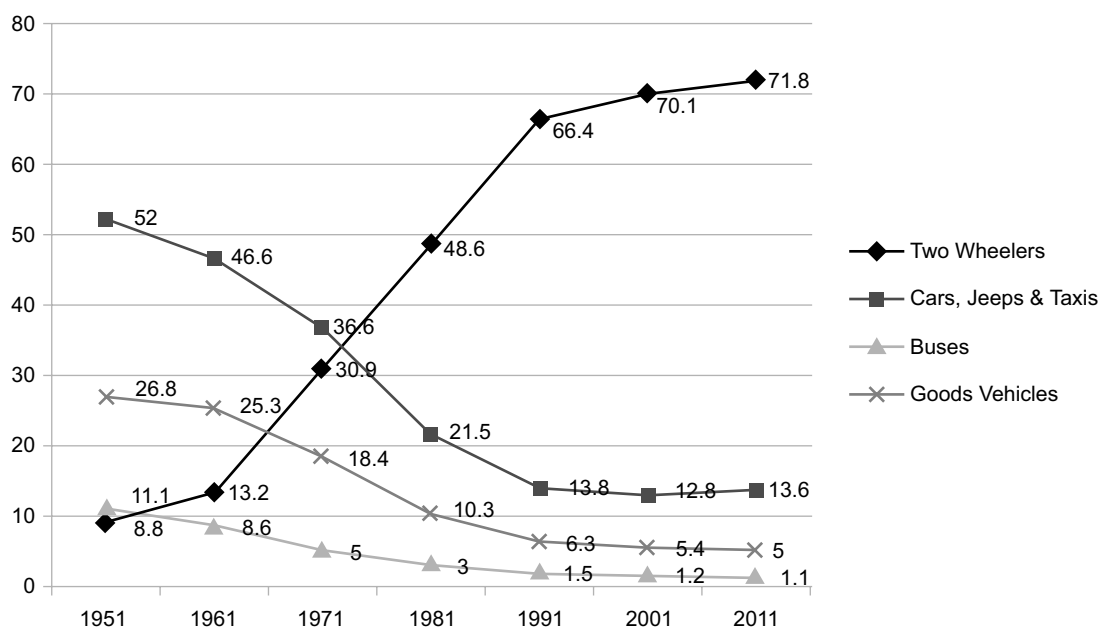


Figure 1.2 Profile of registered motor vehicle categories

Source: Road Transport Year Book 2011–12 accessed from <http://morth.nic.in/index2.asp?slid=291&sublinkid=137&lang=1> on December 15, 2015.

STRUCTURE OF THE TRUCKING INDUSTRY

In this section, we will discuss the structure of the trucking industry.

Customers move their goods almost entirely through third party players, rather than through their own fleet. This makes the trucking industry commercially highly dynamic. The trucking industry has multiple actors (Figure 1.3). The core actors directly serving the customers are the trucking company and the

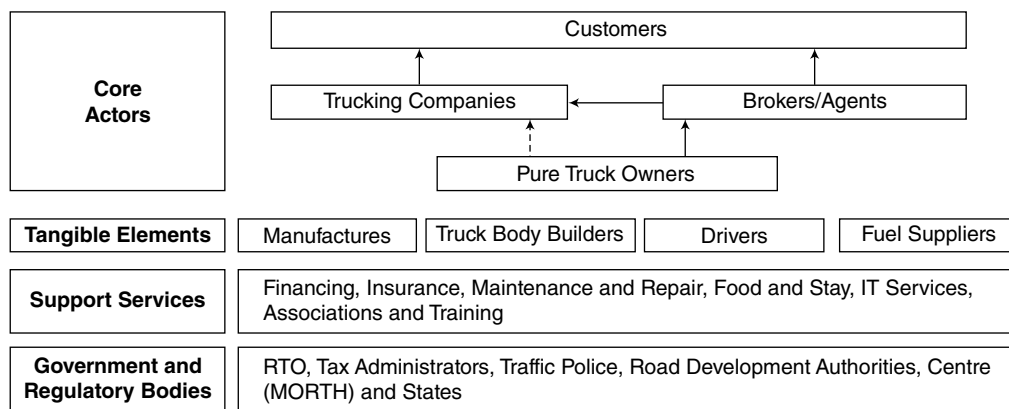


Figure 1.3 Structure of the Trucking Industry

Source: Developed by the author

brokers/agents. They are supported by the pure truck owners. This core set of actors is supported by four entities providing the tangible elements for trucking: manufacturers, truck body builders, drivers and fuel suppliers. The core set of actors has an ecosystem constituting support services, and government and regulatory bodies.

1. Core Actors in the Trucking Industry

(i) Trucking Companies

Being the primary solicitors of freight, trucking companies are either based on ruling market prices or tender based bids. These companies are responsible for delivery of goods from the customers' loading location to the unloading location. They are also accountable for cargo loss and damage claims, and perform various other customer care services. Most trucking companies own some fleet. However, to fulfil market needs, they often source a larger part of their requirement through brokers or directly as 'attached' fleet.

(ii) Brokers/Agents

Brokers/Agents are the primary intermediary acting on behalf of pure truck owners; supporting customers directly (like a trucking company) or providing fleet to the trucking companies. They play an important role in the Indian trucking ecosystem as these brokers/agents are the means of giving continuous business to these companies. Since the trucking companies have limited means of assessing an owner's performance, the brokers help in determining the trustworthiness of the truck owner.

(iii) Pure Truck Owners

These entities account for the largest share of the truck fleet in India, owning, say, less than five trucks. The trucks are driven by a set of family members or hired loyal drivers. The drivers are usually assisted by a helper and virtually live in the truck. They largely depend on brokers for getting business, either directly from customers or through trucking companies. Some of them 'attach' themselves to specific trucking companies (shown as a dotted line in Figure 1.3). The rates they get are as per the market, which reflects the supply-demand situation on specific origin–destination segments.

2. Tangible Elements

(i) Manufacturers

The Indian truck manufacturing sector is characterized by the large organized sector primarily making the chassis, with the trucking companies or the pure truck owners then having bodies built on the chassis as per their market needs. There is a growing, though not yet significant, body built trucks supply direct from the manufacturers. The annual truck sales have fallen in recent years, both due to a sluggish economy and an increasing utilization of trucks. The manufacturing segment is characterized by two market leaders who have had a long innings in an earlier regulated market favourable to them. Over the past two decades, after liberalization, there have been many new entrants with a growing market share and offering a wide

range of vehicle types. The manufacturing industry, also known as the commercial vehicle (CV) industry, is described in greater detail in the Prologue.

(ii) Truck Body Builders

The Indian truck building industry is understandably huge, but operates largely in the unorganized sector. The advantages of this sector are the low cost and the customization that they bring to the table. However, there are concerns related to safety and quality. Further, some of the customized body building violate the Motor Vehicles Act in the interest of higher revenues.

(iii) Drivers

Truck drivers are the most critical players, forming the human backbone of this industry. The role of a truck driver is challenging, given the unpredictable nature and schedule, long distance travels, long periods of separations from family members, perceived harassment by the police while *en route* and the job insecurity involved. Poor design and maintenance of the Indian roads add to problems of health and safety. In spite of this, they are paid poorly and not surprisingly there is a growing shortage of drivers.

There is both a status and a skill gap among drivers. Many actors in this sector have begun to realize this. There is an increasing focus on bridging the skill gap and providing appropriate *en route* facilities for drivers. These efforts are fragmented and need more focused attention. The National Skill Development Council (NSDL) has identified formally trained drivers as an important skill gap.

(iv) Fuel Suppliers

This sector is supported by large organized players, with a larger share in the public sector. The penetration of fuel retail outlets is deep. Many of the outlets have started providing extra roadside facilities for trucking. One issue of contention is that fuel prices tend to vary more often than the ability of trucking companies to pass through the variations to customers.

3. Support Services

(i) Financing

The financing of vehicles largely occurs through non-banking financial services, commercial vehicle manufacturers and sometimes by the unorganized sector including money lenders. Trucking also qualifies under priority sector lending of banks but is targeted at the small fleet owners.

(ii) Insurance

While insurance for the commercial vehicle is organized, it is not so for the goods carried. It is not always that customers insure their goods during transit, since the Carriage by Road Act passes the responsibility to the carrier. Any accident and/or goods lost situation becomes a complex and ‘uncivilized’ process of a blame game. This is one of the high-risk areas for trucking companies and truck fleet owners.

(iii) Maintenance and Repair

Traditionally, this has been carried out in the unorganized road side sector. Increasingly, trucking companies are going in for Annual Maintenance Contracts (AMC) offered by manufacturers at least in the early years of the use of the truck. Some large fleet owners have their own workshops, which makes sense if the revenue-generating routes are largely invariant.

(iv) Food and Stay

The ubiquitous *dhabas* (a commonly used word from Hindi, referring to a roadside food stall) dotted across the roads of the country play a critical role in supporting the trucking sector. Drivers select *dhabas* mostly on a relationship basis. Some of the *dhabas* also become nodal for other support services including maintenance and repair.

(v) IT Services

The most important IT service today is GPS which enables visibility of trucks to the fleet owner/trucking company/customer. IT systems are also used for office automation, starting with Accounting followed by Enterprise Resource Planning (ERP) and then Management Information Systems (MIS). Sensors that can communicate the condition of the vehicle and attempt to optimize performance are technologically feasible and are expected to be brought into practice in the future. Some entrepreneurs are trying to create a market mechanism using IT based platforms, to replace the role of brokers. While this would lead to higher truck utilization, it is not clear whether the ecosystem is ready to replace the services that a broker brings to the table.

(vi) Associations

Associations of trucking companies and truck owners primarily provide support to both for lobbying. Leveraging the scale that their membership offers; there is an opportunity to enable sharing of best practices, set standards and provide roadside facilities.

(vii) Training

There are many driver training schools that provide courses to enable obtaining a license or as a refresher. There is an overall dearth of such institutions, since most drivers learn through apprenticeship and observation. Large customers, large trucking companies, manufacturers, fuel suppliers and associations, apart from government, are involved in setting up such institutions.

4. Government and Regulatory Bodies

(i) RTO

The Regional Transport Office (RTO) functions under the Transport Commissioner in every state. It is responsible for licensing drivers and vehicles, keeping in view safety and environmental considerations. While playing a key 'gate keeper' role, it is often perceived as a source of 'harassment'. The need for such

a 'gate keeper' under the government has often been questioned especially if certified agencies can be assigned the responsibility of achieving the same objectives with better quality. The government is in the process of implementing a project to computerize and network all the RTOs and have a single database to track license holders and prevent abuse.

(ii) Tax Administrators

Due to specific inter-state taxes and tax variations, there are check posts at inter-state borders for inspections by tax administrators. This leads to trucks being significantly delayed. Apart from causing movement inefficiencies, there are harassment and environmental concerns. The government is attempting to bring the Goods and Services Tax to rationalize taxation and consequently remove such check points.

(iii) Traffic Police

Their role is to ensure traffic discipline. The inherent violations by the trucking companies and truck owners cause difficulties, making the relationship with the traffic police a difficult one.

(iv) Road Development Authorities

The road network is governed by various authorities, starting from the NHAI, the Public Works Department (PWD) and local authorities, as outlined in the earlier section. Depending upon the institutional structure and concessioning, the construction, and operation and maintenance could be with different authorities.

(v) Centre (MORTH) and States

The role of the government (Centre and States) is to evolve and implement policy and regulation in public interest. The Ministry of Road Transport and Highways (MORTH) at the Centre and the PWD and Transport Commissioners at the state level are responsible for this.

5. Causes and Consequences of Industry Structure

(i) Competition and Corruption

The sector is characterized by cut-throat competition given the large number of truck owners. Market rates tend to get deflated, which creates the incentive to drive and earn more. This leads to practices such as overloading, overspeeding, not taking the required breaks, violating the eventually regulatory provisions, etc. This leads to corruption, as these operators pay bribes to avoid being caught for plying overloaded trucks, exceeding speed limits and violating other traffic and commercial rules. Various studies have documented the bribes that truckers have to pay on a daily basis. These could exceed a few lakhs of rupees per year per truck. As a result, the industry is highly disaggregated, since large truck fleet owning players will have difficulty in accounting for such bribes. Further, the driving hours often violate the Motor Transport Workers Act (1961), making it tenable only if there is no significant employer–employee relationship between the owner and driver. Thus, small fleet owners prefer to operate their fleet through family and friends.

This is a phenomenon where, in spite of laws and regulations, the norm of violation supports and is supported by the small truck owner. Figure 1.4 describes this phenomenon as the ‘Unholy Equilibrium in the Road Transportation Sector’.

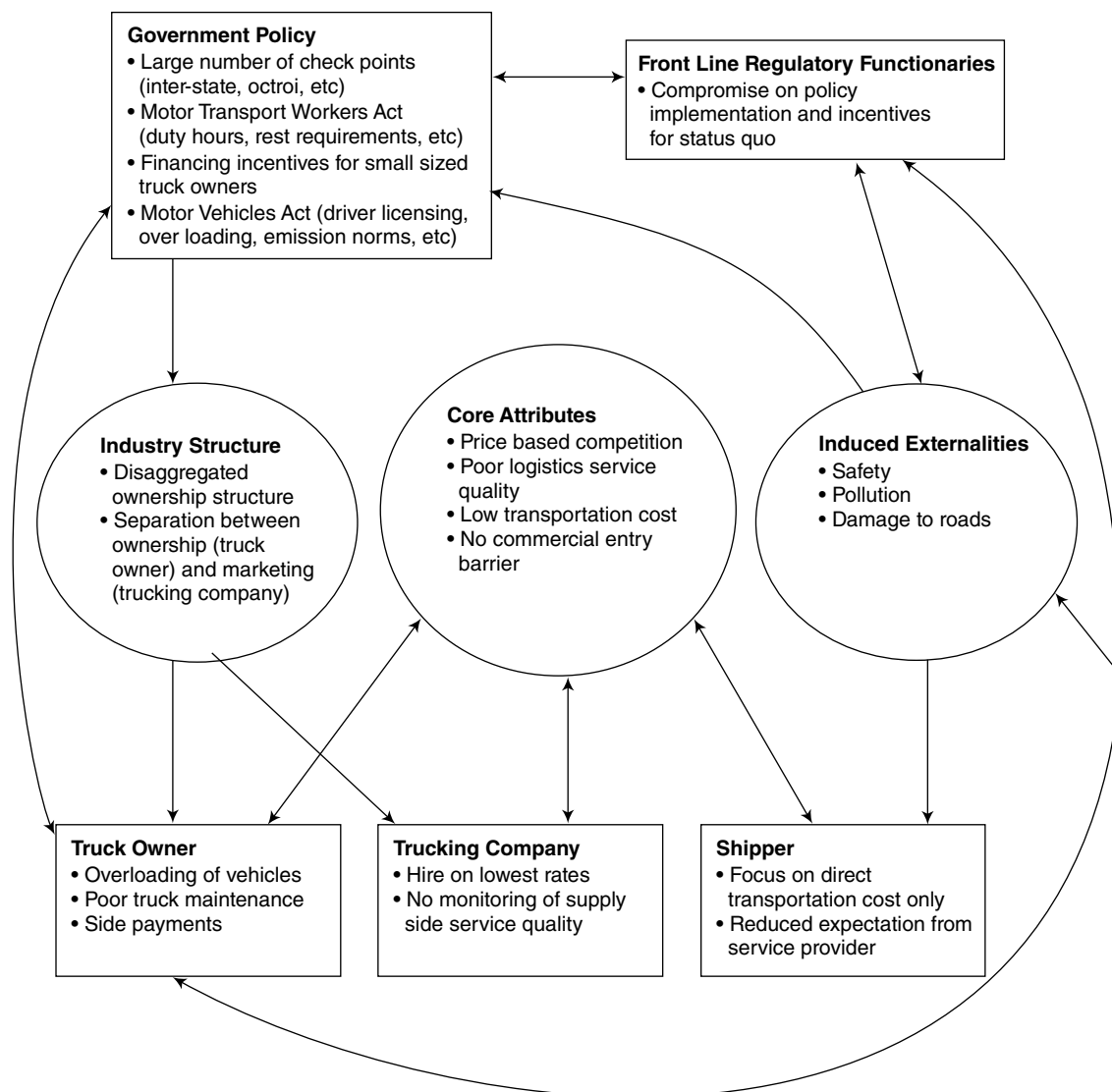


Figure 1.4 *Unholy equilibrium in the trucking sector*

Source: Roadmap for Logistics Excellence: *Need to Break the Unholy Equilibrium* by G Raghuram and Janat Shah.

(ii) Financing

Banks provide financial aid to the small road operators under priority sector lending. This is in accordance with the RBI initiative where it has identified certain sectors to be the priority sectors for the

purpose of granting low-interest loans. The objective of this is to make financial assistance available to low-income groups and weaker sections of society, and also to provide self-employment opportunities to the educated unemployed. Since loans are available at cheaper rates, the truck owners have the incentive to stay small.

(iii) Ownership Pattern

As a consequence of the above ‘equilibrium’, highly fragmented truck ownership is sustained. 75 per cent of the fleet is with those who own up to five trucks. 15 per cent of the fleet is with those who own between six to 20 trucks. Only about 10 per cent of the fleet is with those who own more than 20 trucks (Figure 1.5). It is important to note that this profile is a ‘guesstimate’. The last known field study was done by the Central Institute of Road Transport in 1998 wherein this profile was estimated. It appears that different reports are quoting the same profile.

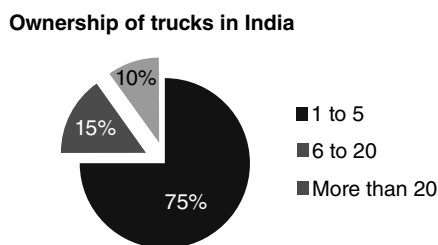


Figure 1.5 *Truck ownership profile pattern in India*

Source: Crisil (2010) as reported in *The Impacts of India’s Diesel Price Reforms on the Trucking Industry*, June 2013 accessed from https://www.iisd.org/gsi/sites/default/files/ffs_india_irade_trucking.pdf on December 15, 2015.

However, the author recalls that in the 1980s, the often quoted profile was that 95 per cent of the fleet was owned by truck owners with less than five trucks. If this was indeed true, the profile has changed towards larger fleet owners.

(iv) Service Quality

Given the structure of the industry, most of the trucking companies/owners (being small) do not focus much on service quality. Competition is cost based rather than service based.

As described in Figure 1.4, this structure introduces a vicious cycle leading to a detrimental situation. As an initiative to break the cycle, certain customers insist that trucking companies should follow regulations. They are willing to pay higher freight rates. They expect better service, including that the same (approved) trucks return for subsequent loading. Case 9 on Ispaat Parivahan Limited illustrates this.

Another way to break out of the cycle is that associations also insist on their members to follow regulations. Similarly, manufacturers can also insist on the same, since they have leverage through AMCs. Of course, if the unorganized maintenance sector gears up, the commercial vehicle manufacturers risk losing their AMCs.

CONCLUSION

To conclude, we draw upon a 'five S' framework which helps focus on the key priorities of any transport system, including the trucking sector. The transport system should be driven by speed with sustainability, safety, security and stresslessness.

Speed: The primary need of the trucking sector is **speed**. While vehicle technologies are moving in this direction, infrastructural and regulatory bottlenecks remain. There was a push on infrastructure in the last decade, which has slowed down. Attempts are being made to re-energize this. On the regulatory side, a lot needs to be done to enable streamlined movement of trucks across the country. Apart from removing inter-state check posts, electronic tolling needs immediate attention. The average speed of trucks needs to move significantly upwards from the current 300 plus kilometres per day.

Sustainability: Rail and Coastal transport are threats to the trucking sector due to their better environmental impact. The **sustainability** issue can be combated by better technologies, maintenance and driving practices. There are efforts to limit the age of the vehicles and use improved fuel.

Safety: **Safety** on the Indian roads is a big concern. Indian roads kill the maximum number of people globally, on a country-wise comparison. Road engineering, signages, driver training and licensing, driving practices and vehicle maintenance need significant attention. Post-accident support is also critical to minimize loss of life and limb. This would be addressed by better roadside support for emergency assistance.

While the government is trying to arm itself with a new Transport and Safety Bill, a lot can be made to happen even without it by focused action at the grassroots. Truck-based video cameras and a 'black box' should be considered for better analysis of the causes of accidents.

While there is sensitivity on these issues, implementation could be better. The recent initiative to have tree plantations on the land adjacent to highways needs caution. As per many international studies, trees are the biggest killers during accidents. This is especially significant while we are trying to increase the average speed on the roads.

Security: There are many situations where truck and cargo thefts happen. Vulnerable areas need to be identified for better **security** support. ICT, including truck based video cameras, can be used more effectively to bring in visibility.

Stresslessness: Studies have estimated that the economic loss due to damages on the road, vehicle and cargo would amount to 2 per cent of GDP. In addition, the driver is often stressed

out, which also could be a cause of accidents. High quality road infrastructure, improved truck cab design for drivers' comfort, and scientific cargo loading practices need emphasis for ensuring **stresslessness**.

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Driver Management Practices in Trucking Industry

Chapter

2

The objective of this chapter is to provide an overview of the Human Resource (HR) practices with respect to driver management in trucking industry. It elaborates on the structural problems and other HR related challenges in trucking industry, and the need for corrective driver management practices in the Indian trucking industry.

The transportation industry plays a very critical role in the economic development of any nation. In India, road transportation has been growing steadily since 1950–51.¹ The trucking sector, commanding a 70 per cent share of the total transportation industry, contributes about 4.5–5 per cent i.e., USD 55–60 billion to India's GDP (Transport Corporation of India Ltd. and IIM Calcutta, 2009). As a key contributor to the economic activity of the country, the trucking sector was also severely affected by the economic slowdown experienced in the country during 2011–14. Soaring fuel prices, a key cost input, did not help the situation and most businesses suffered huge losses, as very few operators could withstand the crippling impact of the economic downturn and high fuel costs.

STRUCTURAL PROBLEMS IN TRUCKING INDUSTRY

The economic downturn intensified the effect of some of the chronic structural problems faced by the industry.²

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1. Lack of Adequate Road Infrastructure

The growth in road networks has not kept pace with the growth in road freight volumes and the number of vehicles on Indian roads. For example, while road freight volumes increased at a compounded annual growth rate (CAGR) of 9.06 per cent, the total length of roads increased at a CAGR of only 3.77 per cent between 1950–1951 and 2007–2008. In India, all types of vehicles, pedestrians and animals can use highways without any restrictions, which affect the speed of freight vehicles and increases the risk of accidents. The speed of trucks is also reduced due to the poor quality and poor maintenance of roads, as it leads to frequent equipment breakdowns and accidents.

2. Lack of Pricing Power

The trucking sector in India is highly fragmented. About 80 per cent of the sector consists of small and medium-sized operators who own five or less vehicles who cannot enjoy economies of scale. Due to its fragmented nature, the industry is highly competitive with price undercutting leading to slim profit margins or likely operating losses. Profit margins are reported to be as low as 4–5 per cent among small operators while organized players make about 10–15 per cent.

3. Low Asset Utilization Rates

Due to the absence of a nationwide unified GST and a proliferation of local taxes like octroi, entry tax, state sales tax, etc., an inordinate amount of time is wasted at check-posts for fulfilling the required documentation and other formalities, especially on inter-state routes. The confusion and anxiety of illiterate or semi-illiterate drivers who are at the mercy of the officials or agents to complete the process often adds to this delay. These delays coupled with the poor quality of roads impact the optimal utilization of a truck and drivers. The average speed of a truck on Indian roads is approximately 20 km per hour. While a truck in the US, can travel up to 400,000 km a year, an average truck on an Indian road typically covers only between 60,000 and 100,000 km in a year. This reduces the overall service quality as on-time delivery and reliability of service is adversely impacted.

4. Externalities and Regulatory Costs

As per estimates, idling at check-posts results in fuel-wastage of approximately ₹100–150 billion (USD 2–3 billion) every year. Additionally, an average truck which costs ₹1.2 million (USD 24,000), incurs an additional cost of ₹300,000 (USD 6,000) per annum in the guise of various taxes. Corrupt practices by various officials including police, transport and other government officials are serious problems and increase the overall trip expenses by almost 15 per cent.

5. Low Levels of Re-investment

A majority of trucks that ply on Indian highways are old, obsolescent and fuel-inefficient and require a high degree of maintenance. However, operators neither retire such vehicles nor upgrade them regularly. Moreover, very few operators use information technology to track shipments on a real-time basis to reduce losses due to delays. With low profit margins, transporters are reluctant to invest in new assets

and available technologies. Further, since the sector is largely unorganized and is not deemed to be an industry officially, transporters experience difficulties in raising capital and debt through banking and formal financial channels. Hence, the service quality of many small- and medium-sized operators remains less than satisfactory.

NEED FOR HUMAN RESOURCE MANAGEMENT IN TRUCKING INDUSTRY

Human Resource Management (HRM) is not a key priority for most firms in this industry due to the low level of operations. The industry sorely lacks robust and well-aligned HRM practices which could attract and retain high-quality manpower.

Currently, a bulk of the manpower consists of illiterate, semi-literate and semi-skilled workers who work as drivers, mechanics and cleaners for minimum or low wages. Attrition levels are high as most firms have not invested in employee retention. Well experienced and skilled drivers are not interested in joining the industry due to involvement of the hard labour, long working hours, low compensation and harassment at the hands of officials.

The skill levels of drivers have a major impact on the firms' operating costs. The quality and experience of the driver have a direct bearing on vehicle maintenance, fuel consumption and other on-road expenses. 'Poor quality' of drivers also impacts inventory holding costs. The client receives payment after the truck load reaches its destination. In case of a delay, the release of payments is adversely affected and the overall cost goes up due to the cost of additional working capital requirement.

Shortage of adequately qualified drivers and staff in turn impacts the adoption of modern technologies and management practices. Also high attrition rates lead to inflated hiring and training costs for firms.

DRIVER MANAGEMENT CHALLENGES IN TRUCKING INDUSTRY

Truck drivers form the backbone of the trucking industry and are one of its most critical resources. While it is relatively easy to get qualified candidates at the managerial, staff and workshop levels, driver acquisition and retention continues to remain one of the biggest problems faced by the industry. Not only is it difficult to find drivers but a recent government rule mandating all drivers to be at least tenth grade pass has further worsened the shortage problem. Most educated people do not prefer taking up a career in trucking until forced to do so due to economic conditions. In addition to adequate education and skill-levels, transport companies require reliable and experienced people as well. As mentioned in the earlier section, the poor quality of manpower escalates the overall costs and revenues, reduces optimum utilization of vehicles and results in loss of customer goodwill and business for the firm. Organizations that succeed in procuring drivers continue to remain under constant stress, since the driver attrition rate is very high.

Some problems related to drivers are unique to this industry because of the nature of the work. Due to the poor condition of roads and vehicles in the country, trucks can break down anywhere on the highway. In order to save on costs, transport companies seldom provide skilled mechanics who may accompany drivers on trips to immediately solve such problems. As a result, during a breakdown, the driver himself has to seek help while the truck remains stranded on the side of the highway with its contents vulnerable

to theft and highway robberies. Such breakdowns also lead to a delay in the delivery of goods to the final destination.

It is difficult to find secure locations where drivers can park their vehicles at night and take rest. Most of them have to sleep in their trucks. Drivers are immediately held responsible if something happens to the valuable contents of their vehicle. Given the lack of infrastructure on highways, robbery and theft pose a serious risk to the materials and there is little that the driver can do to avoid such risks. This might at times even endanger the life of the driver. They work under immense level of stress, trying to meet deadlines, and at the same time acting as a watchman to guard the goods at night.

Poor construction and lack of maintenance of roads add to the woes of the truck drivers. There is always a chance of road accidents and fatalities because of the poor condition of roads. Transporters also overload trucks often to earn higher margins, which eventually increases the risk of road accidents.

Further, corruption in the industry affects truck drivers the most, as they have to deal with corrupt officials while driving. The officials not only exploit the drivers by asking for illegal monetary favours, but also deal with them disrespectfully. Most of the truck drivers are not educated enough to make sense of the receipts required for the inter-state movements. Hence, they have to face problems at the tolling booths. The men at the tolling booths at times unnecessarily harass the drivers for lack of proper documents, may ask for undue monetary favours from them; sometimes keeping the drivers waiting for long, thereby delaying the delivery of goods, for which the driver is held responsible.

Public utilities and resting facilities are seldom available on highways, which poses a big problem for drivers who take trucks for cross-country long trips. Unavailability of such basic facilities is one of the biggest challenges for truck drivers across the country. The lack of comfortable sleep during the course of the trips leads to fatigue and health problems for truck drivers.

Being underpaid truck drivers are constantly away from their family and are forced to live under extremely difficult conditions. Also, due to the requirements of their work, drivers do not get to visit their families as and when they want to. This leads to mental unrest and an unsatisfied work life.

Since most drivers are uneducated, they do not get the respect that they deserve. They are treated poorly at small establishments on highways where they stop for refreshment, and even at the loading and unloading points. This can lead to a great level of stress and depression. Many times, drivers are not treated well by their employers too. In most organizations the power distance between the truck driver and the top management is very high. The drivers often do not even get to see the top officials and are repeatedly disrespected by the low and middle management, who actually deal with them. This lack of dignity at work, adds to the woes of the individuals engaged in this profession.

There is no job security and there are no retirement benefits for drivers. As the drivers grow old, they are replaced by new and young drivers. These old drivers are then not in good health nor are they eligible to earn their livelihood by engaging themselves in some other profession. Also, they hardly have any savings to sustain themselves and their families in their old age, given the low pay-scales while employed.

Drivers seldom like their jobs, but most of them stay with it mainly due to lack of other opportunities. They do not have skills, other than driving for their sustenance. The job provides regular pay; however, in the absence of motivating incentives, drivers do not feel committed to deliver satisfactory performance.

Facing a lot of hardships both on and off the road take a toll on the mindset of drivers, who consequently discourage their next of kin from pursuing this profession. This results in driver shortages in the entire industry.

The following section presents an overview of important practices that can support human resources management in the industry.

DRIVER MANAGEMENT PRACTICES IN INDIAN TRUCKING INDUSTRY

In the present state of the trucking industry, driver availability is not the only challenge. Even if one does manage to hire a driver, there is no exposure to look for a seemingly better opportunity. Since the transport industry has suffered a serious slowdown in the last few years, retaining drivers has become a serious issue for companies. Many companies have come up with innovative practices to help retain drivers. Many of these systems have worked out well, and companies that have put these systems in place have been able to enhance their driver retention rate and overall profitability.

1. Recruitment and Selection

Every organization needs responsible and dependable people. This is more so in the transport industry wherein drivers are given the responsibility of delivering goods on time. Not only do they carry consignments, but they also have to take care of the vehicle, which is the company's property. Therefore, a sound recruitment process becomes necessary. It is difficult to find people who are reliable, can be trusted, have the required skills and experience, and are loyal and committed to the organization. People who choose to become truck drivers generally belong to a comparatively lower stratum of society. Many of them are semi-literate, with inadequate reading and writing skills. As mentioned earlier, the quality of drivers can impact the overall costs borne by the organization, both in a direct and indirect manner. It can impact the timely delivery of consignments and the manner in which drivers manage officials and emergent problems en-route.

Many drivers are caught in a vicious circle of poverty, poor education, addiction to narcotic substances and gambling. This can result in drunken driving, theft of goods, diesel pilferage, and sometimes rude and aggressive behaviour at the client site. All these can reflect poorly on the organization. A recruitment and selection process that screens out inappropriate candidates or highlights the areas of development can help an organization create a high performance-oriented culture.

Recruiting procedures that provide a large pool of qualified applicants, with reliable and valid selection methods have a substantial influence over the quality and type of skills new employees possess (Uzundu, 2013).³ Post-selection, selected employees can be made to go through the process of formal and informal induction and regular training sessions, so they can develop their skills further and become an asset to the company. License verification, examination of past records, experience of working on different routes and reasons for discontinuation of previous employment can be examined at the time of hiring. Overall health check-ups, especially vision and motor-coordination tests, need to be a part of the recruitment process. There should be clarity on roles and responsibilities and the driver should be made aware of these at the time of recruitment. The responsibilities of managerial and administrative staff should also be articulated

and they should be sensitized to the role requirements and pressures of the driver's work so that there is no miscommunication and loss of information.

Employee referrals are a very useful channel to acquire high-quality and reliable resources. Existing drivers and staff employees can be asked to refer candidates from their native place. This does not only help in finding good and trustworthy people, but since the recruited people have references, employers can be confident of their work ethics. Further, they can easily be tracked down if the need arises. This method has been put into use by some transporters and has resulted in hiring good quality drivers. For further surety, some employers also do a background check on their drivers, for example, talk to their previous employers, check the authenticity of their driving license and find out their driving history. This promotes a stronger level of trust and the employer feels confident sending valuable goods with the new employees.

2. Compensation and Incentives

One of the primary causes of high attrition in the transport industry is low salary. Competing firms offer slightly higher salaries and easily lure away drivers and managerial staff. However, regular and timely payment of salaries is more valued by drivers than higher salaries and it makes them feel financially stable and reduces the uncertainty in their lives.

While it is difficult to increase the basic salary beyond a certain limit, organizations can institute rewards and incentive systems, which can motivate employees and raise the standard of performance. The reward and recognition system can be based on employee performance, behaviours or job-related attitudes. These programmes can not only provide employees with much-needed financial assistance, but can also encourage them to work better. It also creates a healthy workspace where the efforts of the employees are being monitored and appreciated. Putting in incentive programmes for drivers has helped a lot of transport companies maintain their employee retention rate.

Many transport companies have put in place a basic salary cum incentive system for their drivers. Some incentive schemes offer a performance-based incentive above the basic salary. Other schemes offer a bonus of a certain amount after a particular number of trips have been completed and an incremental amount is offered if the driver exceeds the mandated trips. Parameters such as maximum attendance on the vehicle, amount of maintenance required on the vehicle, amount of diesel consumed, errors made by the driver, number of accidents, and distance covered beyond the mandated distance are also considered. A percentage of the revenue generated by the extra distance covered is given to the driver as incentive. These steps have attracted second-generation drivers for the company, and have increased vehicle running, client base and customer satisfaction along with more satisfied drivers.

Other innovative schemes such as awarding employees with gold coins as a token of appreciation for their performance and plots of land for lengthy tenure also help in retention of employees. Allowing drivers to acquire ownership of the vehicle through a staggered payment plan and profit sharing over a period of time can also stem driver attrition. Many firms have implemented a 'Driver of the Month' programme, wherein the driver's picture is put up in the premises on a monthly basis as a token of recognition and appreciation. Such recognition also helps in motivating other drivers to work better.

3. Performance Management

Performance management is a strategic approach to improving business performance. It aims at improving employees' performance to achieve organizational growth. It optimizes the execution of business strategy by controlling a set of integrated analytical processes and addressing financial, operational and human resource parameters (Kalathil, 2010).⁴ Most organizations use homegrown rudimentary tracking mechanisms like Excel based reporting. They have a very narrow focus area, which results in limited visibility. Their rules are not very adaptable and are difficult to customize depending on the current needs of an organization. Performance management can be done when there are clear parameters in the mind of the manager. Employees' standard of work is based on preset parameters and then assessed accordingly. The result is analyzed, and feedback and final recommendation is given to improve the employees' performance.

Ideally, a company should decide the metrics which will be used to measure performance after an in-depth analysis of past and current performance and arrive at an incisive understanding of future performance requirements to meet organizational goals. Goal setting should begin from top management and cascade to the individual level. A detailed framework encompassing all parameters for a particular set of people who are at the same level in the company should be put in place. The manager should inform his drivers or office staff about the standard of work that is expected of them. This assures that everyone in every role at every level is aware of the expectations from them. This also helps in monitoring the performance level of employees against defined service levels. These metrics can also be modified or replaced to suit any change that might occur due to changing levels of business, thus making the organization more flexible and adaptable. Rewards and promotions for employees and training and development plans should also be based on an assessment of employee performance and potential. It is also vital for employees to have faith in the system of performance management, which is why it should be transparent and based on a mechanism by which employees can give feedback on the process.

Some transport firms have put in place information technology systems and processes to set, monitor and assess performance targets. The tracking is supported by articulating daily targets, regular meetings each week, sharing of performance data at the end of every month, and counselling sessions for improving performance. Involving drivers in their respective performance management appraisal and providing them with real-time information about their work has helped these firms improve their overall organizational performance.

4. Training and Development

At present, there exists a skill deficit in the industry, which is mainly because educated and well qualified individuals do not find this field attractive enough. Hence, the industry has to do with those who do not have adequate educational qualifications.

Most people in the trucking industry think of training as a significant expenditure and not from a strategic point of view. It is essential for the management in an organization to connect training and development to the growth of the organization. Ideally, training should be an act of change that can recognize and enhance employees' core skills. It adds value to a company, by creating a workforce that is highly skilled, to help achieve the company's goals. Training and development involves investing in people to enable them to perform better and to empower them to make the best use of their abilities for the overall effectiveness and

efficiency of an organization (Uzundu, 2013).³ It helps build employee potential and enables employees to acquire the skills needed for current and future jobs.

Some transport firms provide training programmes to their drivers in association with OEM companies. Some of these are related to improving driving and fuel consumption parameters and safety and handling of hazardous goods. Drivers too feel safe and confident post-training. However, there is a dearth of training programmes on a continuous and consistent basis.

Driver training institutes need to be instituted to periodically train and update drivers on vehicle maintenance, road safety, hygiene standards and health hazards (Transport Corporation of India Ltd. and IIM Calcutta, 2009). Drivers also need to be trained in fulfilling documentation related formalities, dealing with emergent problems en-route, and in technology related basic skills such as use of mobile and messaging services, ATM services and similar others. It can be agreed upon at an industry level that companies will have to provide their employed drivers with periodic certifications and approvals to drive on highways. Industry associations and state and central governments also need to generate awareness and growth by organizing workshops, seminars or conferences and collaborating with academia and consultants for sector-specific projects and customized training programmes (Transport Corporation of India Ltd. and IIM Calcutta, 2009).²

Firms also need to consider the professionalization of all employees including administrative staff. They need to train their employees to take on more decision-making and managerial responsibilities. Managers and staff also need to be trained in using sophisticated technology to improve their operations and human resource management systems. This can help top management and owners to shift their attention from the routine problems of the company and focus on organizational strategy and growth.

5. Employee Well-being

An organization can achieve its goals only when its employees are satisfied with their jobs and feel they are seen as an asset to their organization. Some transport firms pay close attention to employee well-being initiatives so that their employees feel supported and valued by the organization. Such initiatives include constituting a driver management fund wherein both the company and the drivers contribute an equal amount to the fund. This money can be used for events like weddings or during medical emergencies. Some companies provide an additional insurance coverage in case of mishap. Other firms help drivers file mediclaims and also provide generous loans in case of unanticipated contingencies. Free health check-ups including eye check-up camps are also arranged by various companies to ensure drivers are in good health.

Organizations can design innovative programmes aimed at increasing employee engagement and commitment. Firms can come together and create a micro finance society which would provide loans to drivers at very low interest rates.

Some firms have put in place initiatives to support the families of drivers. They have instituted rewards to recognize the academic performance of employees' children. Some firms also provide scholarships to children who want to pursue a career in logistics.

The most critical measure of employee satisfaction in this industry is the degree of respect that is accorded to employees by top management. Good communication between management and drivers enables the

resolution of lot of issues. Drivers appreciate it when they can approach management with their problems and these are addressed. One of the most impactful ways to increase driver retention is to make the driver feel important and treat him with dignity. Some companies have realized this and have witnessed improved performance and reduced attrition rates among drivers.

CONCLUSION

This chapter provides an insight into the ways in which driver management can be done in a feasible way. Taking into consideration the high attrition rate of drivers in the industry, it is highly advisable to use robust and internally consistent driver management practices which are aligned with the organization's goals.

The condition of drivers in the industry in India is not as good as in other countries. Less pay and severe working conditions have led a lot of people away from this field of work. To overcome driver shortage, organizations need to invest in driver acquisition, driver retention and driver attraction strategies on a priority basis to improve organizational performance. Providing drivers with incentive schemes, both monetary and non-monetary, recognizing and rewarding their work, and making them feel respected and valued goes a long way in establishing a secure and stable relationship between drivers and organizations. Organizations need to inculcate a sense of participation and ownership among the drivers. This will help elicit loyalty from them and reduce absenteeism and attrition.

In addition, companies also need to come together and work towards overall employee skill enhancement, use of sophisticated technology and putting together infrastructure and facilities to alleviate en-route issues. This will not only help organizations to improve their performance but will also catalyze growth at an industry level.

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CASES

- CASE 1** Agarwal Packers and Movers Ltd.: The Road Ahead
- CASE 2** Navigators Logistics Company Private Limited
- CASE 3** Agarwal Packers and Movers Limited
- CASE 4** Shreeji Transport Services Private Limited
- CASE 5** KM Trans Logistics: Workshop Operations
- CASE 6** Spare Parts Procurement Planning at KM Trans Logistics
- CASE 7** Novire Technologies: Automatic Vehicle Location
- CASE 8** Instant Transport Solution Private Limited
- CASE 9** Ispaat Parivahan Limited: Additional Fleet Acquisition
- CASE 10** XYZ Trucking Company: Misappropriation of Company Funds
- CASE 11** FarmAid Tractors Limited
- CASE 12** Laxmi Transformers

Case

1

CASE CONTEXT

The case highlights a number of issues that Agarwal Packers and Movers Ltd. (APML) faces, which relate to its pricing, branding and positioning. APML has grown rapidly and positioned itself as the leading service for household relocation. Now, it is facing competition at both ends of the spectrum—there are competitors at the lower end which offer lower levels of service at cheaper prices and also those that have positioned themselves at the premium end of the market and charge relatively high prices.

Further, APML is also facing a challenge from firms that had similar names. Both APML and the DRS group, after splitting, continue to use the name Agarwal Packers and Movers for conducting their business. Also, a number of firms used the word 'Agarwal' to claim a false association or similarity with Agarwal Packers and Movers and to leverage the credibility of the popular brand. APML was not only losing business but this was also harming their credibility and brand.

Agarwal Packers and Movers Ltd.: The Road Ahead

INTRODUCTION

On 1 May, 2015 Ramesh Agarwal, the CEO of Agarwal Packers and Movers Ltd. (APML) and his team were to gather for their monthly meeting. These meetings were used not only to review the performance of the previous month and to tackle various issues that had cropped up, but were also an opportunity to discuss other strategic issues.

There were a number of items on their agenda. The reports from the field suggested that APML was losing substantial business to its competitors as its services were priced higher than theirs. In recent years, as the house relocation industry had grown, a number of local competitors had come up. They had a cost advantage in small geographies; many did not pay any taxes such as service tax or income tax and saved money by offering lower levels of service. Customers often discovered too late that there were hidden costs to this low price. However, APML was losing a number of customers to such players; therefore, an urgent need to work on a counter strategy arose.

The other concern that APML had was that it was losing a number of customers to companies which had similar names and used APML's goodwill to conduct business. Often when customers were cheated or provided substandard service, it was APML that would lose customer goodwill. When Ramesh Agarwal had started the firm, he used his surname Agarwal for the company name. Agarwal is the name of a community in north India and people belonging to this community used this word as their surname. Using the community name for the name of the business was quite common and Ramesh did not give much thought to it then. However, as APML became popular, a number of competitors started using names that had the word 'Agarwal'. Since Agarwal denoted the name of a caste it could not be copyrighted and hence APML could not legally stop others from using it. Ramesh wondered how he could resolve this.

APML was founded in 1987 and over time it had grown to become the largest full-service relocation company based in India, providing third party logistics and warehousing services. Of late, a number of competitors had emerged locally and a few international firms, attracted by

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Case material of the author is prepared as a basis for classroom discussion. It is not designed to present illustrations of either correct or incorrect handling of administrative problems.

This case is not an exact representation of reality and does not necessarily reflect the position of the author on this issue.

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the growing Indian market, had entered in the relocation industry. It was important for APML to differentiate and position itself in the price-sensitive Indian market. Ramesh felt that the market might get segmented in future as the competition grew. The question was how APML should handle this.

COMPANY

Background

APML was established as ‘one office-one lorry-small team’ in 1987. After quitting his army job, Ramesh transported household goods for one of his ex-military seniors from Dundigal in Tamil Nadu to Balasore in Orissa. It was a difficult task, but Ramesh used locally available material like straw and completed the job successfully. This success led him to start Agarwal Household Carriers to cater to the needs of the household goods relocation segment. The idea of using packers while relocating was quite new in India. Agarwal Household Carriers set up its first office in Hyderabad with modest funds.

According to Ramesh—

In those days we used to create ideas for different types of packaging and work really hard to safely deliver the packets. Our customers were families who had a sentimental attachment to their luggage. So, one had to be very careful while transporting their luggage. There were no mobile phones and not even very good roads and infrastructure.¹

The company focused on expanding its customer base and clientele. It also worked to develop a deeper understanding of the sector and consumer needs with Ramesh talking to consumers and various stakeholders in the industry. Over time, the company, which was involved primarily in the shifting of defense personnel, started getting work from other sectors as well. The company’s name was soon changed to Agarwal Packers and Movers. As they were getting work from all over India, they had to soon open branches all over the country.

The Split

In the year 1991, the company that Ramesh Agarwal started as Agarwal Household Carriers, was acquired by DRS Transport Limited. DRS was registered at Hyderabad and had six Directors on its Board, all from the same family—Ramesh Agarwal, Rajinder Agarwal, Dayanand Agarwal, A.K. Agarwal, Sanjay Agarwal and Dinesh Agarwal. The name of DRS Transport Limited was later changed to DRS Logistics Private Limited. As a result of these changes, Agarwal Household

¹ Conversation with the case author

Carriers ceased to exist and the business was owned by DRS Logistics and it operated under the name Agarwal Packers and Movers. The name Agarwal Packers and Movers was registered in 2005 as a trademark of DRS Logistics Company.²

While the business had grown, differences developed between the various directors on the board. This resulted in the formation of two different groups, one led by Dayanand Agarwal along with his two sons and the other led by Ramesh with his brother Rajinder and their nephew Dinesh. The business of DRS Logistics was divided on a regional basis in March 2009. However, this division could not last, and both groups started doing the business through separate companies with the understanding that both groups would use the name Agarwal Packers and Movers. The group led by Ramesh (henceforth APML) continued its business by using the existing trade mark Agarwal Packers and Movers along with a '*Fauzi*' (meaning army man in Hindi, to emphasize Ramesh's background). The group led by Dayanand Agarwal (henceforth DRS) used the Agarwal Packers and Movers trade mark along with the suffix 'DRS Group'.³

GROWTH OF APML

Though APML under Ramesh started as a domestic household goods transportation business, it soon expanded and started offering international movements. As the number of branches and offices grew, it started to organize the business under various divisions with each following a different portfolio of services and solutions. Apart from the services offered under APML, the other divisions arranged their portfolios as APM Transportation, APM Warehousing, APM Exim Cargo, APM ODC (over dimensional cargo) transportation and APM Infrastructure (Exhibit 1).

By 2013, APML had established 103 computerized branches across India and expanded its operations internationally. It had also expanded its total warehousing space (owned, leased and rented) to 4.2 million square feet and increased its total fleet size to 1,100 trucks and 400 trucking cubes. In addition, 8.4 million square feet warehousing space was under development. The group across its various divisions served 1.4 million customers annually. Their contribution to the field of transporting household goods was recognized by the Limca Book of Records (Exhibit 2). In 2013–14, APML received the ISO 9001–2008 certification and also became one of the four companies in India to be certified by ISO 39001:2012, which attested their contribution towards road traffic safety (see Exhibit 1). By 2013–14, its turnover had reached over ₹3,910 million and it aspired to reach ₹20,000 million by 2020. The company employed 1,173 employees and had more than 4,000 people attached indirectly to it.

² Senior Managers in APML

³ Company sources

Structure and Operations

The business model of the company was developed around the movement of households within India and from India to other countries from start to finish with its own people and resources. APML was organized as branches with each branch headed by a Branch '*Malik*'. APML called its managers *Malik* or owner as this was in line with its philosophy of giving ownership to its employees and creating an entrepreneurial spirit in its managers. A state '*Malik*' would look after a number of branches. The whole country was divided into four zones (East, West, North and South). Rajinder Agarwal, Vice Chairman and head of operations managed the West, East and South zone while the North zone was managed by Ramesh.

Each APML office had its own sales and operations personnel and different offices coordinated to manage regional moves. It had standardized all aspects of a move at the point of origin including the pre-move survey, quotation, confirmation, insurance packing, freight and storage, if required. The detailed and stepwise process (Exhibit 6) with the use of an organizational book focused on detailing the roles and functions of employees within each department.

A team of packing and moving crew was led by supervisors and trained as per ISO quality standards. The compensation was also tied to their performance and customer feedback. They also had a gain and share scheme in which a share of the company's profits was distributed among the employees with the percentage of share depending on the percentage of the target achieved by that particular branch office. Tablets were used during the pre-move survey, ensuring detailed and accurate inventory and providing volume and weight estimates on location. In addition, clients were continuously updated about the position and delivery of their luggage. These measures led to high customer satisfaction and minimized the claims for damaged goods. In 2014, APML handled over 1,00,000 relocations with the help of nearly 6,000 employees.

Practices and Innovations

Innovation was one of APML's strengths. The company developed processes and packaging methods to improve the service experience and reduce the true operational cost. The cost of packaging material was about 20 per cent of the cost to the company in transporting the goods of an average one bedroom–hall–kitchen apartment (Exhibit 7). The wrapping material, specially the corrugated sheets, cost ₹29 per kg and contributed towards a large part of the material cost. APML came up with the idea of using a fabric sheet, which was priced at ₹90 per Kg; however, this could be used six times, making it more cost effective. This resulted in a reduction in the operational cost and was also a more environmentally sustainable practice as it saved 300 trees annually (the number of trees cut to produce the annual requirement of corrugated sheets).

Another innovation by APML was to use cement bags filled with glass and foam to pack around the fuel tanks of motorcycles which were prone to damage. The packing of LCD TVs was a

major problem during relocation as a number of claims were made against damaged LCD TVs. Typically, APML would use bubble wrapping, thermocol and corrugated sheet layering and then fix this into a wooden crate by hammering it. However, APML realized that the use of hammers while packing the TV in the wooden crate resulted in internal damage to the TV. Hence, it started to transport LCD TVs with the help of reusable boxes that were rugged from the outside and soft from the inside, known as LED boxes. Another accident prone area was the shifting of crockery items; this was overcome by using special container boxes called perfect boxes to carry fragile items. Normal cartons for transporting books and clothes were replaced by trendy bags. These bags also created a strong brand recall as they had the APML logo printed on them and were left with the customer at the destination. APML also used special plant carriers to transport potted plants.

APML had been using 24-foot double door containers to transport goods; these could carry the household goods of two customers. Although this was a very efficient system, trans-shipment was required in some cases. Agarwal believed that reducing trans-shipment could reduce damage to consignments. Also, there were certain situations where clients wanted their goods to be stored at the APML premises for a few days. This would allow the client to settle in the new city. However, storing a customer's goods meant that the trucks could not be used further, which meant a loss of business. Hence, APML needed a solution to the problem of storage of goods as well as the problem of trans-shipment. APML found this in trucking cubes which were independent units that could be easily latched and unlatched from the trucks. The Trucking Cube (Exhibit 8) was a significant innovation by APML. APML offered to store the customer's goods (in cubes) for 21 days at the destination without any additional charge. These cubes could also be used as car carriers for customers who wished to have their car transported along with their goods.

Further, APML invested heavily in IT to transform the workplace. They started using Enterprise Resource Planning (ERP), Vehicle Tracking System (VTS) and leveraged the internet for online enquiry forms, online payment modes, online consignment tracking, etc.

Marketing

In the early days, APML had primarily relied on word-of-mouth advertising and personal recommendations from previous customers. They believed that a satisfied customer was the best advertisement. As the company grew and APML realized that lack of awareness was a big problem, they started investing in promotional efforts. For corporates, they adopted a direct marketing approach. APML approached them through phone calls, personal sales visits, presentations and email campaigns. For this the company developed print material, videos and presentations. The interactive presentations were considered an important sales tool during visits to corporates. Sales representatives were asked to distribute the print materials that had recently been updated to highlight the innovation in services and newly added services. Such efforts generally resulted in a request for proposals and frequently in a contract.

For the retail consumers, APML had invested in a website and used Search Engine Optimization and Search Engine Marketing to be visible to customers who were looking for such services. The website allowed customers to electronically request services and initiate relocation. It also had links for contacts in various cities.

THE INDIAN RELOCATION INDUSTRY

The Market

The relocation industry in India was largely unorganized but was evolving rapidly. The size of the market was said to be about ₹10 billion.⁴ The demand for relocation services had been increasing as people were more willing to relocate for both professional and personal reasons. The primary driver for relocation was still professional and people primarily moved either due to job transfers or for better opportunities.

Relocation companies existed in every state and estimates suggested that there were as many as over 40,000 small and large players and a ₹23.765 billion market with high growth potential.⁵ There were a number of local players who operated within smaller geographies, for example, large cities such as Mumbai often had a number of local relocators. Unlike the logistics industry, the relocation and transportation industry had no strict laws and the entry barriers were quite low. This allowed a number of questionable transporters to enter the market; these transporters would deceive customers, misplace their property and in extreme cases even disappear with it. Often they would adopt names similar to established companies to attract gullible customers who would fall for their cheap prices.

Awareness about the industry in the price sensitive and lower middle class segments was low. The industry also faced a problem of skilled and reliable labour. Given the seasonal nature of the industry, this problem became more acute in the summer months, April to June, when a bulk of relocations took place.

Consumers

Relocation was not a very desirable activity for most consumers. There was a lot of tension involved as they had to shift their entire household, often to a new and unfamiliar place. This involved packing their household objects, leaving them in the custody of the transporter and again unpacking and setting up home at a new place. The key concerns of the consumers were related to hassles in the process, the security and safety of the luggage and the price.

⁴ http://www.business-standard.com/article/companies/with-ezmove-it-s-easy-to-move-114111700006_1.html accessed on 5 December 2015.

⁵ <https://relocationindia.wordpress.com/2013/03/24/relocation-industry-in-india-perspective-by-rahul-pillai/> accessed on 27 November 2015.

Most of the consumers were professionals working with large national or international firms and government officials. Broadly, consumers could be segmented into two types based on whether the cost of relocation was borne by the customers or by the employers. When the customers were paying for the relocation, they tended to be price sensitive. However, when the charges were paid by the employers, they were less so.

From APML's perspective, consumers were either corporates who entered into a direct deal with relocation firms or direct retail consumers who approached relocation firms on their own. Corporates normally preferred large relocators who had a good brand image and a pan India presence. Corporate contracts accounted for 80 per cent of APML's revenues.

Competitive Landscape

APML was the largest relocater in India and was said to have an over 60 per cent share of the market. This was largely due to its pan India presence. There were about 40,000 small and large players in this market, but the bulk of the relocation market was in the hands of a few players such as APML, the DRS Group, Writer, Crown, Gati, etc. For APML, the main competitor was the APM (DRS) group that had separated from them. Other companies such as Writer, Crown and Gati had a small presence and each of them had a market share of less than 2 per cent.⁶

Barring APM, most of the other companies had a regional presence. In Mumbai, Writer was the major competitor whose services and prices were similar to APML. In North India, primarily around Delhi, Gati was a major competitor. Bengaluru was considered to be a large hub for the relocation business, and the competition was intense among the local, national and international players. DHL was dominant in the Hyderabad and Chennai regions. Indian Packers and Movers had a strong presence in the North East Indian relocation market.

Competition also came from a number of relocators that operated with names similar to Agarwal Packers Movers. A number of such firms used the word 'Agarwal' in their name. Since Agarwal was the name of a community and a commonly used word, APML did not have any legal protection against the use of this word in names. However, APML had registered this as a trademark in 2005 and Ramesh had been successful in filing court cases against third parties for infringement of trade mark and other intellectual property rights for using similar and identical names. He had also been successful in getting a number of favourable orders. However, this had not solved the problem fully. Since the word 'Agarwal' was not protected, firms could still use it in their name and attract customers. The onus was always on APML to locate and then litigate with such firms, which involved time and money.

Exhibit 10 provides a brief overview of some of the major competitors.

⁶ Estimated market shares as per conversation with Senior Managers of APML.

THE ROAD AHEAD

A large part of APML's revenues came from corporate contracts where they had a direct tie up with employers who paid for the relocation of their employees. However, in the retail consumer segment, APML was losing substantial business to its competitors due to the perception that it was high priced. While there was no doubt that APML was priced higher than some of the local competitors, Ramesh felt that the level of service that they offered was significantly higher than the competitors'.

In the last few years, APML had also invested in several innovations such as special packing for LED TVs, 'Perfect Box' for fragile material, fabric sheets, cages for plants and pets, wardrobe cartons and a special protocol for packing a '*Mandir*' (house temple, which was quite common in Indian households). APML had thought that this would improve customer satisfaction. However, Ramesh sensed that while customers appreciated all the innovations and the better service that APML offered, the price comparison at the time of giving the contract was a huge barrier. Customer satisfaction reviews supported APML's belief that it enjoyed positive word of mouth from past customers. However, APML would still need to leverage this satisfaction and the positive reviews to generate new and repeat business.

There were various options before Ramesh. One option was that APML could position itself as a premium service provider and not compete with local competitors who would undercut prices. While this seemed an easy option, the problem with this approach was that *ab initio* it was difficult to identify a price conscious consumer. There was a high chance that the local managers might drop a customer whom they would have been able to convert had they persisted. The second option was to offer price tiers for the service. This would mean that every customer would be able to choose a basic service at a low price that was closer to the competitor's and offer a higher price for value adds. However, this could drive the cost of servicing such customers, cause confusion and would need better trained staff. Further, APML might also need to educate customers about the value that it delivered. The question was how to do it?

APML's major competition was the DRS group which used the same trademark. Moreover, APML also suffered on account of firms which were trying to pass themselves off as APML. Not only had APML lost business, but it was also losing goodwill in the market due to the unfair practices adopted by them.

A key concern for Ramesh was the use of 'Agarwal' in the names of some of the competitors. However, he had the rights to the use of 'Agarwal Packers and Movers' as a trademark and he had used this right to successfully fight court cases against firms which used similar names.

Ramesh wondered if changing the current brand name could be an option. It would have to be a name that was differentiable and had stronger legal protection. However, given the top of the mind recall and the brand equity that APML had developed, he was not sure if this was a prudent

option; moreover, APML could lose a large market to the imposters. The other option was to create brand elements for APML that were unique, memorable and protectable and which could be used to differentiate APML. However, this would take time and also significant investment and there was still no guarantee that this would solve the problem.

Ramesh was also conscious of the growing competition. The entry of the local players competing on price was biting the market at the lower end. At the same time firms like Writer and Crown were trying to capture the upper end of the market. He wondered if he would be squeezed between the two just like Nokia had got squeezed by Apple, Micromax and Samsung. He knew that APML might need to identify the right positioning for its target segments. Should APML re-segment the market and then do the targeting and positioning?

EXHIBIT 1

Awards and Recognition

Limca

Book of Records

National Record

Agarwal Packers & Movers Ltd, an Agarwal Movers Group company based in New Delhi, transported household goods of 61,302 clients in 2012-13 bettering their own record of 43,335 clients during the previous year. Established in 1987, the company has 78 branch offices and serves 1,264 locations across the country with a fleet of 2,500 vehicles.




Vijaya Ghose
Editor, Limca Book of Records

THE DOLLAR BUSINESS' ANNUAL RANKING OF INDIA'S LEADING LOGISTICS SERVICES PROVIDERS IN FOREIGN TRADE

CERTIFICATE OF RECOGNITION



This is to certify that
Agarwal Packers & Movers Ltd.
has been ranked amongst the **Top 10 Companies** in
The Dollar Business' Annual Ranking of India's leading
logistics services providers in Foreign Trade


Steven Philip Warner
EDITOR-IN-CHIEF
THE DOLLAR BUSINESS

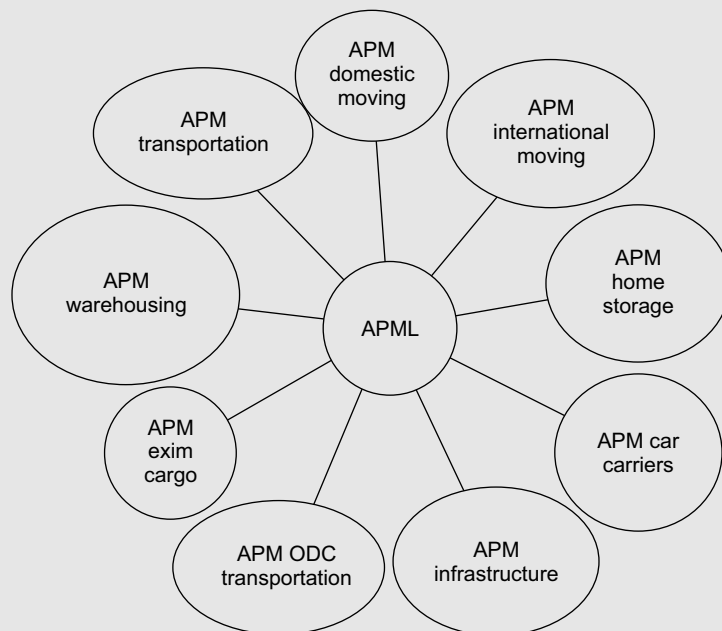



Avnish Goyal
PUBLISHER
THE DOLLAR BUSINESS

Source: APML

EXHIBIT 2

APML's Service Portfolio and Warehouse Spread in India

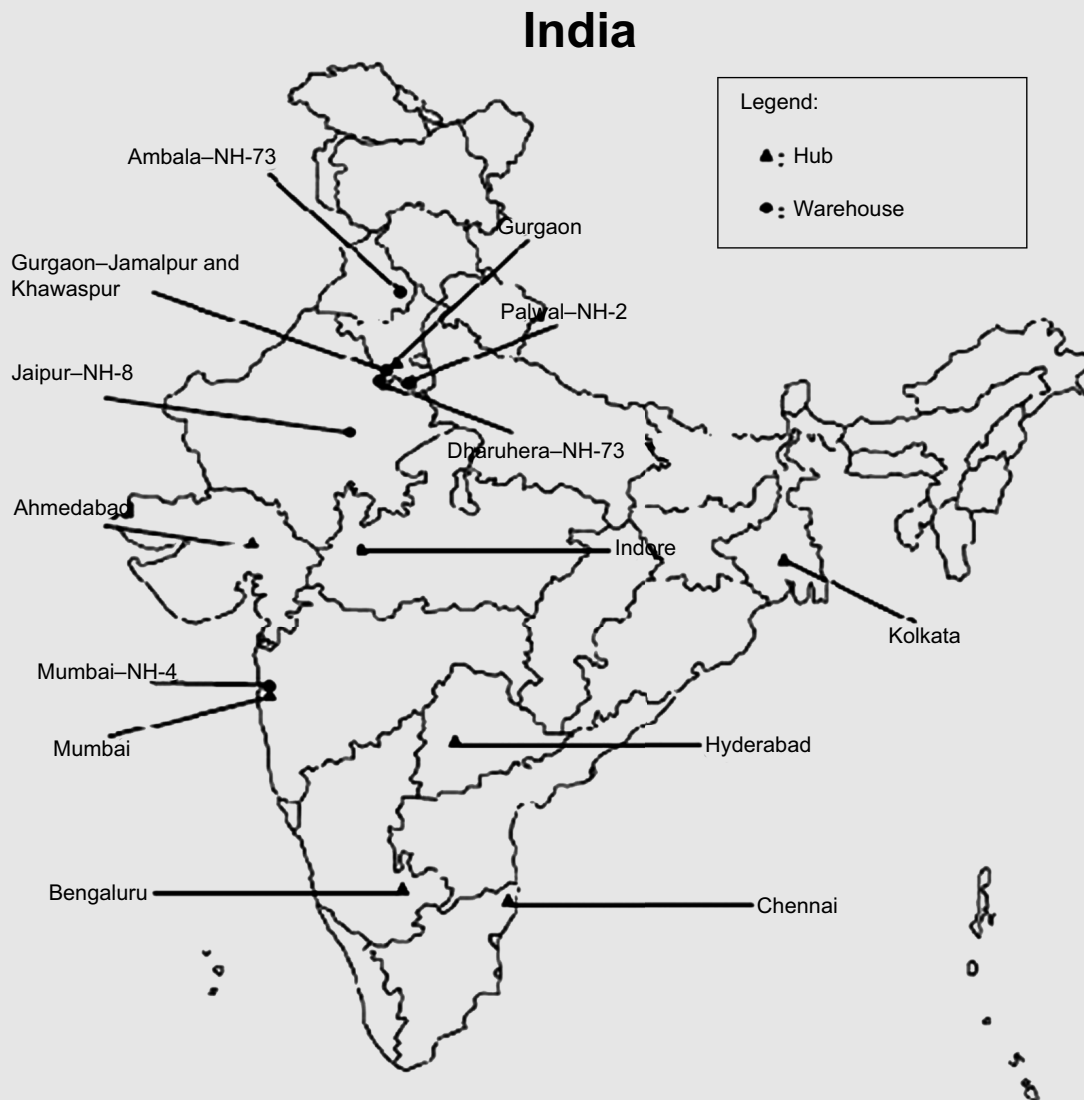


Source: APML

EXHIBIT 3

APML's Warehouse Spread in India

Map showing location completed warehouses and hubs



Source: APML

EXHIBIT 4

Firms with Similar Names

<http://www.agarwalpackersmovers.co.in/>



<http://www.agarwalpackers.in/>



<http://aggarwalmoversrelocation.co.in/>



<http://www.agarwalpackwayindia.com/>

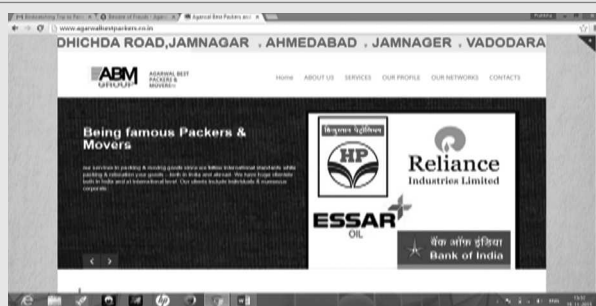


(Contd.)

<http://www.agarwalhomemove.com/index.html>



<http://www.agarwalbestpackers.co.in/>



<http://www.agarwallogisticspackers.in/>



<http://agarwalpackandmove.in/packing-service.html>



Source: Websites of the respective companies above

EXHIBIT 5**APML-Communication against Fraud****Welcome to the APML Help!**

We are here to save you from getting confused or trapped...

We are coming across a number of cases that are bringing the increased operations of fake companies and their advanced ways to trap the innocents into light. These cheating companies are reaching out to the masses that are looking for the market's leaders in relocation: Agarwal Packers & Movers Ltd. to shift their household goods, but such fake companies are tempting them by falsely and smartly claiming to be the partners or have some kind of associations with us.

It is really astounding to know that lots of people who are getting trapped everyday include numbers of educated and professional ones. This translates the fact that the fraud moving companies have been working through really advanced ways that are not only tricking the innocents, but also are succeeding in fooling the masterminds including I.T. personnel, bank managers, advocates, police officers, etc. Such advanced techniques at display could pose difficulty to anyone in judging the fraud company's crooked credentials and believing its fake existence.

Whilst it has been worked out that every day, on an average, 87 people get trapped; people, like me and you, become one of these statistics. If you or your near or dear one has not been trapped as yet, maybe your or their turn is tomorrow.

Be cautious!

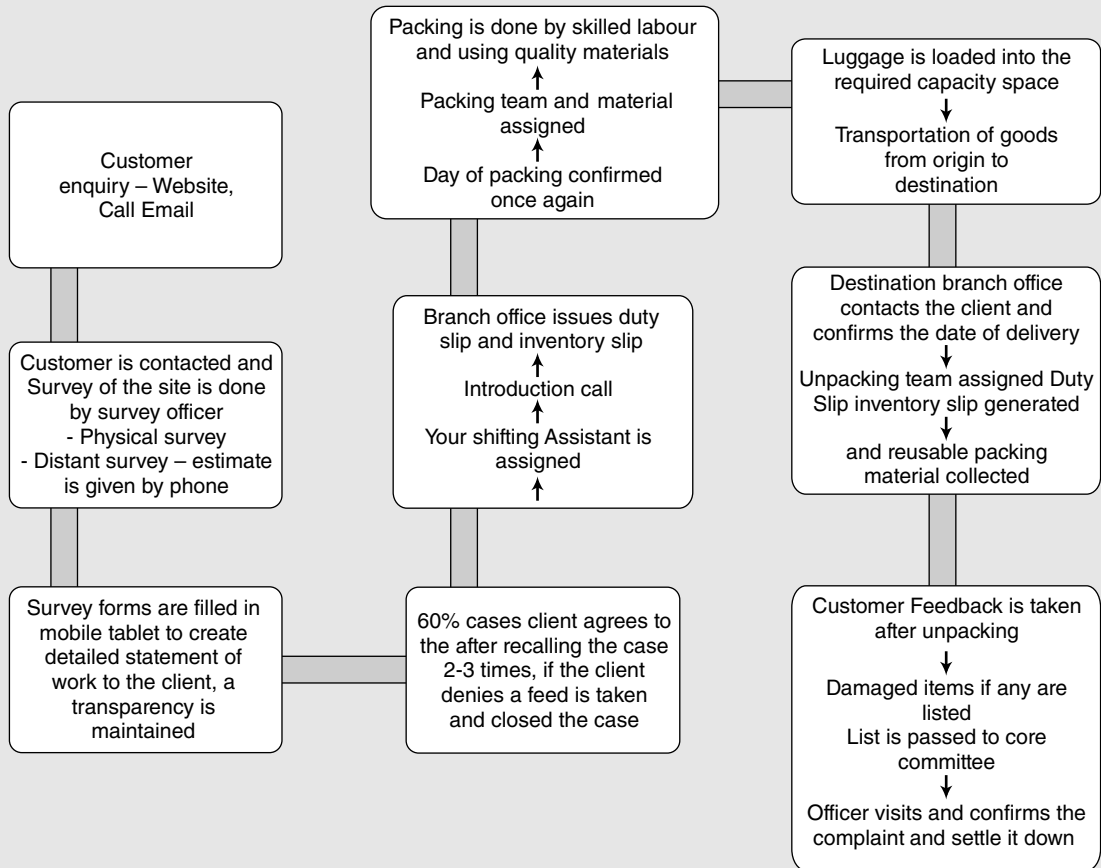
Follow any of the steps to find the genuine – us, as:

- > The significant  A-Logo,
- > A Balance Sheet with 391-crores turnover, [Click Here](#)
- > Limca Book of Records Holder, or [Click Here](#)

Source: APML website www.agarwalpackers.com/beware-of-frauds.html; accessed on 12/12/2015.

EXHIBIT 6

Relocation Process



Source: APML

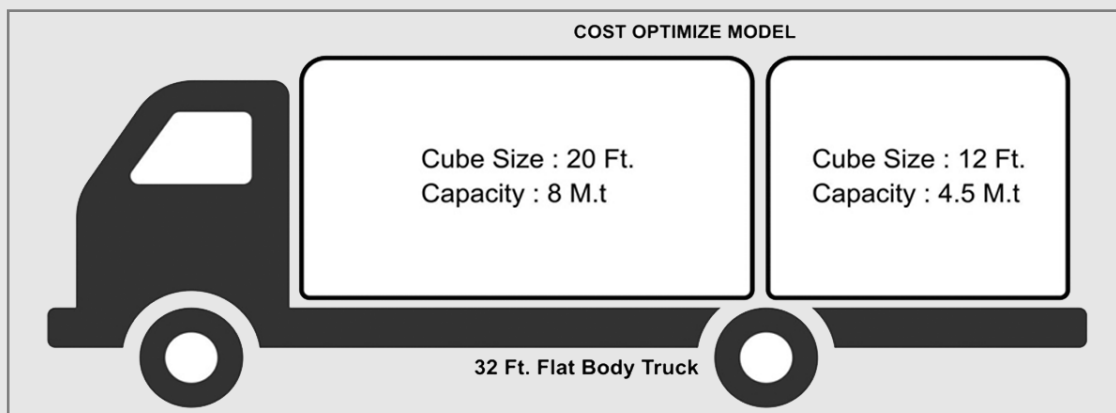
EXHIBIT 7**Pricing for Relocation Firms (New Delhi to Bangalore)**

Particulars / transportation heads	APML (₹)	Gati	Angel packers and movers	LG packers	Delight packers and movers
Basic for household goods	29000	28000	23000	32000	20000
Car freight	-	-	-		-
Statistical charges	100	-	-		-
Additional freight on value	-	-	-		-
Surcharge for rate of transportation	2910	-			
Packing charges	Included	Included	Included	Included	Included
Loading charges	Included	Included	Included	Included	Included
Unpacking charges	Included	Included	Included	Included	Included
Unloading charges	Included	Included	Included	Included	Included
Service tax	4.2% extra on total billing	14% extra	14% extra on total billing	14% extra	2800
Insurance charges/ Risk Coverage	3% of the value	1.5% as per value extra	3% on value	1.5 extra	2500 (@2.5% for 1 lakh)
Total (in ₹)	34355	28450	23200	32550	25300

Source: APML

EXHIBIT 8

Innovation- Trucking Cubes



Trucking Cubes on Trucks



Trucking Cube: Outside and Inside

Trucking Cube Features

Flexibility: From 4ft to 20ft (TRUCKING CUBE- Big or small? We have all).

Economy: 25 per cent reduction in packaging cost.

21 Days of free storage facility at destination in the cube.

Less damage: "No Trans-shipment" of goods.

Security: Clients can lock the Cube using their own lock and key.

Safety: Shock Absorbing Pad on floor, Net & Safety Belts on the walls to hold the goods.

Tracking: 100 per cent online Consignment Trucking through GPS.

Source: APML

EXHIBIT 9

Marketing Communication

Be-aware

Be-smart, Be-safe

Do you know ?
87 people get trapped every day
while Relocating their Household Goods

They Get Trapped through Paid Listing On

HOW TO RECOGNIZE GENUINE

- Company should be registered with PF, ESIC, IBA & Service Tax Department
- Company should have at 3 yrs of Audited Balance Sheet with min. turnover of 100 cr. each yr.
- Pay by cheque only
- Customer lock their container with own Lock & Key

HOW TO IDENTIFY EXPERT

- Check this logo on Crew Dress, Stationary, Packing Material, ID Card Etc.
- "A to Z Assurance" (in TV Ads)
- Countrywide Single Phone No. **098 6001 5001**
- Check Website: www.agarwalpackers.com

Issued in public interest by :-
AGARWAL PACKERS AND MOVERS LTD.
Limca Book of Records Holder
An ISO 9001:2008 & ISO 29001:2012 Certified Company
1800 11 6001

AGARWAL MOVERS GROUP
Imagins of Assurance

Assurance
Imagins of Assurance

Zero Transit damage to your LED/LCD

We deliver smiles with our innovation

Fact: 25% of LED/LCD TV sets come in service stations for repairs due to the traditional packing in wooden crate

The biggest worry when you shift your TV set is "Will my TV set be safe after transit?"

Agarwal Packers & Movers sensed this problem and through its extensive R&D has come up with the most scientific and convenient way to transport your LED/LCD TV sets that makes them completely safe during transit by providing the use of hammer. We dedicate a cure to your worries "LED Box".

Hard Exterior for external safety	Foam Cushion to provide extra protection to TV Screens	More durable to Transit damage	Add extra years to the life of your TV sets	Environment friendly	An Economical solution to transport your TV set
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With this innovation we save 160 trees annually. Join us in our initiative "Save Trees" Campaign.

AGARWAL PACKERS AND MOVERS LTD.
Limca Book of Records Holder
An ISO 9001:2008 & ISO 29001:2012 Certified Company
098 6001 5001
08155 - DOMESTIC & INTERNATIONAL
www.agarwalpackers.com

Assurance
Imagins of Assurance

AGARWAL MOVERS GROUP
Imagins of Assurance

Assurance
Imagins of Assurance

Statutory Warning: When you book through us, don't forget to check our logo on ID Card & Stationary

APM INTERNATIONAL MOVING

(A UNIT OF AGARWAL PACKERS AND MOVERS LTD.)
Limca Book of Records Holder
An ISO 9001:2008 & ISO 39001:2012 Certified Company

Moving Abroad ?

Your **Trusted Mover** is Now Serving in **182 Countries**

AGARWAL MOVERS GROUP
Imagins of Assurance

Member of **IAM**

093 6001 5001
SHIPPING - DOMESTIC & INTERNATIONAL
www.agarwalpackers.com
www.agarwalmovers.com

Assurance
Imagins of Assurance

AGARWAL MOVERS GROUP
Imagins of Assurance

Assurance
Imagins of Assurance

Statutory Warning: When you book through us, don't forget to check our logo on ID Card & Stationary

Big or Small, We have all

Cubes available in different sizes : 4ft, 6ft, 8ft, 11ft, 16ft, 20ft.

Trucking Cube: Ground breaking innovation
Result: Reduction in logistic cost from 18% to 22%
How? We have the answer

- 25% reduction in packaging cost - on account of low ply required
- Clients can self lock and return key
- 20 Days free storage facility at destination in some cities
- Zero pilferage
- These cubes are made as per ISO certification, hence no under usage is possible which is common in close body modes
- Exclusive cube even flat port alignment
- Just free delivery of goods
- No leakage for air packed goods especially pharma & food
- Low Insurance Premium on account of zero risk
- Easy to handle your work at destination
- 100% online Consignment Tracking through GPS
- Multiple handling of goods in transit reduced to Zero
- In case of destination, cube can be transported by another vehicle without transshipment
- Lighting Reduces the Shock Absorbing Pad on Floor, Net & Safety Belts to hold the goods intact

AGARWAL MOVERS GROUP
Imagins of Assurance

truckingCube.com
Imagins of Zero Transshipment

Assurance
Imagins of Assurance

Statutory Warning: When you book through us, don't forget to check our logo on ID Card & Stationary

Source: APML

EXHIBIT 10

Competitive Landscape

Name of company	About	Network	Revenue (2013–14) million
Agarwal APML	Transport of household goods, logistical services, APM infrastructure services, warehousing services and other goods.	HQ in New Delhi, India, operations for global and Domestic market both. In India they have more than 75 offices. Serves in 182 Countries through partners.	₹7.9 to ₹10 billion
Allied Lemuir	Allied Pickfords, acquired Allied Lemuir in 2011 in India	Over 600 locations in 40 countries Allied Pickfords was handling 50,000 international moves every year.	Not available
Crown Relocation	Founded in 1965, a global company	Spread over 265 locations in almost 60 countries worldwide. Warehouse Space: Over 7.5 million square feet.	₹42.25 billion
DTDC Packers & Movers	DTDC was a courier and cargo company based in India and founded in the year 1990. Also gave Courier express, freight forwarding, logistics services and other premier services.	Headquartered in Mumbai, developed national and international markets.	₹5-7 billion
Maxwell	A division of Maxwell logistics	Spread over India with 1,00,000 square feet of warehousing facilities	₹700 million
Gati Courier express, freight forwarding, logistics services, moving other goods	Gati was an Indian company operating since 1989.	It has over 4,000 vehicles on road, 2 marine vessels and 7,000 plus business partners across the country.	₹12.9 billion to ₹13 billion
Writers relocation services	Operating since 1953 and serves across India, UAE, Bahrain, Oman, Qatar and Singapore. It is based in Mumbai	It has 360 global partners to ensure smooth relocation across the globe.	₹50.5 billion

Source: Websites of the companies mentioned above.

SUGGESTED QUESTIONS

1. How could Agarwal Packers and Movers Ltd (APML) compete with competitors that offered lower prices?
2. What could APML do about its customers who were not ready to pay a higher price for the better value that it provided?
3. What is the right consumer segment that APML should target?
4. Was it possible for APML to target multiple consumer segments? If yes, what would be the implications on the portfolio of its offerings?
5. A number of competitors were using similar brand names. How should APML deal with this?

APPROACH FOR ANALYSIS

The case highlights that APML is at the crossroads as it charts its growth path. It would need to take a number of key decisions related to choosing its target consumers, positioning and branding strategy. APML was a pioneer in the household relocation market and developed the market in India. However, as the market evolves, the competition has grown and the competitors now compete with APML by differentiating themselves on attributes such as price, service, geography, etc. APML has currently been targeting all consumer segments. However, now there seem to be sizeable consumer segments that differ in their needs and which are sensitive to different attributes such as price, level of service, etc.

APML could choose to focus on one of the segments, for example, the large middle-class segment, and ignore the low-end segment, where it is being challenged by low-cost operators, and the high-end market where premium relocators can operate. However, this might mean that APML exits a market where it enjoys high-brand equity; this would also give space to its competitors. The alternative is to try and target multiple consumer segments with multiple services (and price tiers). APML may like to have a broader positioning and offer itself as a relocation service provider for all consumer segments and offer services that cater to the needs of all segments. It may need to unbundle its services and offer basic services and add-ons for which it can charge a high price. Though this is a viable strategy, there will be challenges in the execution.

A tougher challenge awaits APML where branding is concerned. Firstly, the fact that it shares the trade mark on Agarwal Packers and Movers with the DRS group means that

there will always be a lack of consistency in the service offering and brand communication. Moreover, as the word 'Agarwal' cannot be protected, protecting the brand elements and projecting a unique identity will always be a challenge. The 'business as usual' strategy is likely to have long-term negative effects. While using the brand 'Agarwal Packers and Movers' has its advantage APML may need to work towards a long-term solution. Firstly it may need to settle the trademark issue with DRS so that the consistency in offering associated with the brand is maintained. Secondly, it may need to create brand elements that are protectable. Towards this it may think of developing sub brands and creating more unique brand associations such as the 'Fauzi' logo.

Case

2

CASE CONTEXT

Navigators Logistics Co. Pvt. Ltd. faced a number of issues with its clients in terms of the fluctuation in demand volumes and extended credit periods. The spread of client transportation requirement was not consistent across the year and that was the major point of distress. Further, the process for handling internal transactions was manual with limited process checks. This led to unproductive man-hours and adversely affected business profitability. Should the company restructure its entire client portfolio? What process changes are needed to manage internal operations?

Navigators Logistics Company Private Limited

In July 2013, Preet Shah, the Executive Director of Navigators Logistics Co. Pvt. Ltd., Gujarat, arrived at his office to begin his day's work. Navigators Logistics was a road transportation company. They transported hazardous chemical products to chemical companies in Gujarat, Madhya Pradesh and Maharashtra.

Preet looked at the profit and loss statement of the company for the last three years and was not surprised to find out that the company's profit had almost been constant for these years. He was facing regular issues with the clients in terms of fluctuation in demand volumes and extended credit period. The spread of demand of his clients was not consistent throughout the year and that was the major point of distress. The fluctuation in demand curve was so wide that at times it led to the fleet being fully utilized while at other times the fleet was idle. Not only this, during the times of full utilization at times even more trucks had to be rented from the market. The scenario was even worse during turbulent economic conditions when the clients used to suffer and it reflected on his company's business as well. The payments from clients used to be delayed and at times it even took three to four months to get the payment released. This was a matter of serious concern to Preet. Apart from the issues arising from demand fluctuation and extended credit period, another issue was troubling Preet. The organization had to incur huge maintenance cost as the humidity at Kandla port (where loading used to take place) caused corrosion of the trucks.

In addition to the external factors, there were certain issues in the way the organization used to function. Due to the extended credit period, man-hours were wasted in follow ups for payments, which were unproductive. Also, the company used the pen and paper medium for data entry which was inefficient as lot of time was wasted in trip calculations. The drivers used to report falsely on the amount of money spent on diesel, as the organization had no mechanism to check the same. All these issues adversely affected Navigators Logistics' business and the accounts further weakened during unstable economic condition.

Despite of the fact that the issues were many, Preet this time was determined to solve the problems that the organization was confronting, both, internal as well as external ones. The decisions to be taken involved (a) whether to continue with the existing clients only or to think about restructuring the entire client portfolio (b) what changes were to be brought about to manage

Prepared by Professor Debjit Roy, Indian Institute of Management, Ahmedabad.

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the issues in internal operations (c) what growth strategy and technological reforms should he bring about and (d) what he had to do to acquire the competitive edge in his business? Decisions to address these problems had to be taken at the earliest to facilitate the future course of action.

ABOUT NAVIGATORS LOGISTICS

Navigators Logistics Co. Pvt. Ltd., a logistics solutions provider was established in the year 2008 with the vision to become a major integrated logistics service provider in India.

For its existing clients, majority of them being based in and around Gujarat, it took care of logistics management and ensured safe and timely delivery of goods. Moving a step forward, apart from transporting goods, Navigators Logistics intended at streamlining and managing the end to end supply chain process of its clients.

Navigators Logistics was engaged in transportation of various types of liquid cargos, gases, chemicals, etc. It intended to extend its services beyond transportation, and wanted to serve as a strategic planning partner to its clients by extending services such as analyzing material shortfall, giving more visibility to their supply chain inventory, enhancing customers' experience and likewise, to its clients.

To serve the needs of its existing clients in a better way and also to add new clients to its folio, the organization had expansion plans in the years to come. In addition to this, the organization was also looking forward to diversify and provide solid cargo handling services and warehousing services to the clients. This would enable the organization to move a step further in achieving its mission to provide top quality logistics services to help improve the supply chain management of its clients, by offering value added services such as building customer relationship, warehousing (for clients having storage needs), daily consumption planning and visibility of inventory to mention a few.

Navigators Logistics had a unique style of operation. It had mostly dedicated its vehicles to specific clients/products on long term basis, so as to be able to offer consistent services. However, the exclusive vehicle system was feasible only for contractual clients, such as GSPC, whereas, for all the other clients the vehicles were to be pooled. This strategy was adopted to indirectly push more clients to enter into a contract with Navigators Logistics, thereby providing the company with an estimate of the volumes of demand.

BACKGROUND

Navigators Logistics has its registered office at Ahmedabad, Gujarat. It also has branch offices situated at Bharuch, Gandhidham and Kandla (see Exhibit 1). The Ahmedabad office of Navigators Logistics was founded jointly by Mr. Ketan Shah and Mr. Chirag Patel in the year 2008. While Mr. Ketan Shah brought with him the expertise in the field of chemical trading

and transportation, Mr. Chirag Patel was himself a chemical engineer. Mr. Ketan handled administration, finance and business of the company and he was also the founder of Multichem Corporation, a chemical trading firm that had an in-house transportation department for more than 25 years. Preet Shah s/o Mr. Ketan Shah was the Executive Director of the office. He had been associated with the company since January, 2012. He managed business development and operations at Navigators Logistics and also looked after the in-house transportation department of his father's chemical trading firm Multichem Corporation.

After finishing his MBA, Preet had initially joined the commercial banking department of a leading private sector bank in Ahmedabad. Perceiving his role at the bank to be monotonous, he quit his bank job and decided to join family's traditional chemical trading business. The dynamic nature of the transportation business motivated him to join Navigators Logistics. Moreover, since the Shah family was based in Ahmedabad, it provided him the necessary support and also consideration from a number of family members.

SERVICES OFFERED

Initially the company decided to venture into the field of transportation services, in particular, transportation of Ethylene oxide gas, which was extremely hazardous to carry. However, the segment was very niche to cater; it also had a very limited scope for growth due to the limited end application of the product. So, the company decided to venture into transportation of crude oil which was subsequently followed by hazardous chemicals, in tankers. The distribution was spread across India and that decided the future course of action for the company. The company achieved expertise in handling and transporting hazardous supplies. Navigators Logistics as an organization was committed to provide professional transportation services of hazardous liquid chemicals.

There were a number of statutory requirements to be fulfilled for transporting hazardous material. The tanks had to be calibrated every year and the license of vehicles needed to be renewed from time to time. The license in this regard was issued by Petroleum & Explosives Safety Organization (PESO). All these renewals had to be done well before time to avoid any safety issues. Also, the drivers carrying the cargo had to be trained appropriately for safe and risk-free transportation and the company needed to ensure that every driver had a training card, authorizing him to carry hazardous material. This card was also to be endorsed by the regional transport office along with the valid license. The company had to abide by certain rules and regulations that were laid by PESO under the petroleum rules for petroleum class A/B, 2002. Some of the important rules are listed below:

- ❑ No leaky tank or container containing petroleum shall be tendered for transport.
- ❑ No person while engaged in loading or unloading or transporting shall smoke or carry matches, lighters or other instruments capable of producing ignition or explosion.

- ❑ Petroleum shall not be loaded into, or unloaded from any vessel or vehicle between the hours of sunset and sunrise
- ❑ Every tank vehicle used for the transport of petroleum, in bulk on land shall be built, tested and maintained in accordance with the requirements laid down in the Third Schedule and be of a type approved in writing by the Chief Controller
- ❑ The tank should be fabricated and mounted on the vehicle chassis by a manufacturer approved by the Chief Controller.
- ❑ The net carrying capacity of the tank should be 97 percent of its gross carrying capacity in case of petroleum Class A and 98 percent for petroleum Class B.
- ❑ A portable fire extinguisher (10kg, dry chemical powder or equivalent) suitable for extinguishing petroleum fire should be carried in an easily accessible and detachable position and away from the discharge faucets on every vehicle which is transporting petroleum by road. Additionally, one dry chemical powder type fire extinguisher of 1 kg capacity should be carried in the driver's cabin of the vehicle.
- ❑ Petroleum should not be loaded into or unloaded from a vehicle until its wheels have been secured by efficient brakes or by scotching.

ASSETS

The only vehicle employed by the company in transportation was the *Truck*. The company used to buy their own trucks. Exhibit 2 shows the picture of a truck used by the company. When Preet joined the company in 2012, the company operated with a fleet of 29 trucks of various manufacturing companies (Tata, Mahindra, Ashok Leyland, and Eicher). All the trucks were fitted with tanks made up of mild steel. The gross capacities of these tanks were 31 tons and 25 tons. The complete distribution of trucks used by the company can be found in Exhibit 3.

PROBLEMS WITH THE EXISTING TANKS

The mild steel tanks used by company had a lot of issues with them. Though a mild steel tank used to cost just around INR¹ 2.5 lakhs (as compared to other investments), the maintenance costs of these trucks would add up to huge amounts (see maintenance costs for various years in Exhibit 4). Most of the tankers were loaded at Kandla Port. The humid weather there used to make the tankers rusty. It required proper and periodic maintenance for proper fitness of the tanks. The tankers had to be painted with special anti-rust coating and proper servicing of the trucks had to be done (once in every 6 months) to ensure long life of trucks and also reduce the risk of leakage. All these measures used to add up to huge maintenance costs and despite all these costs, the trucks had to be divested in 4-5 years.

¹ 1 USD = 63.34 INR

CLIENT BASE

The initial clients of the company were GSPC, Pon Pure Chemicals, CJ Shah Specialty, Sanjay Chemicals, Simali Industries and Balaji Formalin. These clients were located in Gujarat, Madhya Pradesh and Maharashtra. These clients were of high value to them as they were associated with the organization since Navigators Logistics was founded. These clients were mostly local and small scale chemical industries. Exhibit 5 reflects the location of various clients on the map of India. Refer to Exhibits 6 and 7 for the share of individual clients towards the total business.

ROUTES

The routes on which the company operated were generally short, covering a distance of not more than 1600 kilometers in a round trip. The average distance per round trip was around 714 kilometers (refer to Exhibit 8 for complete data of the routes and trucks for the year 2011-2012). The routes that the trucks used to follow were majorly national highways and state highways. Refer to Exhibit 9 for the routes on the map of India.

Vehicle Tracking System (VTS) and Fleet Utilization

The company had installed VTS on each of its trucks to monitor the location during the trip. This way they could provide their clients with the whereabouts of their goods while in transit and also the time when the consignment would reach the destination. GPS data of the trucks could be used to calculate utilization of the fleet. Refer to Exhibit 10 for GPS data of a truck for all the days of May 2012. The average utilization of that truck was 13.23 percent for that month.

On an average, 4 days were taken by a truck for one round trip. The distance covered in a round trip was 700 kilometers on an average. The average number of trips taken by a truck per month was around 5. The average utilization of the trucks was 13.69 percent per month in the year 2011-2012. Refer to Exhibit 8 for average monthly data of the trucks for the year 2011-2012.

Route Profitability

The fixed cost of the chassis of the truck was around INR 20–22 lakhs. The cost of mild steel tank was INR 2.5 lakhs. The operational costs, administrative costs, maintenance costs and financial costs accounted for a total of around INR 90,000 to INR 140,000 per vehicle per month. The revenue generated per vehicle per month was approximately INR 100,000 to INR 150,000. Thus profit generated per route was around INR 15,000 to INR 45,000 per month. Refer to Exhibit 8 for complete data.

EXTERNAL PROBLEMS

After joining the business in 2012 and having worked for one year, Preet began to realize that he was not comfortable in doing business with the existing clients. There were various problems associated with these clients that made him uncomfortable in doing business with them. These were:

- **Scattered client base:** It became difficult for Preet to do business with traditional techniques and scattered client base after having professional banking experience and qualification. The clients with whom the company operated at that time were mainly local chemical importers and small scale chemicals manufacturing companies. They were not contractual clients. These clients were sole proprietors. They were not professionals and he found it uncomfortable to do business with them, on a personal level.
- **Inconsistency in volume of demands:** There were inconsistent demands from these clients over the year. During the year, in case of turbulent times in market, their volume demands used to decrease abruptly affecting the cash flows of Navigators Logistics. This fact is evident from Exhibit 7 and Exhibit 11 which shows the range of average volume demands of various clients over the year. For instance, the average monthly volume demand of Pon Pure chemicals ranged from 400 tons to 600 tons which was not profitable for the company.
- **Low utilization of vehicles over the year:** The utilization of the fleet over the year was not sizeable enough owing to the low demands of these clients. The average utilization of the vehicles every month was just around 15 percent. 40 percent utilization was on the behalf of vehicles rented in market. However it was not profitable enough. Rest of the times the vehicles used to remain idle which was unprofitable as stand by costs of each vehicle was around INR 2500-3000 per day. Moreover during turbulent times in economy, the utilization of vehicles would come down to a mere 5 percent per month which was certainly not profitable.
- **Poor paymasters:** The clients were poor paymasters. There were unnecessary follow ups with the clients for payments. The receivable period of payments by the clients extended to about 4-5 months. This had an adverse effect on the cash flows of the company.
- **Very little growth opportunities:** Since these clients were mostly small scale proprietors, their growth over the years was not remarkable. This was evident from the fact that the profit that the company made remained almost the constant across the years from 2009 to 2012 (See Exhibit 8). In a service based industry like transportation, business growth is directly proportional to the growth of its clients. Since these clients didn't reflect any remarkable growth and their solvent demands never increased much, Navigators Logistics was also not able to expand its operations much over the years.

INTERNAL PROBLEMS

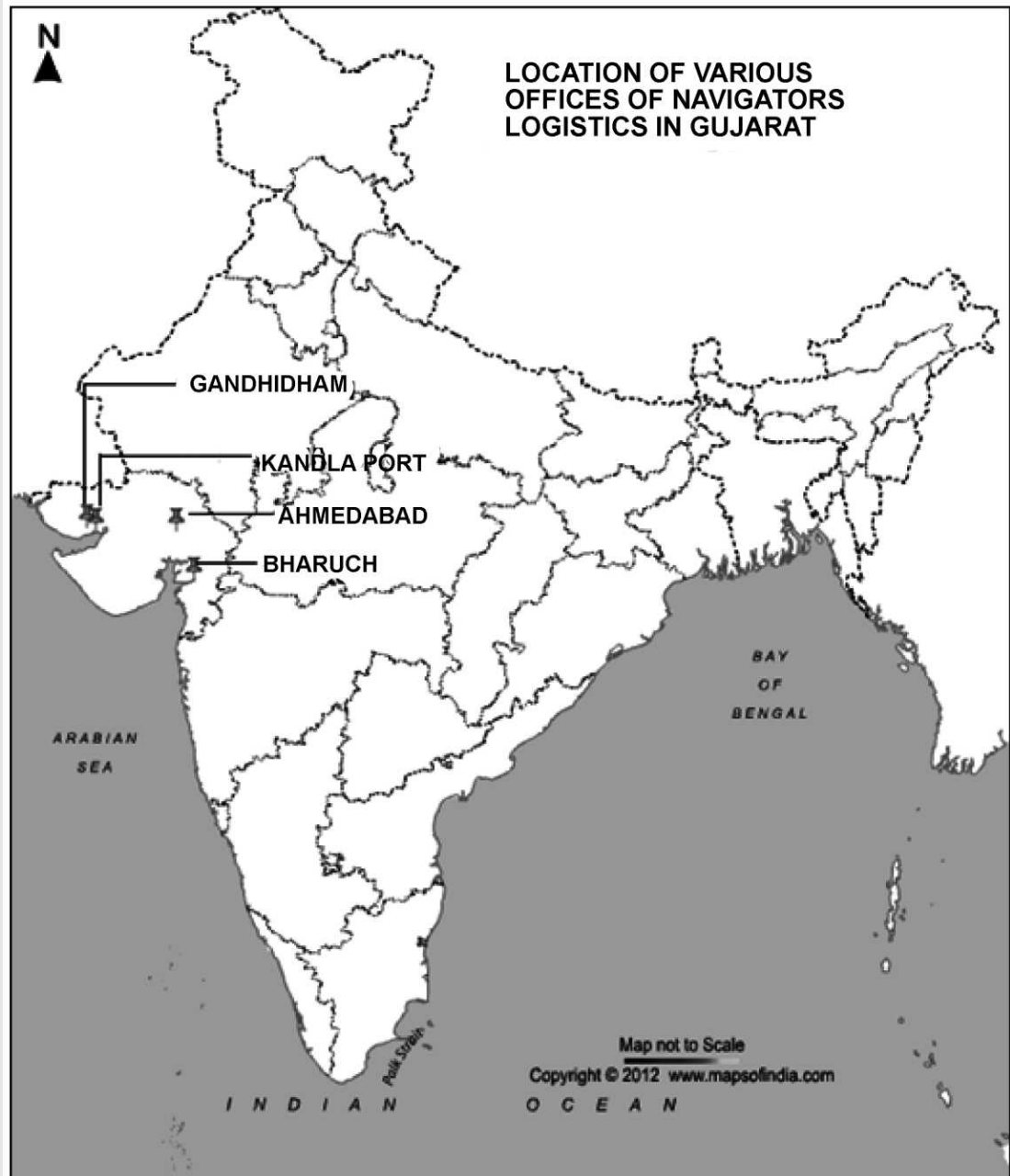
Apart from the problems stated above, the company faced problems internally as well. The company failed to match the estimated outcomes and was untouched by the technological innovations taking place. All the data entry was done using the pen and paper medium which was very inefficient and time consuming. The internal reporting and accounting system was weak. Dispatches were not planned properly. Lot of time was wasted in unnecessary follow ups with the clients and other associated agencies during loading, like terminal customs and clearing agents. A lot of time was wasted in manual trip calculations, like driver's expenses, trip duration, etc. All the transactions were made through cash which was inefficient. Diesel accounted for 70-75 percent of operating costs and there was no way of keeping a check on money actually spent by drivers on diesel as the dealings were in cash. No emphasis was laid on the technical aspects of maintenance and wheel replacement issues. Old traditional vendors were associated with maintenance work. Drivers' health and safety were not given adequate attention. They had to drive continuously for days and as a result they suffered from fatigue.

Impact of External Issues on the Functioning of Navigators Logistics

The major effect of the issues that company faced with clients reflected on the cash flows of the company. Coming from the small scale industries background, these clients never placed orders for large volume of solvents and as a result the company never generated high revenues at any given time. Also the clients were poor paymasters and the company had a credit period stretched to over 5-6 months. The unprofessional nature and the negligent attitude of the clients hindered the growth of the company. The clients themselves didn't grow much over the years and as a result the company never really got a chance to grow.

CORE ISSUES

Preet believed that their client base and functioning of the company was such that it was not facilitating the growth of their business. Following the economic crisis of 2012-2013 and having faced all the above said issues, Preet pondered upon what to do. The decisions to be taken revolved around (a) Whether to go with the original clients or to restructure the client base? (b) What should be the criteria for deciding new clients? (c) What growth strategy Preet should have adopted? What technological reforms should he have introduced to make the company more efficient? (d) What unique features should the company adopt to make them different from their competitors?

EXHIBIT 1**Location of Various Offices of Navigators Logistics in Gujarat**

Source: Authors' Analysis

EXHIBIT 2**Photo of Truck used by Navigators Logistics**

Source: Company Records

EXHIBIT 3**Distribution of Fleet of Navigators Logistics**

Manufacturing company	Number of trucks	Gross capacity (tons)	Number of wheels	Material of tank
Mahindra	2	31	12	Mild steel
Eicher	2	31	12	Mild steel
Tata	5	25	10	Mild steel
Tata	9	31	12	Mild steel
Ashok Leyland	11	31	12	Mild steel

Source: Company Records

EXHIBIT 4**Revenues, Expenditures and Profits of the Company**

(in INR)

Year ->	2009-2010	2010-2011	2011-2012	2012-2013
Revenue	7811778	17618273	35840621	53903763
Operating and other expense	3945315	10437055	25664153	36548859
Administrative expense	271833	415921	1392123	2531060
Employees benefit	436545	1000031	2455039	3854949
Financial charges	1146218	2244258	3679268	7318759

(Contd.)

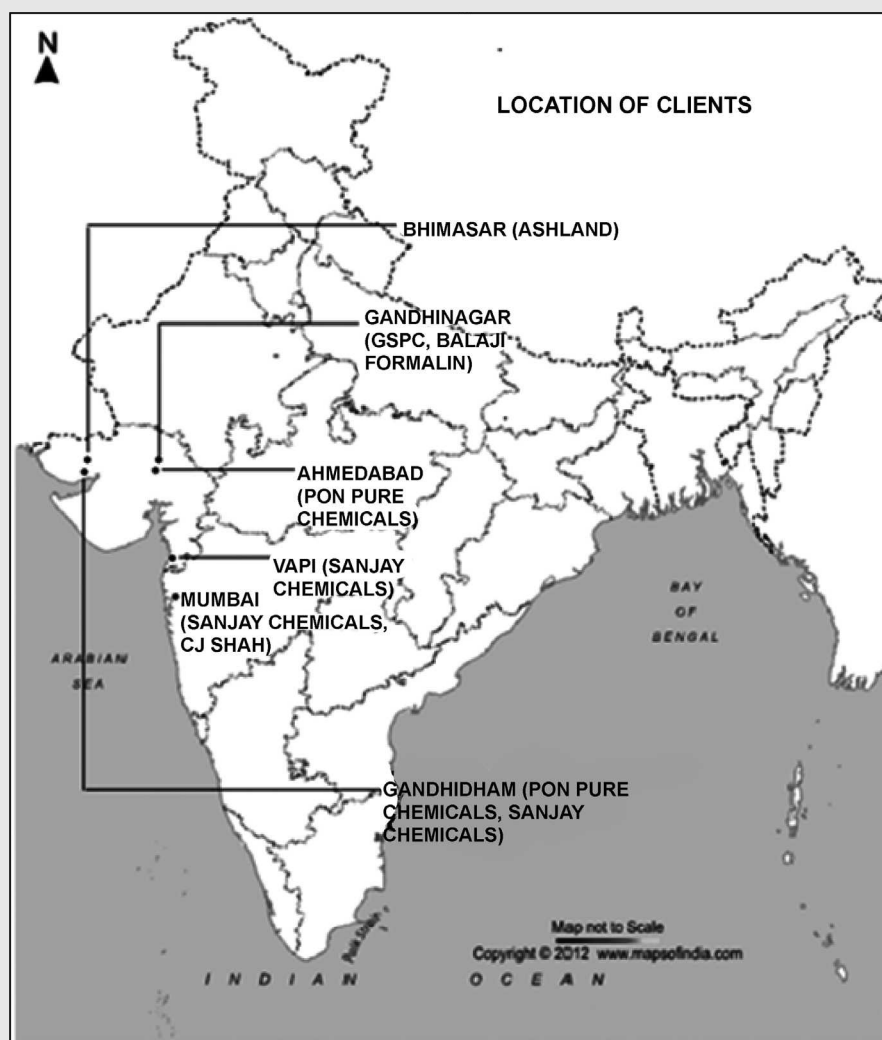
(in INR)

Year ->	2009-2010	2010-2011	2011-2012	2012-2013
Depreciation	10006529	2260459	4430045	6816892
Total expenditure	6826440	16357724	37620629	57070518
Profit	985338	1260549	1780008	3166755

Source: Company Records

EXHIBIT 5

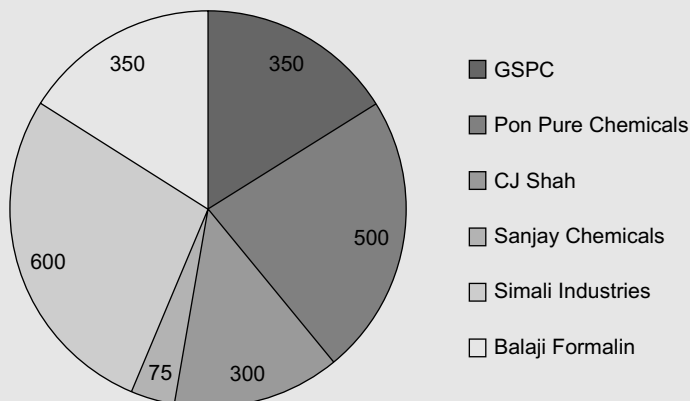
Location of Clients on the Map of India



Source: Authors' Analysis

EXHIBIT 6**Distribution of Quantity of Material Transported to Various Clients**

Monthly average of quantity of material transported to various clients (tons)



Source: Company Records

EXHIBIT 7**Quantity of Material Transported to Various Clients**

Client	Product	Monthly average of quantity of material transported to various clients (tons)	Monthly quantity of material transported to various clients (tons)
GSPC	Crude Oil	350	270-430
Pon Pure Chemicals	Solvent (Petrochem)	500	400-600
CJ Shah	Solvent (Petrochem)	300	250-350
Sanjay Chemicals	Solvent (Petrochem)	75	50-100
Simali Industries	Solvent (Methanol)	600	450-750
Balaji Formalin	Solvent (Methanol)	350	300-400

Source: Company Records

EXHIBIT 8

Typical Monthly Data for Trucks for the Year 2011-2012

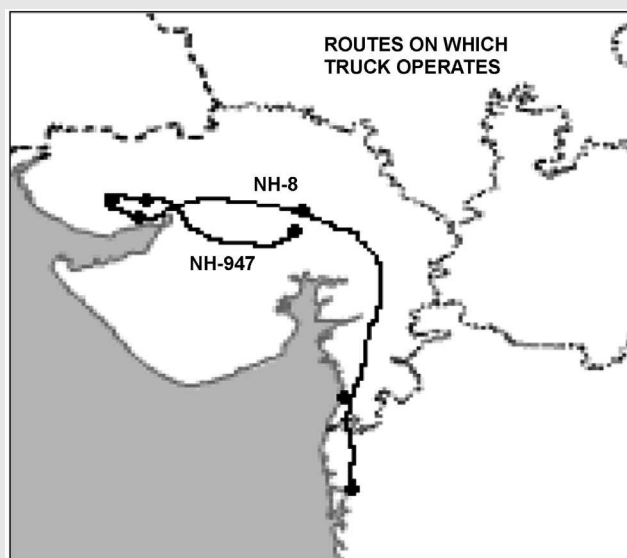
Route	Number of trucks used on the route	Round trip distance (kilometers)	Total days taken in round trip	Monthly trips	Run Time Utilization	Total revenue (INR)*
Kandla to Gandhinagar	5	500	3	5	10.00%	600000
Kandla to Bhimasar	5	70	2	8	6.67%	400000
Kandla to Gandhidham	4	40	1	10	3.33%	500000
Kandla to Ahmedabad	5	592	4	4	13.33%	550000
Kandla to Vapi	5	1312	6	3	20.00%	700000
Kandla to Mumbai	5	1640	8	2	26.67%	850000
		Average distance travelled per truck per month in round trip = 714.82	Average number of days taken per truck per month in round trip = 4.1	Average monthly trips per truck per month = 5.17	Average utilization per truck per month = 13.69%	Total revenue per month = 3600000

* Gross profit ranges from 25-30 percent of the revenue

Source: Company Records

EXHIBIT 9

Routes on which Trucks Operate on the Map of India



Source: Authors' Analysis

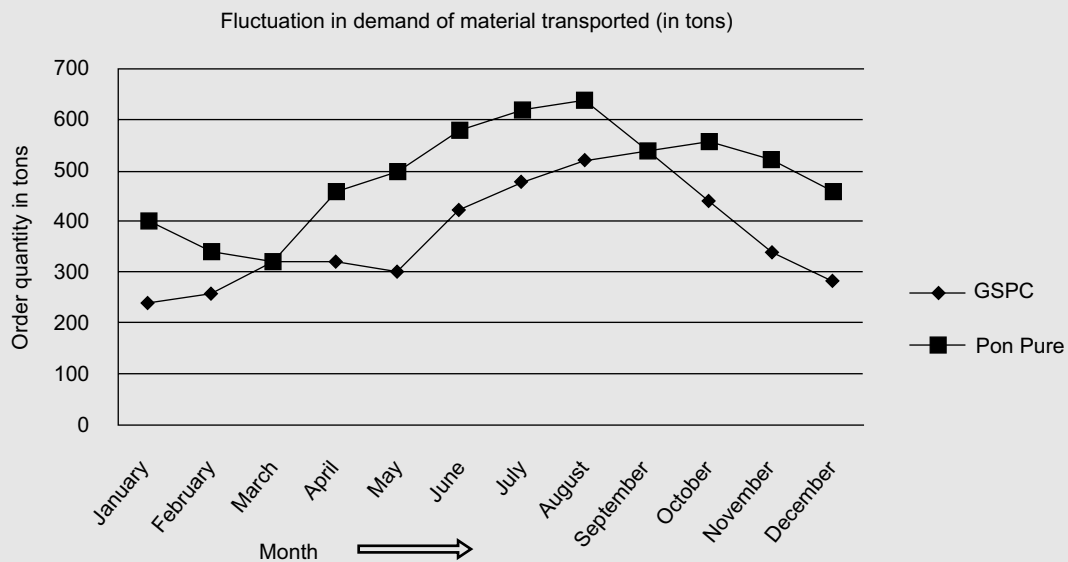
EXHIBIT 10**GPS Data of a Truck for May 2012**

Date	Driving Time	Idle Time	Standing Time	Total Time	Distance travelled	Utilization	
	(hh:mm:ss)	(hh:mm:ss)	(hh:mm:ss)	(hh:mm:ss)	(km)	(%)	
1/5/2012	0:00:55	14:22:02	9:37:03	24:00:00	5.0	0.00	T R I P 1 Kandla to Mumbai
2/5/2012	3:27:24	2:22:56	18:09:40	24:00:00	141.2	14.38	
3/5/2012	11:11:38	1:44:30	11:03:52	24:00:00	452.0	46.60	
4/5/2012	8:30:37	1:33:25	13:55:58	24:00:00	343.3	35.42	
5/5/2012	3:48:17	3:59:33	15:12:10	24:00:00	149.9	14.90	
6/5/2012	4:22:03	1:42:53	18:55:04	24:00:00	176.3	18.19	
7/5/2012	3:53:48	1:30:57	19:35:15	24:00:00	156.2	15.68	
8/5/2012	2:56:36	0:46:02	20:17:22	24:00:00	117.2	12.22	
9/5/2012	0:00:00	0:00:00	24:00:00	24:00:00	0.0	0.00	T R I P 2 Kandla to Vapi
10/5/2012	3:43:21	5:24:56	15:51:43	24:00:00	153.4	15.62	
11/5/2012	6:00:59	9:16:10	8:42:51	24:00:00	235.4	25.01	
12/5/2012	2:16:27	13:33:47	8:09:46	24:00:00	87.0	9.44	
13/5/2012	4:16:43	3:21:21	16:21:56	24:00:00	166.4	17.78	
14/5/2012	1:55:39	8:22:14	13:42:07	24:00:00	62.0	7.99	
15/5/2012	1:37:59	1:35:53	21:46:08	24:00:00	54.8	6.67	
16/5/2012	02:52:49	1:19:14	20:47:57	24:00:00	100.8	11.94	
17/5/2012	0:41:18	0:36:29	22:42:13	24:00:00	16.4	2.85	
18/5/2012	3:55:39	1:03:58	19:00:23	24:00:00	142.0	15.99	
19/5/2012	6:15:37	1:44:02	16:00:21	24:00:00	246.4	26.04	
20/5/2012	3:18:59	0:20:37	20:20:24	24:00:00	127.2	13.75	
21/5/2012	0:00:00	0:00:00	24:00:00	24:00:00	0.0	0.00	T R I P 3 Kandla to Ahmedabad
22/5/2012	0:00:00	0:00:00	24:00:00	24:00:00	0.0	0.00	
23/5/2012	0:43:15	8:08:05	15:08:40	24:00:00	17.2	2.99	
24/5/2012	2:06:13	3:35:51	18:17:56	24:00:00	82.4	8.75	
25/5/2012	2:01:37	1:11:11	20:47:12	24:00:00	80.4	8.33	
26/5/2012	0:13:45	1:47:06	21:59:09	24:00:00	5.2	0.90	
27/5/2012	4:08:03	8:30:52	11:21:05	24:00:00	163.2	17.22	
28/5/2012	4:55:17	8:19:58	7:44:45	24:00:00	182.0	20.48	
29/5/2012	1:23:22	8:03:43	14:32:55	24:00:00	49.2	5.76	
30/5/2012	4:04:30	3:34:14	16:21:16	24:00:00	161.6	16.68	
31/5/2012	3:53:58	1:37:55	19:28:07	24:00:00	141.2	12.45	

Source: GPS data of Navigators Logistics

EXHIBIT 11

Client Demand for the Year 2011 - GSPC and Pon Pure



Source: Company Records

SUGGESTED QUESTIONS

1. What decision should Preet take, with respect to the client folio? Should he continue with the existing client base or should he consider restructuring the entire client portfolio? What factors should Preet consider while restructuring his client base (if necessary)?
2. What process changes are needed to improve the efficiency of internal operations and ensure client satisfaction? How can they ensure the safety of trucks and drivers and the productivity of operations using the Vehicle Tracking System (VTS)?

APPROACH FOR ANALYSIS

Decisions with respect to the client mix are highly critical to the success of any organization. While choosing the mix, it is extremely important to consider the potential growth opportunities arising from the expected increase in the demand of the target clients.

It is also important to negate the demand fluctuations arising out of economic fluctuations. To minimize the risk associated with the markets, it is advisable to opt for clients belonging to diverse industries/sectors. Also, if the clients can be spread across wider geographies, the underlying risk can be further reduced.

To retain clients and capitalize on the opportunities provided by them, an important requirement is to have internal efficiency levels to support growth. So, the focus should be on gradually introducing technical solutions. Preventive maintenance can be a key area of interest. Enterprise resource planning (ERP) systems having modules that can prompt for preventive maintenance activities to be undertaken could be possible solutions for improving vehicle utilizations.

Further, transparency in business operations helps elicit loyalty from the clients. To enhance the experience of its end clients, the business should look towards developing differentiators. This will not only lead to a long term client association but will also contribute towards increasing the likelihood of a greater share of business from them.

Technology based solutions such as VTS should be introduced. This will not only provide the real-time status of the consignment, but will also help save operating costs by keeping a check on scenarios where the vehicle was idle with the fuel ignition in a running state. Part of the costs saved by doing this can be passed on to the drivers as well. Moreover, VTS can help facilitate driver safety by keeping a check on speeding, which is one of the major reasons for accidents.

Further, to ensure driver retention, incentive schemes can be introduced. These schemes can be designed to accord either monetary or non-monetary benefits to the drivers, and could be aligned to the objective data gathered using the VTS.

CASE CONTEXT

Agarwal Packers and Movers Limited (APML) is an example of a business that delivers superior customer service with continuous logistics design innovation. The case provides details of a leading logistics and solution provider for household goods relocation. In the past, the company had faced problems due to an increase in the number of customer complaints and claims and also an increase in packaging costs. Solutions were offered by modifying the processes through innovations in its services, resulting in customer delight. As a result of continuously improving capabilities, people, processes, and technology, the services improved too. APML believed that mistakes could be avoided and defects could be prevented. The case gives an insight into how the company improved its services by innovating and how these innovations were sustained by a large organization with many branches throughout India.

Agarwal Packers and Movers Limited

Addressing his employees, Steve Jobs once said, “Our DNA is as a consumer company—for that individual customer who’s voting thumbs up or thumbs down. That’s who we think about. And we think that our job is to take responsibility for the complete user experience. And if it’s not up to par, it’s our fault, plain and simple.”

Founded in 1987, the DNA of Agarwal Movers Group (AMG) was no different. A family-owned and professionally run business, AMG was India’s leading logistics and solution provider for household goods relocation.

In February 2015, the annual meeting of Agarwal Packers and Movers Limited (APML) was nothing less than a celebration for the entire team. Their key service innovations helped in successful implementation of novel packaging processes through which the company not only reduced customer complaints but also absorbed the increase in packaging cost without increase in freight cost. Mr Ramesh Agarwal, Chairman-cum-Managing Worker of AMG, reflected upon the innovative approach followed by the organization to identify cost effective solutions for packaging and relocating household goods. Without being complacent, the APML team wondered if the innovation process was sustainable from the point of view of the organization. In addition to this, the company was looking at transforming the drive from a reactive (customer-complaint driven) to a proactive innovator in the industry.

Background

In 1987, Ramesh Agarwal transported household goods for one of his ex-military seniors from Hyderabad, which led to the foundation of Agarwal Household Carrier.

Over time, the company grew with experience, core competence, and confidence and established itself as one of the India’s largest household transportation companies. The company’s name was soon changed to Agarwal Packers and Movers Limited. It had a fleet of over 1,000 vehicles, 80 company-owned offices with headquarters in New Delhi. It was an ISO 9001-2008 certified

Prepared by Professor Debjit Roy, Indian Institute of Management, Ahmedabad.

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organization with a turnover value of over INR 3,820 million¹ in 2013-14 and aspired to reach INR 20,000 million by the year 2020. It employed 1,173 employees at payroll with more than 4,000 people attached indirectly with the company. It was amongst the only four companies in India to be certified by ISO 39001:2012, which attested their contributions in road traffic safety. In 2012-13 APML was registered in Limca Book of Records for transporting household goods of 61,302 clients (Exhibit 1). The core values of APML were *Aastha*,² *Apnapan*,³ *Awesome*, *Aspiration*, and *Assurance*.

Services by APML

- ❑ **APM Domestic Moving:** Performed packing, loading, moving, unloading, and unpacking of the goods using convenient and good handling practices, all coordinated by a centralized office in Delhi (India).
- ❑ **APM International Moving:** Provided relocation services to and fro for more than 200 countries and territories worldwide. The APML team conducted relevant research on international client culture and regional etiquette to execute business operations efficiently. Variety of packaging materials such as corrugated boxes (for books and crockery), corrugated rolls, bubble wraps, tissue papers, thermocol, corners, crates, and cases were used to prevent damage to the consignment.
- ❑ **APM Home Storage:** Involved storing client's goods at destination for both long term and short term. This applied to cases where client had not finalized the destination for the goods or had to move to other places on temporary assignment.
- ❑ **APM Car Carriers:** Involved transportation of client's car in its pristine condition using safety measures such as safety chains and locks, wheel stoppers, and safety belts.

Other Services

Apart from the above services, AMG also offered:

- ❑ **APM Transportation:** Involved employing a multi-modal transport model as airways, seaways, railways or roadways depending on the purpose.
- ❑ **APM Warehousing:** Provided safe and convenient storage for computers, documents, home furnishings, antiques, furs, linens, mattresses, electronic equipment, musical instruments, and innumerable other items using facilities such as multiple loading docks, provided with ample amount of space for staging of materials at the time of receiving and shipping (Exhibit 2).

¹ 1\$ = INR 63.44

² Belief

³ Oneness

- **APM Exim Cargo:** Provided inter-modal transportation for the movement of export/import containers through local transportation for both domestic and international shipments.
- **APM ODC (over dimensional cargo) Transportation:** Involved movement of over dimensional, heavy, and bulky cargo. This included telecom equipment/towers and rail coaches.
- **APM Infrastructure:** Provided infrastructure and roof-tech services to functional domains such as commercial, agricultural, and industrial groups such as warehouses, godowns, and large sheds using state-of-the-art technology to assure durability, quality, and safety. Notable clients included Walmart.

APM Domestic Shifting

Agarwal Movers Group provided household relocation services under its flagship company, APML. The revenues from relocation services accounted for over 60 per cent of total revenue of AMG.

Organizational Structure

Ramesh Agarwal believed that while practice makes a man perfect, so if one practiced being a server for his entire life, he can never become an owner. Therefore, in APML, the managers at different levels were called *Maliks* literally meaning ‘owners’. Every branch had a *Branch Malik*, while a group of branches was headed by a *State Malik*. For the purpose of ease of operations, the country was divided in four zones. Rajender Agarwal, brother of Mr Ramesh Agarwal and Vice Chairman and Head of operations managed the West, East and South zone while the North zone was managed by Ramesh Agarwal (Exhibit 3).

Domestic Relocation Process

APML had standardized entire operational process in an organizational book detailing the roles and functions of employees within each department. The process started when a client made an enquiry for relocation, which came through any of the three mediums: website, telephone or email. This enquiry was followed by a survey of the house to assess the volume of goods that needed relocation. The survey could be either a physical assessment (98%) in which the survey officer visited the client’s house to gather useful information about relocation on the basis of pre-defined survey forms or through distance survey (2%) where the client gathered the useful information himself by taking instructions from the survey officer over the phone. The details were then entered into a mobile tablet by the survey officers. Based on this form, a quotation was sent to the client detailing the cost of relocation. After this, for 70 per cent cases, the booking was confirmed (sometimes, the client had to be contacted 2-3 times). In case of a

non-conformation, a feedback was taken from the client asking about the reasons for not going ahead with the booking (Exhibit 4).

After confirmation, the process was divided into two parts: *hospitality*, which made the front end of the process and *operations*, which made the back-end of the process. There were two coordinators, who acted as intermediaries between the hospitality and the operations department. These coordinators ensured smooth flow of information between the teams internally.

The hospitality team comprised of about 20 people known as 'Your Shifting Assistant' (YSM). After confirmation, each client was assigned a YSM by APML, who served as the single point of contact between the client and the company. His job was to keep the customers informed about the location of their goods through telephone calls during various phases of the goods transportation (Exhibit 4). The phases of the relocation process were:

- *Phase I:* Introduction call just after confirmation of the booking.
- *Phase II:* This call involved taking a feedback after packing was done.
- *Phase III:* During transit of goods, customers were called every alternate day to inform them about the location of their goods.
- *Phase IV:* This call was to fix an appropriate delivery time based on client's convenience, after the goods reached the destination city.
- *Phase V:* This call was after the delivery and a feedback was taken from the client about the overall experience with APML's service.

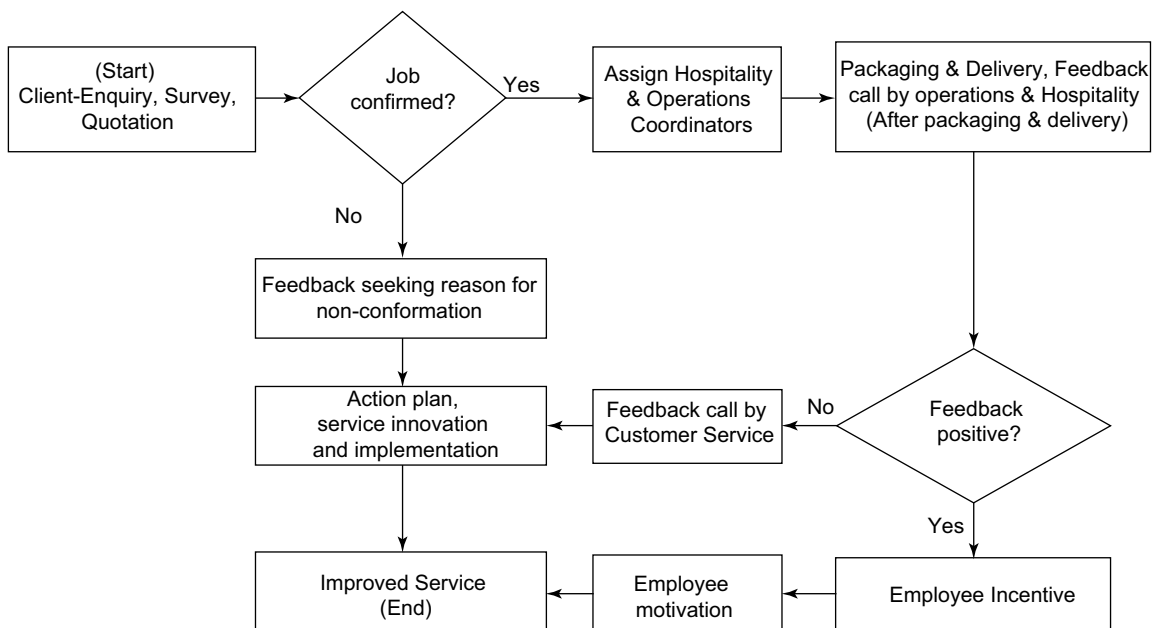


Figure 1 *Domestic relocation process*
Source: Author's representation

The operations team comprised of a team of packers along with their supervisors at individual branch office. They were responsible for packing and delivery operations performed at the source and destination respectively (Exhibit 4). On confirmation of a booking, the branch office at the originating city was informed where the *Branch Malik* issued a duty slip, an inventory issue slip, and wrapping material for the job. A typical packing team included four packers and one supervisor. However, other factors such as the number of floors and distance between the house entry and the vehicle location affected the number of packing team members. This team was responsible for packing and loading of consignments. The goods were then transported from the origin branch office to the destination branch office. At destination branch office, a duty slip and inventory collection slip was issued and an unpacking team was assigned for unloading, unpacking, and re-arranging the goods. They also collected the reusable packing material. The unpacking team had the same composition as the packing team. After delivering the goods, feedback was taken from the customer.

Cases of negative feedback post delivery of goods were handled by Customer Care Department. Any customer claims were also handled centrally by the Customer Care Department. The idea of having the customer care team centrally located was to have a focused approach. Also, it facilitated observation of any patterns or trends in the complaints/claims received across locations. While there were approximately 10 per cent complaints on the total number of deliveries, only 2.5–3 per cent of these complaints were requests for monetary settlements.

Employee Performance Appraisal

At APML, monthly performance appraisal was done at different levels based on the feedback obtained from customers. In the hospitality department, performance score was evaluated on the basis of appreciation given by the client. Shifting assistants got a score of 1, 4 or 6 based on the feedback by the customer.

In the customer care department, appraisal was done on the basis of a gain share matrix which included both, the number of claims solved and the time taken to settle a claim. They had internally set a 21 days deadline, the base time, within which a claim must be settled.

To ensure ‘zero mistakes’ at operational level, APML conducted a weekly branch meeting. All the employees participated in this Saturday meeting. At the employee level, this meeting provided a platform to be heard while at the supervisory level, this meeting was an opportunity to assess and share the feedback with the employees.

APML also started ‘gain and share’ scheme in 2014, where a share of company’s profits was distributed among the employees with the percentage of share depending on the percentage of the target achieved by that particular branch office.

Also, in an attempt to treat all employees as partners in the company, APML had started an *incremental profit sharing* scheme under which about 50-60 per cent of the relative increment

in APML's profit (obtained from balance sheet) with respect to the previous year, would be distributed to the employees while the rest would be distributed to the investors or would be invested in shares. For instance, if APML's current year profit was INR 300 million relative to last year's profit of INR 250 million, then about 50 per cent of the increase in profits, i.e., about INR 25 million would be given to the employees.

Feedback and Claim Settlement Process

21st of every month was denoted as the *Claim Clearance Day*, where all the claims and customer feedback from the previous months were discussed and appropriate actions were taken. The feedback was categorized into similar groups and the process to address the client concerns was initiated (Exhibit 4). The feedback of groups was then sent to a core committee, which was the *think tank* of APML. Problems confronted by the clients were then identified and after careful discussion and research, a plan for improving service was presented to the task head. Thereafter, the task head created an action plan for the implementation of improved services throughout the country. After the creation of an action plan, the systems head controlled the process of informing every branch in the country about the modification to the services proposed by the central office. Lastly, the vigilance department ensured that the improved processes and services were followed throughout the country without any branch specific discrepancies.

During the innovation process, suggestions were sought from the entire team of APML. The supervisor gathered the suggestions from the ground staff. This was the most elementary but also the most crucial aspect of the entire process, as the ground staff was the one who actually handled the materials. The supervisor would then share the suggestions with the branch *maliks*, who in turn would share it with the State *maliks*. After having received the ideas from all the branches, the state *malik* would filter out the ones which were feasible from the organizational point of view and send them to the top management for their views and further action. The top management would then compare the ideas with the objectives for feasibility analysis and also check the market suitability of the suggested proposal. Once the management review was done, it was forwarded to the Research and Development (R&D) team to materialize the proposal and do a prototype testing of the product on ground. Based on the feedback of prototype, final changes, if any, were incorporated and followed by universal implementation.

Service Innovations by APML

APML developed new processes and packaging methods to improve the service experience on the basis of customer feedback. Interestingly, the innovations further decreased the *true* operational cost. These innovations could be grouped into three categories:

1. Managing Packaging Cost

The cost of packaging material was about 20 per cent of the cost to the company in transporting goods of an average 1 Bedroom-Hall-Kitchen (BHK) apartment (Exhibit 5). Therefore, APML had to cut down on their packaging costs in order to maintain the price at the same level (if not lower) and provide better customer service.

Increasing cost of corrugated sheet Change in price of packaging materials had a significant impact on the freight cost charged for the customer. APML had been using corrugated sheets for packing goods. For one household packing, around two kg of packing material was required. With the rate of corrugated sheets increasing upto INR 58 per two kg, the APML research team had to think of an alternative, which would enable them to deliver service at a same or lower rate without being affected by the price hike.

To find a feasible solution APML's R&D team focused all its attention on getting a material which not only provided same cushioning effect as done by corrugated sheet but also brought down the overall cost. In the process, APML developed a flexible sheet named 'Fabric Sheet' (Exhibit 6). The cost of production of the sheet was INR 180 per two kg but it was reusable and could be used for six times making its effective cost to be INR 34 for a single usage (including the cost of fabric wear and tear).

Use of fabric sheets was also a step towards conserving environment because it saved 300 trees (the number of trees cut to produce the annual requirement of corrugated sheets).

For full implementation of fabric sheet in the system of packing, a time period of 20 days was set and this was also followed by training the packers about all specifications along with the ways to handle it. Timely audits were then conducted to ensure compliance.

Increasing cost of cartons APML used normal cartons to transport books and clothes, for which the cost was as high as INR 72 per carton. To lower the costs, APML designed new trendy bags instead of cartons to transport clothes and books. This led to reduced cost as the price of each trendy bag was INR 38 only (Exhibit 6). Further, these bags created a strong brand recall because they had the logo of APML printed on them and were left with the customer at the destination.

2. Managing Customer Feedback and Claims

APML's mission was to achieve 'Zero Claims, Zero Tension,' i.e. minimize the number of claims, and reduce the stress level to improve organizational productivity. Therefore, they strived hard to deliver excellent customer service by reducing claim-related problems. At APML, feedback was viewed as a powerful tool for reducing the claims thereby improving services.

Increasing complaints about damage to LED Television APML started receiving high number of complaints about malfunctioning of television sets after 5-6 months of relocation. An in-depth study of all the relocations that happened in the previous year revealed that during the transfer once the television was packed in the wooden crate it had to be sealed using nails (Exhibit 6). In the process of sealing, the crate was hammered 45-48 times causing damage to the delicate circuits of LED/ LCD televisions. The problems reflected after a few months. It was clearly a problem with the method that was being used for packing TVs.

Having identified the root problem, the R&D team at APML, under the guidance of management, started working on possible combinations to offer a solution to the issue. After 15 days of research on designs, the team came up with a solution that also resulted in reduced cost to the client. 'LED Box' was a box like container specifically designed to store television sets during relocation process (Exhibit 6). The box was layered with soft cushion from inside to provide extra protection to the screen, had a shock absorbing sheet, and was rugged from outside to face the inclement weather conditions. On the cost part, the box was a 'win win' situation for the company as well as its client. Since the manufacturing cost of a wooden crate was INR 800 with just one time use; whereas an LED Box with a manufacturing cost of INR 2,500 could be reused upto 14 times which brought down the cost of one time use to INR 200. This benefit was ultimately passed on to the customers who were now required to pay less for a much superior service.

Also, because of the innovation upto 160 trees were saved per year, which was very much in line with APML's Corporate Social Responsibility (CSR) objective.

Damage to fragile items such as crockery In the course of its market research, APML's team came across certain customers who had also used services of some other packers in the market. Feedback obtained revealed how fragile items like crockery and glass decorative pieces got damaged during shifting.

The research team realized packing crockery items in normal cartons resulted in much damage due to their fragile nature. Further, thermocol sheets used for initial wrapping tended to break into small pieces (during handling, packing, as well as unpacking) scattering all around. Hence, special boxes called 'perfect boxes' were introduced which were foamed from inside for transporting fragile items ensuring their utmost safety (Exhibit 6).

This not only solved customer problems but also resulted in cost savings for the company. The thermo-sheet packing cost was just INR 2.5 compared to thermocol packing cost of INR 7 saving 200 trees annually. The perfect boxes were sealed with security stickers. The customer had to sign on the sticker after the packing process, which further enhanced the customer's trust in the company.

Samples were distributed among different branches for testing so as to know their suitability in practice. Testing was done for a period of 15 days in different geographical locations and with

goods of variable fragility level. Once the assessment was over all samples were evaluated and the best were selected. Also, some major modifications were made in the internal specifications based on the feedback obtained during testing process.

After finalization of container, a span of 20 days was fixed to replace all existing cartons used in packing.

Also, corner and side protection covers for cartons were used in order to strengthen them (Exhibit 6).

Requirement for filler Number of claims owing to the damage done to the clients' motorcycle fuel tank during transportation was rising. To address this, the most apparent solution was to use air-packed containers, which would act as fillers and provide support during transportation. However, they were expensive. Hence, APML had to think of an alternate solution which was cost effective too.

Finally, APML team came up with an innovative idea to collect used cement bags, clean them, fill them with grass and foam and then use them as filler. It provided a permanent and effective solution to the problem and the production cost was only around INR 5 per bag.

Requirement for wardrobe carton Special boxes called 'Coat Carriers' with pre-installed hanger were innovated (Exhibit 6). These were meant to benefit those customers who wanted certain clothing items such as a coat or a shirt to be transported unwrinkled at the destination for immediate use. The cost of a hanger for coat carrier was INR 130 and it was reusable.

Packaging of religious items APML faced a problem with some of its clients while packing their religious items. These clients were very sensitive and wanted their religious items to be dealt with utmost care. This was a matter of serious concern for APML team, who highly valued emotions of the clients.

After giving it a considerable thought, certain guidelines were laid down for packers to pack items of religious value. The packers were to first wash their hands and remove their shoes before entering the *pooja room*⁴ of the house. They were also given behavioural training for the same. Also, the carton containing religious idols and other items of worship was marked with a newly designed *Mandir*⁵ sticker (Exhibit 6). This sticker distinguished the particular carton from the other cartons. These cartons were the first to be packed in the packing list and were always the last to be placed inside the truck. The same procedure was then followed while unpacking the goods.

⁴ Room of the house used for worship

⁵ Temple

Potted plant carriers While APML were experts in relocating household goods, there were demands from some customers to also transport some of their potted plants, such as *Tulsi*,⁶ which held a high religious sentiment attached to them.

To satisfy the needs of such customers, APML customized its truck and fitted them with special potted plant carriers (Exhibit 6) at the bottom of the truck which could carry customer's plants safely and separately along with household goods. They were designed in such a manner that the plants got fixed at a place where they were open to air and sun and also the drivers were instructed to water the plants during their stoppages.

3. Managing Transport and Goods Storage Problems

Transportation cost had the highest share in the total cost of moving 1 BHK apartment at 40 per cent (Exhibit 5). Therefore, APML needed to device ways to cut down on the transportation cost.

Trans-shipment and storage problems APML used 24ft double door trucks to transport goods, which could normally carry goods of two customers. Although this was a very efficient system, trans-shipment was required in some cases. Agarwal believed that reducing trans-shipment was the key behind reducing damage to consignments. Also, there were certain situations where clients wanted their goods to be stored at APML premises for a few days. This period would allow the client to settle down in the new city. However, storing customer's goods meant that the trucks could not be used further, which meant loss of business. Hence, APML needed a solution to the problem of storage of goods as well as the problem of trans-shipment.

To address both these concerns, the company's R&D team after a month long discussion, came up with a cost-effective solution called 'Trucking Cubes' (Exhibit 6). Trucking cubes were independent units that could be easily latched on and unlatched off the trucks. These cubes could also be used as car carriers for customers who wished to have their car transported along with their goods. APML stored the customer's goods in them for 21 days at the destination without any additional charge. The cubes came in three sizes: 8 ft, 11ft, and 16ft. The client's goods were picked up at source through branch vehicle by either 20ft or 16ft trucks. These cubes were then collected at the nearest hub (Exhibit 2). The goods were next transported from the hub near to source to the destination hub via big 33ft trucks that could carry 4, 3, or 2 cubes depending on the size of the cube. APML was currently in the process of acquiring more of these cubes and 33ft trucks. The team analyzed that for efficient functioning of the truck-cube system, 5 cubes on an average per truck were needed. Since 6 cubes were needed per truck for 11ft cubes (3 for transit and 3 for storage) whereas 4 cubes were needed per truck for 16ft cubes (2 for transit and 2 for storage), an average of 5 cubes was required for a single truck operation. While

⁶ Basil

33ft trucks would be purchased, the 20ft and 16ft trucks would be acquired by modifying the existing trucks in order to make them suitable to carry trucking cubes. They had 46 trucks and 100 cubes, and at the rate of introducing 50 new cubes per month, they aspired to reach their target of 1,000 cubes and 200 trucks.

Trucking cubes also helped to reduce cost in the long term. Agarwal mentioned that trucking cubes reduced the overall operating cost by 18-20 per cent, including 20 per cent annual fuel savings (volume in litres). The cost savings included toll tax savings and fuel (diesel) savings because the new 33ft trucks incurred only half of the toll tax and consumed half of the fuel (diesel) compared to the 40ft trucks earlier used as car carriers. Cost saving was also due to the fact that, with effectively 3 cubes attached to a truck, a single truck was doing the work of 3 individual trucks used earlier, thereby reducing the transportation cost to one-third of the previous value. The total investment on trucking cubes was around INR 400 million with breakup as INR 110–120 million on cubes, INR 210 million on trucks, and INR 60 million on secondary trucks (around 80 secondary trucks). The cost of an individual truck was around INR 1.1 million which included a customization cost of INR 0.1 million.

Thefts on highways There were many cases of thefts on highways in certain areas such as Madhya Pradesh where some groups were involved in thefts even on moving vehicles. APML had to think of a solution to curtail these thefts.

In order to counter these thefts, the carriers were fitted with a separate top and bottom lock which would make thefts very difficult. This customization was done at body shop located in Ghaziabad, Uttar Pradesh, India. Total cost of customization was around INR 400 which included bolt charges of INR 100, labour charges of INR 100, and sheet charges of INR 200.

Also, ‘lashing belts’ were used at the back of trucks in order to securely hold the goods and prevent any accident to the worker while unloading. While the cost of each belt was INR 90, there were 12 belts required for a single truck making the total customization cost for a single truck to be INR 1,080.

Driver exhaustion and lack of motivation According to Agarwal, truck driver was the driving force behind the country’s economy. However, truck driver’s job was not considered respectable in India; hence very few second and third generation youth considered it as a career option. As a result, there were only 770 drivers per 1,000 trucks.

To boost the morale of drivers in APML, Agarwal launched a scheme called ‘*Khub Chalao Khub Kamao*’ meaning ‘Drive More, Earn More.’ Under this scheme, drivers were given incentive to drive more by paying them extra for every kilometre driven.

However, this scheme led to use of increased speed by the drivers, damaging the consignments. Further, the scheme also incentivized more driving hours per day, leading to driver sleep deprivation and accidents. To arrest this situation, APML had to think of a more innovative

solution, which would not only increase the performance level of drivers but also boost safe driving practices.

Keeping in mind the safety concern, a modified '*Khub Chalao Khub Kamao*' scheme was launched. It proposed that the driver could recruit a co-driver to drive with him. Incentives were given based on the number of hours for which a truck was driven rather than the distance travelled. The time driven by the truck was monitored using a Global Positioning System (GPS) device, which also checked the speed of truck and ensured that drivers do not increase their speed above 50kmph. Under this scheme, while APML paid INR 2 per km driven to drivers, in case of driving for more than 15 hours, additional incentive of INR 15,200 was awarded (this was to be shared between the two drivers). This scheme not only ensured that output of each truck was doubled (because the truck now ran for double the time by two drivers as compared to a single driver) but also reduced the problem of highway thefts, as there was more vigilance in the presence of two drivers as compared to one.

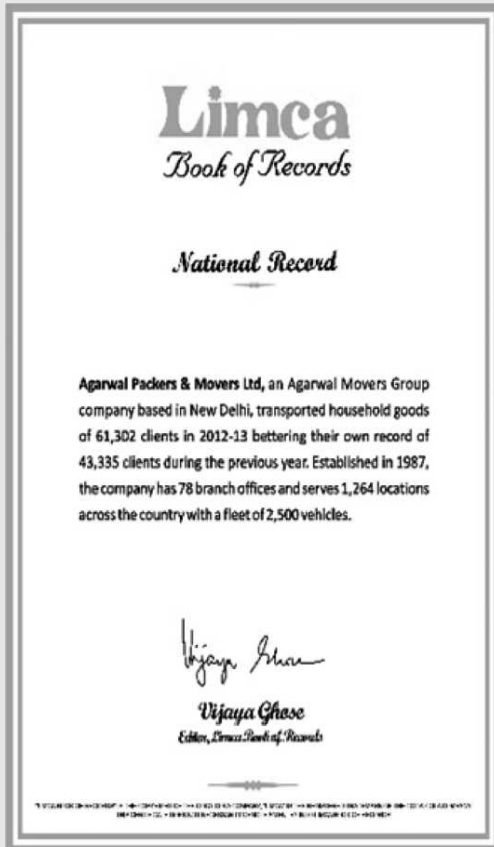
Looking Back

APML had always taken customer feedback constructively and used it to modify and enhance their existing service resulting in decrease in the cost incurred by the customer and therefore customers' delight. Agarwal wondered whether the existing processes for implementing innovative solutions were sufficient for APML to remain a domestic location leader.

EXHIBIT 1

APML Awards

Limca Book of Records Certificate



ISO 39001:2012 Certificate



Source: Company Records

EXHIBIT 2

Warehouse Details and Location of Hubs and Warehouses

Every warehouse has a similar structure:

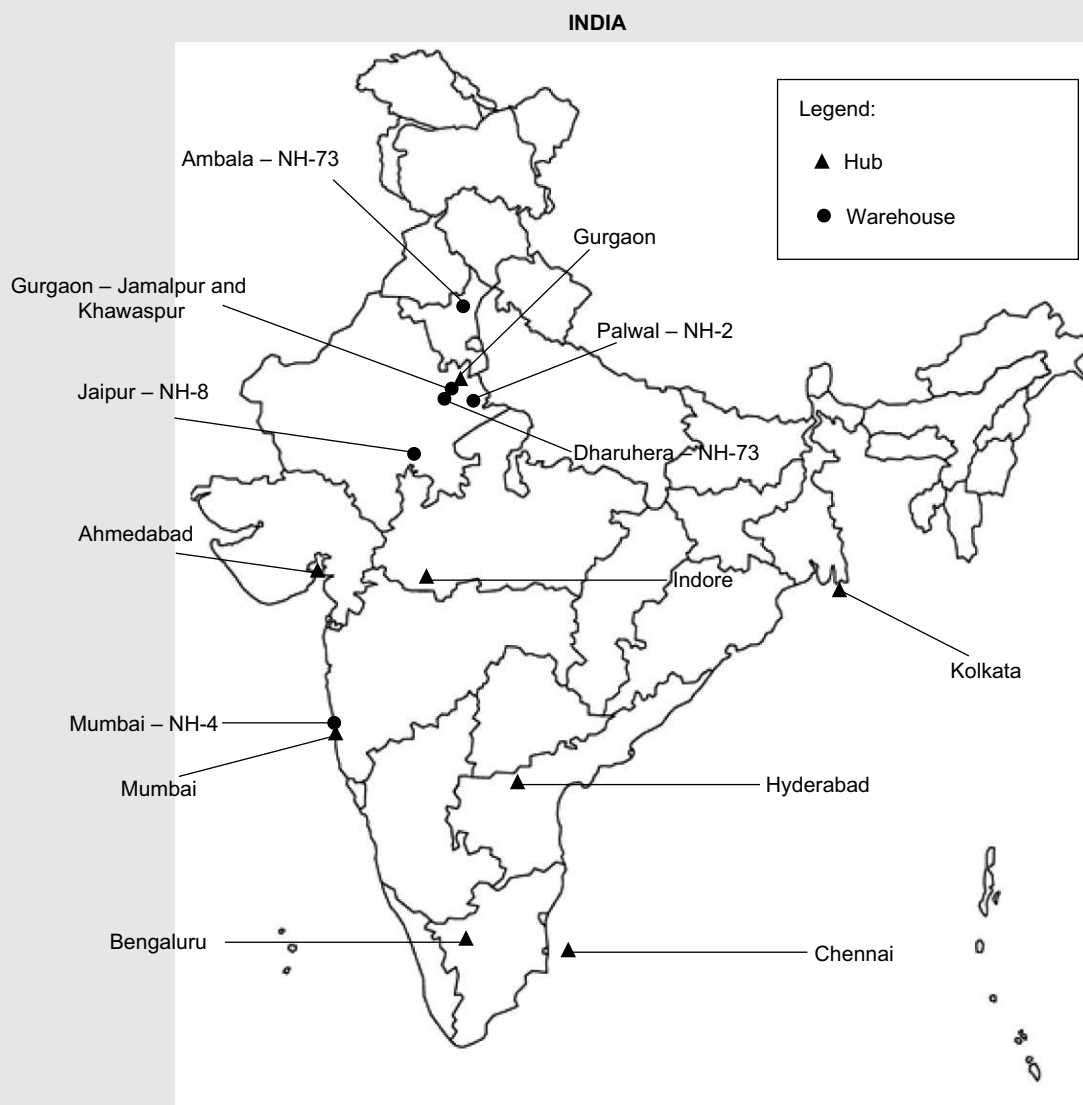
Basement: Industrial Storage

Ground Floor: Short Term/Transit Storage

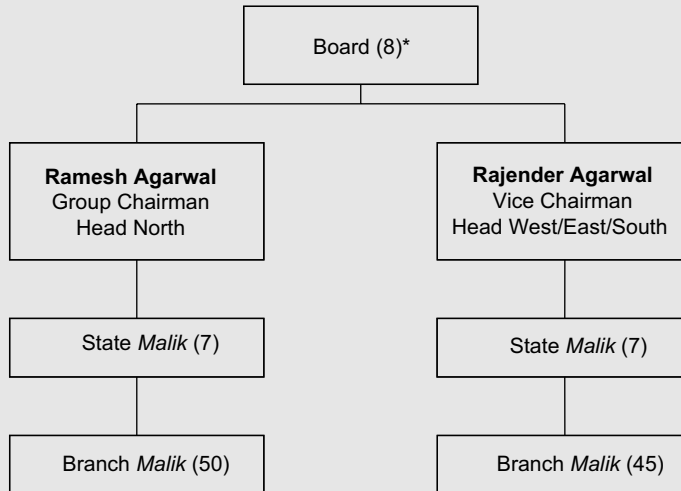
First Floor: Long Term Storage

Second Floor: Complimentary residential facility for warehouse workers

Map showing location of completed warehouses and hubs



Source: Company Records

EXHIBIT 3**Organizational Structure**

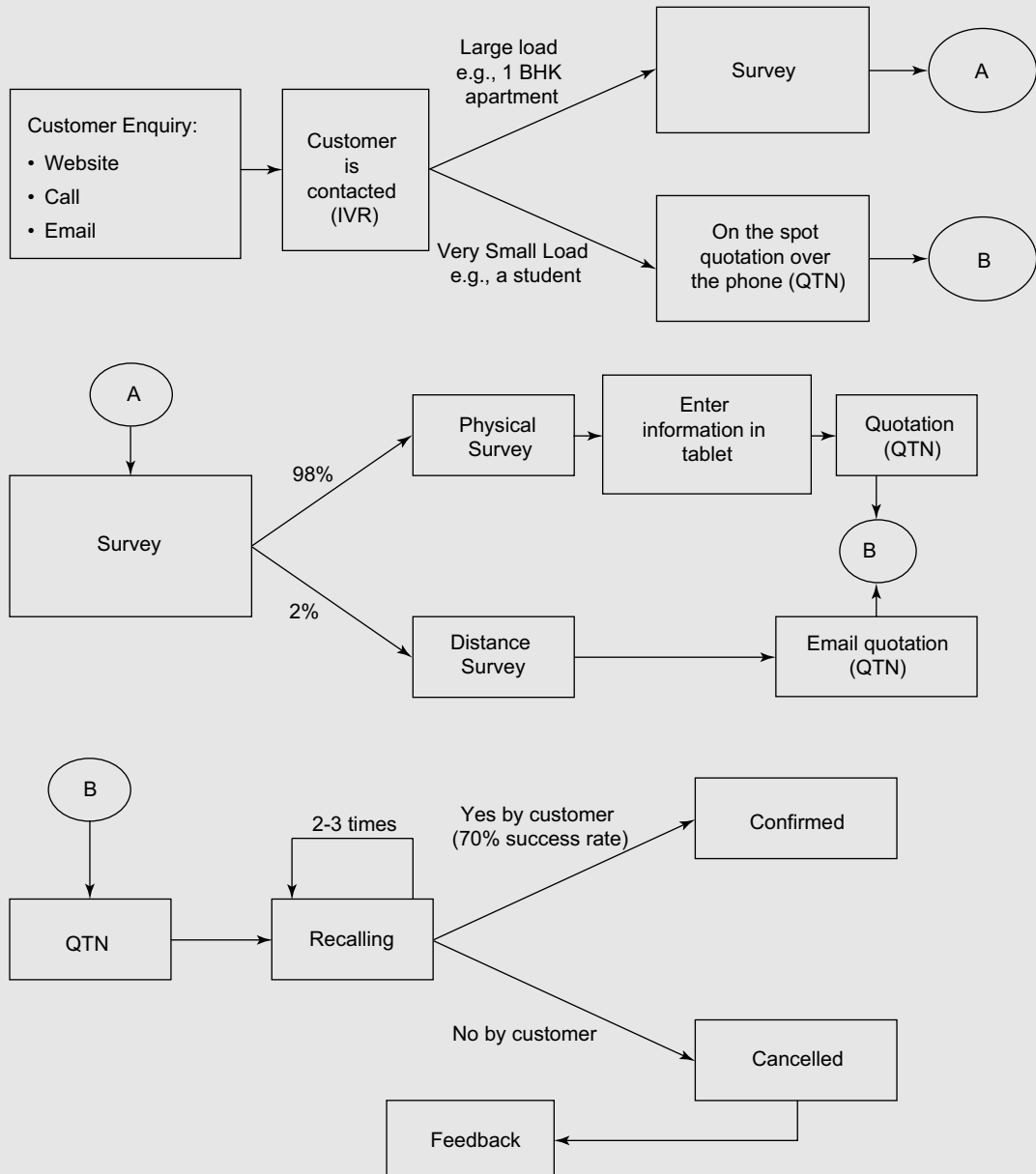
*Number in parenthesis indicates the total number of employees in that division

Source: On the basis of interview

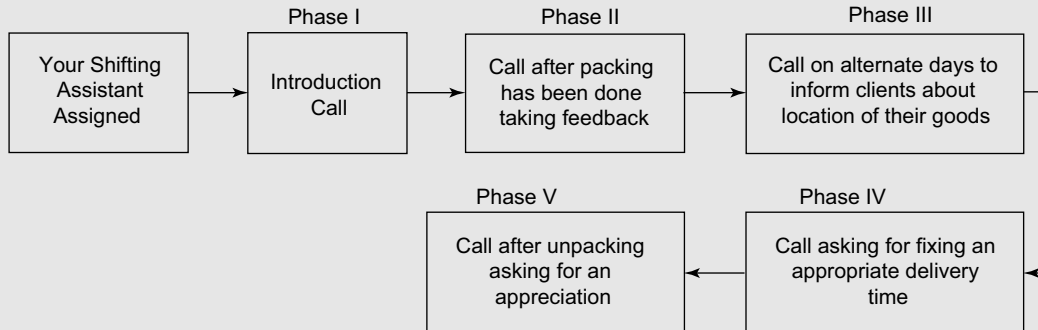
EXHIBIT 4

Domestic Relocation Process of APML

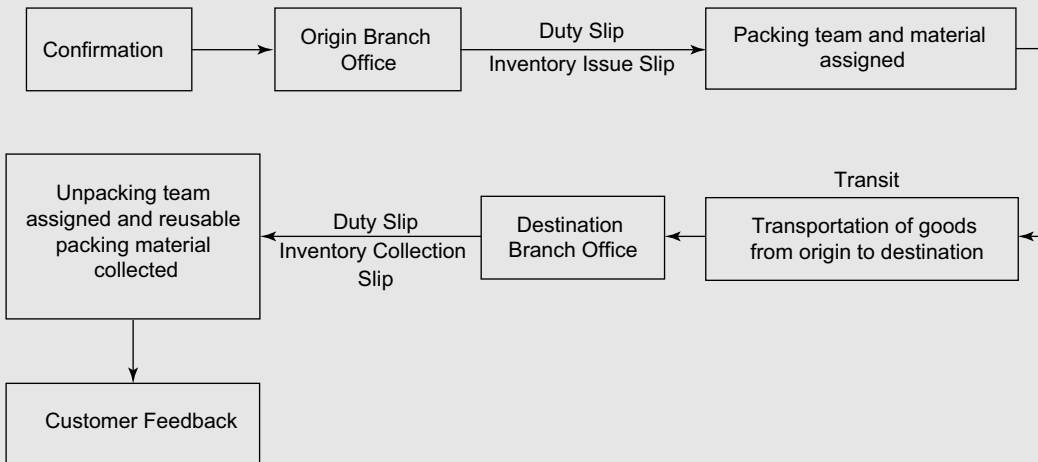
Confirmation Process



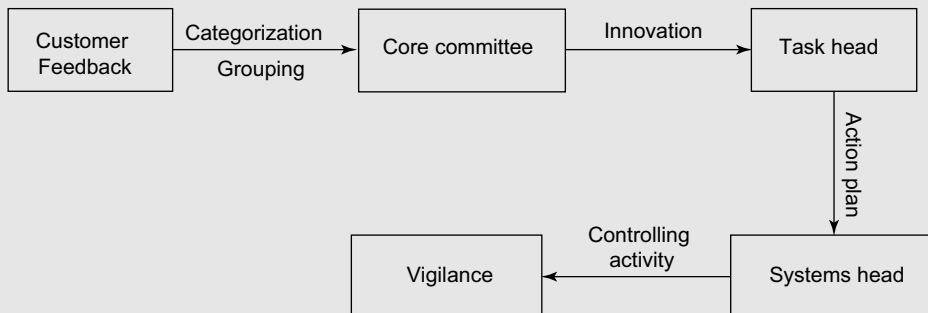
Hospitality Process



Operations Process



Service Innovation Process and Implementation



Source: On the basis of interview

EXHIBIT 5

Cost Breakup of Relocation Process

Cost share in movement of 1 BHK apartment from Delhi to Ahmedabad:

Packaging cost: 16%

Transportation cost: 40%

Labour cost: 10%

Overhead cost (Your shifting assistant, supervision and other): 7%

FOV (Risk cover charge): 1%–3%

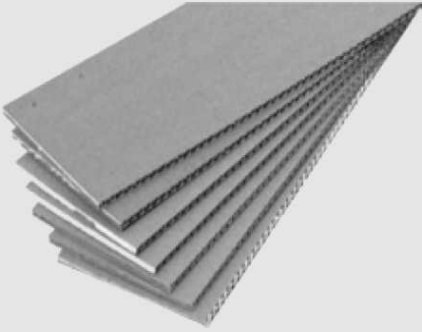



Surplus charges: 10%

Remaining cost share which is around 12.5% accounts for the company profit.

Source: On the basis of interview

EXHIBIT 6

Service Innovations

Before Innovation	After Innovation
<p>Corrugated Sheets</p> 	<p>Fabric Sheets</p> 
<p>Wooden Crate</p> 	<p>LED TV Box</p> 

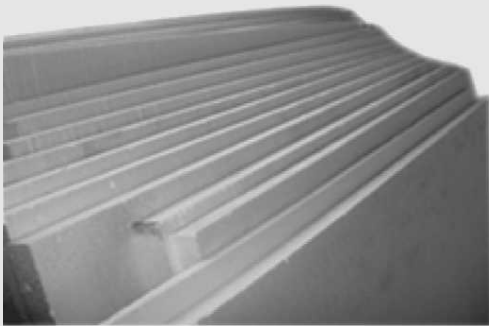
Corrugated Box



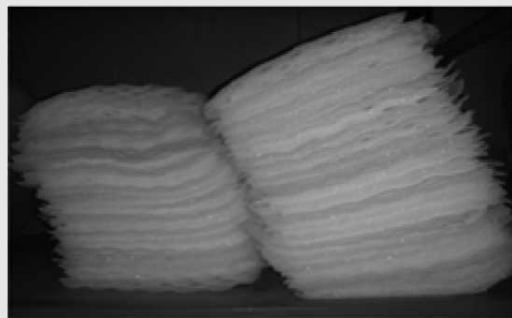
Perfect Box



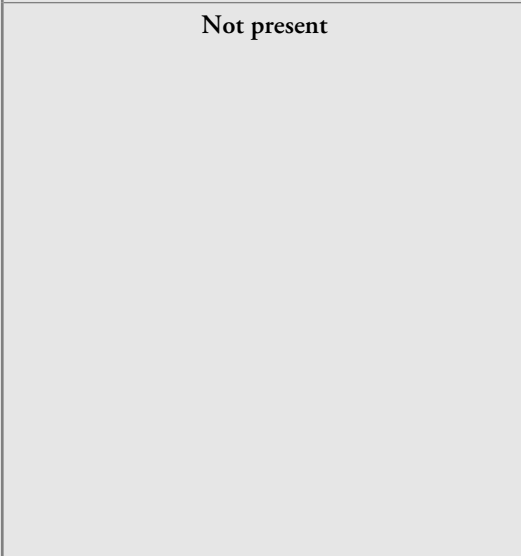
Thermocol



Thermo-sheet



Not present



Corner Protection Cover



(Contd.)

<p>Cartons</p> 	<p>Trendy Bags</p> 
<p>Not present</p>	<p>Coat Carrier</p> 
<p>Not present</p>	<p>Mandir Sticker</p> 

Not Present

Potted Plant Carriers



Single Door Truck



Double Door Truck with Front and Back Door



Not Present

Trucking Cubes



SUGGESTED QUESTIONS

1. How is Agarwal Packers and Movers Limited (APML) able to bring innovation into its services to meet customer demands without increasing packaging cost and customer freight rate?
2. How are these innovations sustained in a large organization with many branches across India?
3. How far does the organizational structure of APML help in implementing innovative solutions?
4. What is the operating strategy adopted by APML which enables it to innovate and incorporate the process of total quality management (TQM) in its operations?
5. How APML is different from other companies providing domestic relocation services?

APPROACH FOR ANALYSIS

The innovation process at APML was based on an analysis of customer feedback. The company ensured that the new process or product did not burden the customer in terms of increased freight. Given the pace of innovations at APML and its mission to provide standard services across its branches, it was critical to sustain the innovations with zero tolerance for deviations. To ensure process standardization, APML had listed down the processes and procedures in a rule book. The standard operating procedures had clearly listed the roles and responsibilities of all employees, which enabled effective implementation of new service innovations. The motivational and behavioural training imparted to its employees also helped in maintaining their process discipline and execution. Further, the human resources team ensured that employee performance measures and incentives were aligned to the process performance metrics.

APML had an organizational structure that had instilled a sense of ownership among all its employees. They could relate to the innovations and were keen to implement these because they had participated in the early phases of implementation by providing feedback. To add to the sense of participation and involvement, the employees were provided a share in the profit of the organization, thereby encouraging them to work efficiently.

The operating strategy of APML focused on the participatory involvement of each and every employee in the innovation process, irrespective of their level. This helped it to implement

TQM which is a method by which the management and employees can be involved in the process of continuous improvement in production of goods and services.

Due to its integrated and standardized relocation logistics processes (no transfer of goods to a third-party from pick-up to delivery), APML was able to effectively adopt customer feedback while improving its processes. It evaluated the quality of services by collecting feedback at various stages of the relocation process. A root cause analysis of new complaints/ feedback registered by customers resulted in innovations, leading to improved services and processes. Also, to provide distinguished services, APML set up an exclusive customer care department to deal with customer queries, complaints and claims.

Case

4

CASE CONTEXT

Shreeji Transport Services Private Limited (SHREEJI) was a family-owned trucking business, engaged in providing a range of transport and logistics services. SHREEJI was in the process of improving its business operations including routewise profitability, performance levels of the parcel business and the incentive scheme. For this purpose, it was looking to develop a Management Information System (MIS). This case focuses on the design and role of the MIS to address the above-mentioned problems and highlights the role of spreadsheets as a business modelling and a scenario-generating tool.

Shreeji Transport Services Private Limited

It was Wednesday, August 7, 2013. Mitesh Shah, Vice President, Parcel Business and Harshal Shah, Chief Executive Officer, Full Truck Load (FTL) and Bonded Trucking (BT) business of Shreeji Transport Services (SHREEJI) Private Limited, were in a meeting with V. Kannan, Vice President, Metis Family Office (METIS) at SHREEJI's office in Chennai. Bipin Shah (father of Mitesh Shah and Harshal Shah), Chairman and Managing Director, SHREEJI; along with other family members who worked as Directors of the company were also in the meeting.

METIS had been helping SHREEJI to examine its overall strategy by developing Management Information Systems (MIS) that helped in the analysis of the business. Such analysis had enabled the company to review its focus on what was perceived to be a highly profitable BT business. It had given pointers on the cost economics being in favor of hired trucks over owned trucks. It had also helped them to time the acquisition of trucks based on business potential rather than just the price discounts.

The representatives of SHREEJI had scheduled the meeting for the assessment of the overall performance of the company for the quarter ended June 2013. Among a larger agenda, the focus area of the meeting was to analyze the routewise profitability of the FTL business, service performance of the parcel business and incentive schemes for truck drivers.

HISTORY OF THE BUSINESS

SHREEJI began as Kumar Transport Company (KTC). It was started by Bipin Shah's father, Chhabildas Shah and his two brothers, Manubhai Shah and Virendra Kumar Shah. In 1967, KTC purchased its first two trucks. Later in 1976, the company's name was changed to Rakesh Roadlines. The name was again changed to Rakesh Bajwa Roadlines in 1977 after the addition of two new partners, Bhajan Singh Bajwa and Jaswant Singh Bajwa. They brought in 20 trucks owned by them.

In 1983, Chhabildas Shah, his brother Manubhai Shah, and the family's second generation members (Exhibit 1) started Shreeji Transport Corporation (STC) with sole focus on parcel

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services. The company catered to the clients with garments manufacturing business in Mumbai and their customer base in the southern parts of the country. Consequently, STC focused on the Mumbai to Bengaluru and Chennai route in the early years. In the beginning of its business, STC used half-bodied trucks. But by early 1990s, it shifted to the use of full-bodied trucks as safety of the consignments became a priority service for the company. It also provided door-to-door delivery of the consignments on a milk run basis.

Later, in 1984, the second generation members of the Shah family formed Bangalore Roadways with focus on truck brokerage business. Working as a truck-brokering firm, it earned revenues as commission for hiring trucks for its clients on NH-4 which linked Mumbai, Pune, Bengaluru, and Chennai.

In 1994, the company was incorporated as SHREEJI. It was a family-run business with Bipin Shah, his brothers and extended family members in the key decision-making roles. Its wide geographic network along with key customer relationships (built by its history of brokerage) helped the company venture into FTL business. While the share of FTL in the company's overall business was high, the company moved to potentially more profitable segments given that the competition in FTL business was increasing in Southern India. In 2000, the company started using containerized full-body trucks for both FTL and parcel businesses. With this, the total cost of trucks increased by 20 per cent. However, SHREEJI were compensated by a 150 per cent rise in the capacity of the trucks. In 2001, SHREEJI introduced global positioning system on its trucks for real-time tracking of vehicle movement.

The company's most recent venture was in 2002 when it pioneered the BT business. (This business involved carrying export/import cargo of various international airlines to/from the airline-serviced airport from/to other airports having air cargo complexes to serve a larger customer base. The transportation happened in sealed custom-bonded trucks, with customs clearance happening at the air cargo complexes.) Since the concept was relatively new in India, the company called it a 'path breaking move'. SHREEJI initially operated with international airlines on a trial basis and then regularized with both international and domestic airlines.

In 2008, SHREEJI invested in bus services. However, the services were discontinued in 2012 as the operations were found to be unviable and it involved dealing with human lives.

Details of the various services provided by SHREEJI are given in Exhibit 2.

METIS FAMILY OFFICE

METIS was a business advisor to family-run businesses, and managed the assets of these business families and the individuals. The company worked on the principle of "Mentoring Entrepreneurs to Innovate and Succeed" to facilitate effective decision-making in these businesses. Its vision was to be the best, unique and unbiased business advisor to help mid-sized family-run businesses achieve their corporate and individual goals.

METIS was founded by Suresh Ramanujam and I.A.S. Balamurugan who worked in the capacities of Directors of the company. Both of them had been senior bankers who had spent many years with leading banks in corporate finance, commercial banking, investment banking and private wealth management. Meanwhile, Kannan worked with the finance segment of the company. He had been a senior business and corporate finance professional with over 20 years of experience and worked with various mid-sized companies.

Suresh Ramanujam was associated as a banker with the Shreeji family. He offered that METIS could become their business advisors. SHREEJI also thought that it was the right time to avail METIS services as they felt it would be of value to them to reach the next level of growth. In June 2011, SHREEJI became one of the early clients of METIS.

START OF THE METIS ENGAGEMENT

After the first session between METIS and SHREEJI in August 2011, METIS inferred some 'positives and concerns' regarding the overall business of SHREEJI. METIS analyzed the situation and came up with recommendations for the company. It also suggested the domains it would focus on during its affiliation with SHREEJI. The following is based on a presentation made by METIS to SHREEJI.

Positives of Business

- ❑ Good diversification between own and hired fleet.
- ❑ Topline growth at a CAGR of 15 per cent from 2006 till 2011.
- ❑ Profit after tax growth at a CAGR of 22 per cent from 2006 till 2011.
- ❑ Return on capital employed improved from 14 per cent in 2006 to 18 per cent in 2011.
- ❑ Net worth of SHREEJI grew at a CAGR of 26 per cent from 2006 till 2011.
- ❑ More than 25 per cent of SHREEJI's vehicles were debt free.

Concerns for Business

- ❑ Receivables increased from 77 days in 2006 to 90 days in 2011.
- ❑ Few major routes were operating with negative margins.
- ❑ Idle capacity to the extent of 15 per cent for various reasons. It remains as a cost with scope to improve profitability.

Recommendations and Analysis

- ❑ Develop a standard cost model for major routes to understand the profitability of each route, profitability gap between onward and return trips to get price increases wherever imperative, and to evolve an optimal route mix.

- ❑ Track the distance covered by each vehicle tripwise, to know the exact capacity utilization and productivity. Set up targets vehiclewise in terms of distance (in kilometres), revenue and profitability.
- ❑ Build a driver incentive scheme with the dual objective of profitability and capacity utilization. Develop a flexible template for the incentive scheme to improve the kilometre efficiency of the vehicles.
- ❑ Test run new vehicle models with one or two vehicles only to avoid high operating cost and drivers' reluctance towards new models. (It had been observed that 2008 model vehicles were being sold due to high operating cost as early as in 2011 itself.)
- ❑ Carefully plan the proposed purchase of vehicles for INR 110 million, as it involved additional equated monthly installment (EMI) payments of INR 3 million in addition to the current monthly debt payments of INR 5.7 million.
- ❑ Reduce the administrative overheads from the current 9 per cent of turnover to 7 per cent of turnover.

Focus for Future

- ❑ Segmentwise profitability of the businesses of SHREEJI (FTL, Parcel, BT, third party logistics (3PL) & import-export (IM-EX)).
- ❑ Route network optimization for improving profitability.
- ❑ Interest cost reduction through strategic financing.
- ❑ Analysis of administrative overheads towards cost reduction.

CHANGE IN THE SYSTEMS OF SHREEJI

Prior to its association with METIS, SHREEJI operated with all its members working in their own locations. This meant that each family member focused on the business in his geography and took decisions based on the company's requirements in that particular region. This resulted in truck acquisitions that were more than the requirement and higher expenses that outweighed the returns from geographical expansion. As one of the initial recommendations, METIS devised an organizational chart based on the capabilities of different members and provided functional clarity in the business based on individual interests. As a result, functional and business responsibilities were given to each of the members, as shown in Exhibit 3. For example, Mahendra Shah had marketing and client relationship responsibilities for SHREEJI, while also being responsible for FTL business. Harshal Shah had similar responsibilities like Mahendra Shah and dealt with marketing and FTL business of SHREEJI. Similarly, Rajnikant Shah had finance, accounts and software related responsibilities, while Mitesh Shah handled the parcel business and shared functional responsibilities with Rajnikant Shah. The family members continued to operate from their respective locations.

METIS helped SHREEJI in implementing MIS which reduced managerial workload and led to a centralized information sharing platform. During this time, SHREEJI used enterprise resource planning (ERP) enabled systems to monitor and manage office procedures and on-road operations. With the help of MIS, METIS suggested to SHREEJI to track the distance covered by each vehicle through kilometre reading. METIS found that while SHREEJI did not take into account the cost involved in the repair and maintenance of the idle and moving trucks, only the revenues from the trips were used for financial calculations. METIS suggested that SHREEJI should look at its overall profits rather than its standalone revenues. For this, the accounts (revenues and expenses) of each of its businesses were combined and SHREEJI focused on increasing the profitability of each segment through the use of MIS data. For instance, the BT business was profitable in the initial days of the venture. However, with time, the overhead expenses increased more than the rewards from the business. As these overhead expenses were included in the total expenses of the company, the high cost of running BT business was not isolated and therefore, not known to the company. Thus, after METIS' analysis, it was observed that the BT segment of SHREEJI's business was actually lower in profitability than expected.

Further, METIS suggested that SHREEJI should increase its presence in the new areas with lower competition and focus on the more profitable customers. METIS used ABC framework for classification of the customers, and recommended to SHREEJI that it should use this analysis to improve its customer service.

METIS also advised SHREEJI on the ratio of hired to own trucks to be maintained by the company. SHREEJI had a fleet with over 70 per cent of its own trucks and the rest were hired. It was continuously buying new vehicles for geographical expansion. Since, the ratio of owned trucks was higher in the company, the cost associated with the repair and maintenance of these vehicles was also high. Consequently, though SHREEJI had high revenues, its profitability remained low. METIS advised that SHREEJI should increase the number of hired trucks as compared to its own trucks. SHREEJI was, however, concerned that it might lose those customers who relied on SHREEJI for vehicles owned by it. The customers believed that such vehicles were more reliable.

Along with this, METIS worked on the timing of acquisition of new trucks and the sale of old ones. Prior to the association with METIS, SHREEJI bought trucks on the basis of the discounts available in the market, irrespective of their demand and use in the business. However, METIS pointed out that as a consequence, the company had to resort to selling trucks earlier due to underutilization. It also devised an incentive scheme to encourage the drivers to drive the old vehicles. Further, METIS advised that the strategy of buying new trucks be restricted by way of buying them subject to the proper evaluation of business opportunities.

Exhibit 4 gives the key financial indicators of SHREEJI until 2012-13.

PREPARATIONS FOR AUGUST 2013 MEETING

Routewise Profitability

This analysis was attempted in the FTL business, which contributed to more than 60% of the revenue. Earlier, the company viewed longer routes as being more profitable since they provided higher vehicle utilization. This was because the loading and unloading time to total time was low. Further, due to the growth in the business, SHREEJI believed that empty trips would not be a concern. All this led to the business focusing on longer one way trips, rather than on a route (to and from trips).

METIS however felt that an analysis of routewise profitability through MIS would help SHREEJI to confirm their views. They used one month's data of 772 trips for the analysis (Exhibit 5). Of these, 611 trips on seven (to and fro) routes were analyzed for profitability. The remaining 161 routes were both loaded and empty to keep the vehicle balance over the month.

They obtained tripwise data on the distance, rate, and variable cost (including route advance and repairs & maintenance). Based on the EMI and other expenses incurred on a truck (irrespective of usage), total cost was calculated to arrive at a fixed cost per vehicle per month which was INR 60,615. Based on this, the contribution per km was calculated and the breakeven kms were arrived at. This gave an insight into the relative profitability of the various trips. It challenged the belief that longer routes were more profitable. For example, the Chennai-Bengaluru trips had traditionally received a lower priority than the Chennai-Mumbai trips due to their shorter length while the MIS showed otherwise. This analysis did not include the opportunity cost of the loading and unloading time, which could vary from half a day to one day.

METIS also attempted an analysis of routes (to and fro trips) to examine if there should be a routewise marketing and/or asset allocation focus. As an example, out of the revenue earning trips on the Chennai-Mumbai route, 73 per cent were from Chennai to Mumbai and 27 per cent were from Mumbai to Chennai. Using this relative share, they analyzed the route parameters under the 'Combined' column. Based on the route parameters, they generated the breakeven first for the round trips (4.26), and then for the to and fro trips. Mitesh and Harshal were unsure as to how to interpret the 6.19 and 2.34 as the 'breakeven' trips for the Chennai-Mumbai and Mumbai-Chennai routes respectively.

While there was an attempt by SHREEJI to minimize empty trips, the Cochin-Chennai segment inherently did not provide the opportunity. Out of the 24 per cent of the Cochin-Chennai trips, only one in four had a return load at a rate of INR 16,800 (INR 24 per km). The Cochin-Chennai rate was low since there was not as much outbound demand as inbound demand. The MIS consequently recognized this as INR 6.00 per km. The same was also true for the route advance which was INR 7.10 per km for the empty trips and INR 14.14 per km for the loaded trip, giving an average of INR 8.86 per km.

While SHREEJI generally felt that in most of the destinations, a loaded trip to some other destination would be available, Cochin did not always offer such opportunities. Hence there were empty trips from Cochin to Chennai. Rupesh and Harshal wondered how to improve the profitability of this route by seeking higher rates from Chennai to Cochin on the premise that the return could be empty. On the other hand, they wanted the least rate they could charge from Cochin to Chennai to increase their demand and yet get a positive contribution. Given the competition in Chennai, in case they could not get rates higher than the current INR 38.57 per km, how much should they charge at Cochin to make the to and fro route viable?

An organizational issue was whether SHREEJI should open a branch office in Cochin to develop a market for loads to Chennai.

Performance of the Parcel Business

The parcel business was an early aspect of the growth of SHREEJI and contributed to nearly 10 per cent of their revenue. In order to focus on this business, Mitesh Shah had started setting yearly targets which were broken down by customer and month. The idea was to focus on those customers who were more profitable. However, the current MIS did not help them to analyze the margin profile of C and D type of customers, as they could only get the aggregate revenue generated from their clients. It was possible that some of these customers could be giving a high margin, despite low revenues. SHREEJI also needed to monitor those customers who had not given their business to it in the recent past. Driven by the need to reduce delivery times, SHREEJI had earlier felt that it was good to have the trucks moving as soon as they were loaded. In the past, this had led to shipments for Chennai and Bengaluru to be clubbed together in the same truck. Trans-shipment then happened at Bengaluru. However, recognizing the additional cost of trans-shipment associated with this method and given more than adequate volumes to cover both Chennai and Bengaluru separately, this practice had been discontinued. For instance, SHREEJI had reduced the number of average delivery days from 8.16 days in April 2012 to 5.90 days in March 2013. It had also introduced a 'bakshish' system in which the workers were rewarded for faster delivery of parcels.

SHREEJI did not monitor the delivery time of parcels. It was trying to gather data on the details of hub to hub operations. Currently, SHREEJI monitored the total delivery time, but was wondering whether it should disaggregate it.

The company kept records of the customer name, origin, destination, date, time, type of consignment, etc., at their collection centers. The goods were then loaded by destination and a Lorry Receipt (LR) was generated. The originating centre dispatched these details to the destination electronically. At the destination, the truck arrived at SHREEJI warehouses, where it was unloaded. The unloaded articles were manually checked against the received information. SHREEJI generated a monthly report on the Number of Articles, Number of LRs, Total Revenues, Total Days Used and the Average Days of Delivery per Article (Exhibit 6). Although SHREEJI

had a computerized system of booking the parcels, it was unable to analyze by customer and track their performance, as the quality of data input was poor. For example, the same customer's name was stored differently by various data entry operators, the units associated with the parcel whether a bundle, billet or something else was not standard and variations existed. Mitesh was keen that SHREEJI should generate clientwise performance report which when shared with the client would let the client know regarding SHREEJI's on-time performance. He felt that this could help them to establish better credentials and improve the business.

Paiya Gumao, Paisa Kamao Scheme

METIS had suggested that SHREEJI should introduce an incentive scheme. Three options were proposed (Exhibit 7), out of which one was selected for implementation in September 2011. The scheme was called 'Paiya Gumao, Paisa Kamao' under which the drivers were entitled to cash payments for driving trucks over a distance of 7,000 km per month. Under the selected option, a flat incentive of INR 1,500 was given to all drivers who drove 7,000 km, above which there was an INR 1 per km incentive upto 9,000 km and INR 1.50 per km thereafter.

However, as seen in Exhibit 8, the old trucks were unable to cover a distance of 7,000 km every month and the drivers were less interested in these vehicles. In turn, the management thought of selling off the old vehicles as the cost of keeping the old trucks idle were high. However, there was also the consideration that the incentive scheme may need restructuring as per the age of the vehicle.

MEETING DETAILS

As the meeting proceeded, the following decisions were taken, based on various MIS inputs.

For studying the declining profitability of BT business, it was decided that the Directors of SHREEJI would meet in Bengaluru to discuss the performance of BT business and do a comparative study of the last three years.

It was decided that SHREEJI would focus on receivables older than 180 days in all branches, but with a greater focus on Bengaluru. The receivables above 180 days in Bengaluru were high at around INR 7.5 million.

On the reporting front, it was decided that reports of the performance of the company would be sent to the clients on a monthly basis. This would allow SHREEJI to improve its prominence amongst the new clients it added while maintaining a strong position amongst its old clients.

Looking at the benefits from the MIS, SHREEJI had decided that the format would be made accessible to all the Directors. This would allow use of the data for effective results across business segments.

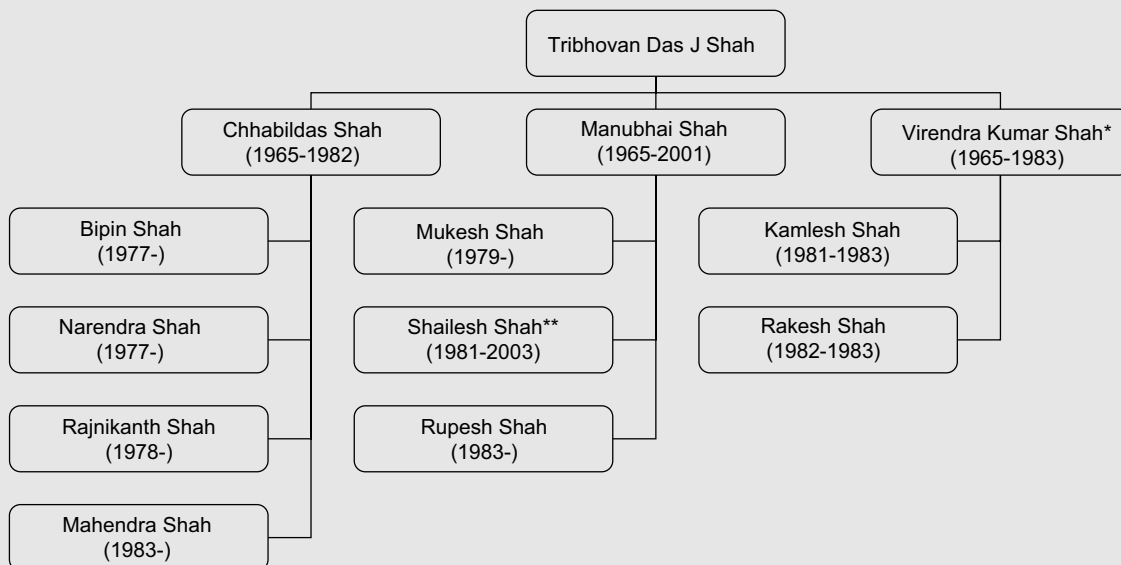
Further, in order to attain its target of reaching a gross profit of INR 200 million, SHREEJI would set up monthly targets, while METIS would regularly monitor the turnover and gross profits on a quarterly and monthly basis.

New routes would be added to the MIS and their various combinations would be studied in order to analyze profitability of the FTL trucks.

For the parcel business, the cost elements would be reworked under METIS's guidance to establish the precise profitability of the business. The discussion was still continuing...

EXHIBIT 1

SHREEJI's Family Tree



Note: The dates in parentheses denote the year of joining and exiting the business of the family members.

* Virendra Shah and his family separated from the family-run business in 1983.

** Shailesh Shah moved out of SHREEJI in 2003 to start his own business.

Source: SHREEJI Communication

EXHIBIT 2

SHREEJI's Services

Full Truck Load (FTL) services

- It moved around 1,500 trucks and 500 containers between inland container depots in ports with de-stuffing points on a monthly basis.
- It offered leasing services to the companies on either monthly or trip basis from all its regional offices.
- The fleet consisted of full-body, half-body, platforms, trailers and containers ranging between 17-40 feet.
- The company followed a time-bound delivery to suit individual requirements of its clients.
- It also used Digi m-Track; a web based fleet management solution for information on real-time vehicle location, and duration and location of stops.

Parcel and Part-Load Services

- The company provided door delivery of parcels on a daily basis from Mumbai, Vapi, and Surat to Bengaluru and Chennai.
- The GPS-enabled trucks of the company allowed the customers to track their consignments on a real-time basis.

- It started 'Express Parcel Bakshish', an incentive to the truckers for long haulage routes to reach in specified time. The scheme helped SHREEJI to increase the volume of parcels by 20 per cent.
- The company branched out to new routes in parcel service i.e., Indore, Ahmedabad, and Madurai.
- For these new routes, the company used 'Hub & Spoke Model' where in all the cargo was moved to SHREEJI's hub near Mumbai from where the material was moved in trucks to South India.

Parcel Division	2012-2013
Origin	3
Destinations	4
Total Routes	11

Source: SHREEJI Communication

Bonded Trucking (BT)

- SHREEJI ventured into the new area of BT business in 2002.
- The company started with Bengaluru and served around nine airports as well as 25 airlines. It worked with the air cargo complexes in Chennai, Mumbai, Hyderabad, Cochin, Coimbatore, Ahmedabad, Indore and Delhi.
- As a custom bonded trucking solution provider, it handled export and import cargo of various international airlines from many air cargo complexes.
- SHREEJI used standard size container trucks for regular transport.
- In case of cargo dimensions larger than normal truck size, SHREEJI was flexible and made possible special arrangements to transport the same.
- With such a solution, the company reduced its freight charges as compared to the movement of cargo by domestic flights.

Warehousing and 3PL

- SHREEJI offered this facility in and around Mumbai, Bengaluru and Chennai. Further, the services were extended to other centers as well as per its clients' requirements.
- It also inter-linked its offices with ERP software, MIS reports and inventory applications for information access to the customers and consignment-handling employees.
- It followed the 'First in First out' system enabling circulation and distribution of goods in accordance with their expiry dates, especially for pharmaceuticals and FMCG industry.

Shipping Line Container Movement (IM-EX)

- SHREEJI connected the ports with the rail segments for containerized freight movement. This kind of specialized trucking runs between ocean ports, rail terminals, container freight stations and inland container depots.
- It catered to both export and import of containers with a length of 20 feet and 40 feet.
- On an average, SHREEJI moved more than 6000 container loads per annum.

SHREEJI's Background (2012-13)

Turnover (INR in million)	680
Number of Employees	250
Number of Drivers	200
Number of Branches	25

Source: SHREEJI Communication

(Contd.)

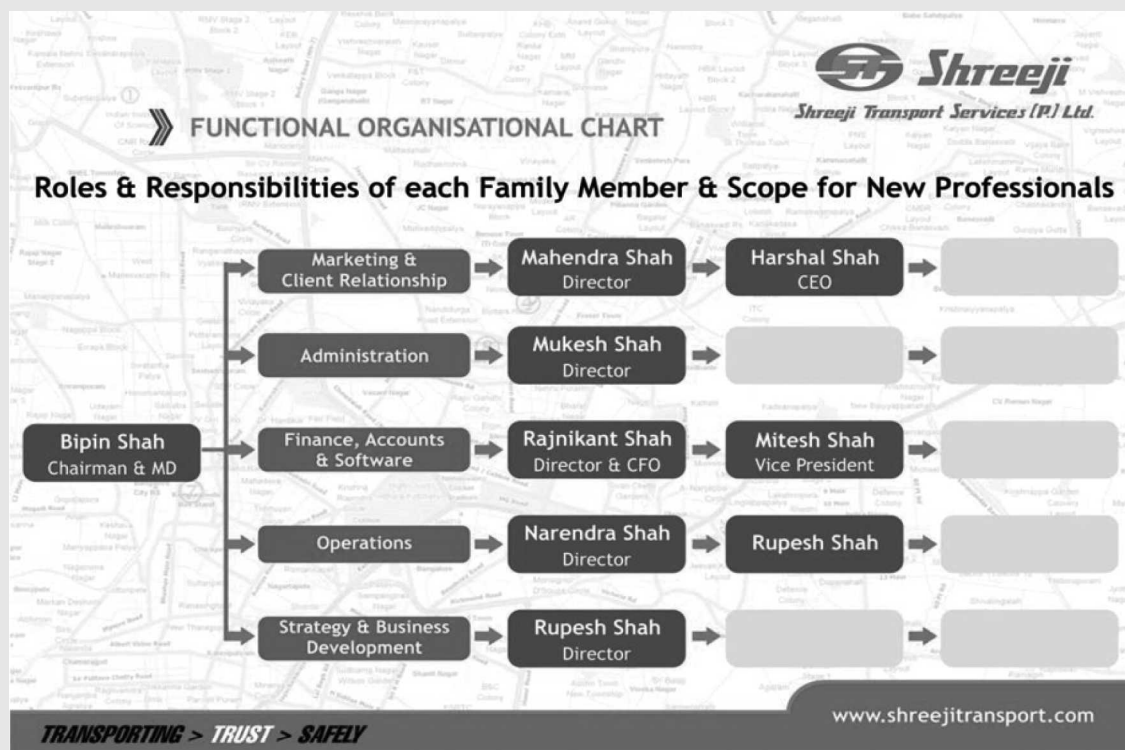
SHREEJI's Fleet Strength (as March 31, 2013)

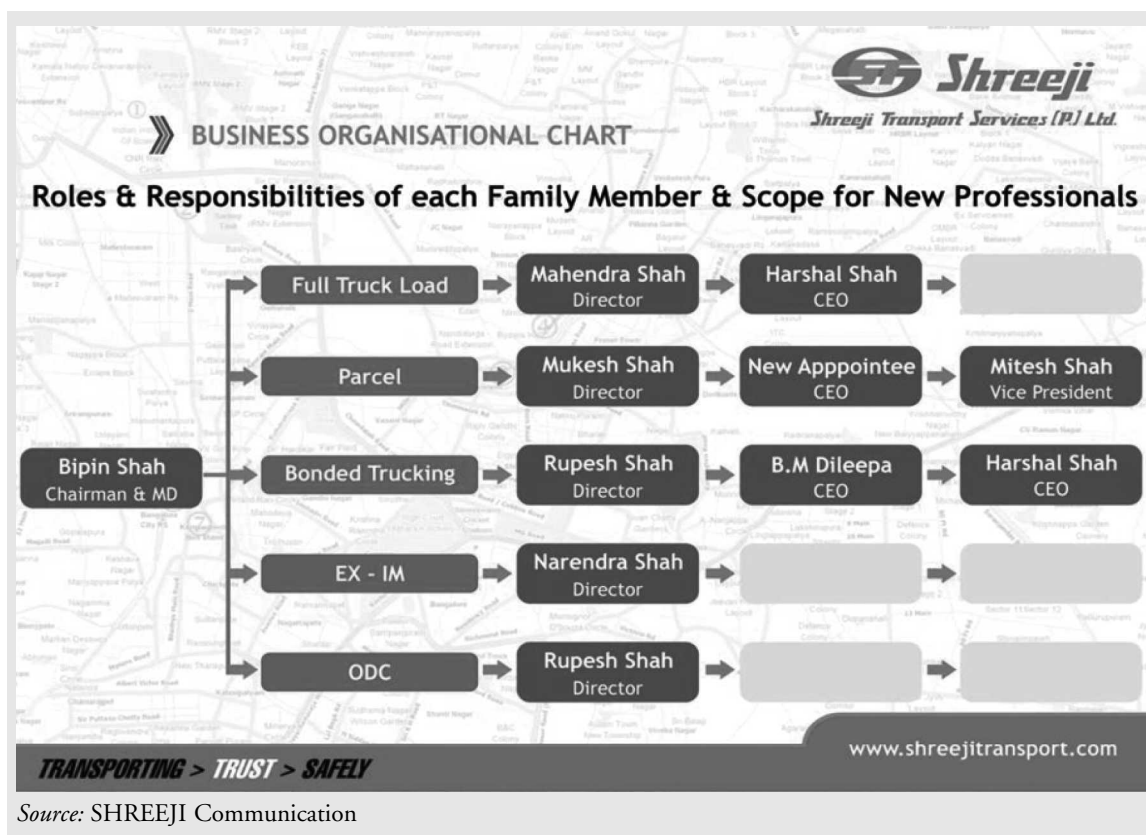
Vehicle Type	Capacity (tonnes)	No of Vehicles
32-feet closed container	7	150
32-feet taurus closed container	15	27
22-feet closed container	5	7
20-feet platform truck	21	12
40-feet platform trailer	25	10
Light commercial vehicles	3	3
Total		209

Source: SHREEJI Communication

EXHIBIT 3

Business and Functional Organization Chart



**EXHIBIT 4****Key Financial Indicators of SHREEJI**

(Rs million)	CAGR (%)	2012-13	2011-12	2010-11	2009-10	2008-09	2007-08	2006-07	2005-06
PROFIT & LOSS:									
Operating Income (OI)	13.2	678.7	620.8	574.2	452.6	424.7	425.9	363.6	285.1
Growth (%)		9.3	8.1	26.9	6.6	-0.3	17.1	27.5	
Operating Expenses (OE)		479.9	432.2	401.8	317.7	302.7	314.2	274.5	216.5

(Contd.)

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(Rs million)	CAGR (%)	2012-13	2011-12	2010-11	2009-10	2008-09	2007-08	2006-07	2005-06
Net Block		145.9	187.9	156.7	110.7	89.5	83.8	78.3	54.6
Trucks		91.5	132.0	106.7	72.0	61.2	61.8	69.0	47.1
Buses		0.0	0.0	1.7	2.8	4.6	0.0	0.0	0.0
Others		54.4	55.9	48.3	36.0	23.7	22.0	9.3	7.5
Total Debt (TD)		276.0	313.4	232.4	190.4	167.7	153.9	137.3	97.8
Total Networth (TNW)		121.0	110.5	95.5	70.6	53.5	46.9	38.4	30.5
Deferred Tax Liability (DTL)		-1.2	2.7	3.1	1.1	-0.9	-0.3	2.1	3.5
Capital Employed (CE)		395.8	426.6	331.0	262.1	220.3	200.5	177.8	131.8
Current Assets (CA)		250.5	233.3	180.7	182.4	150.4	143.3	115.6	87.8
Debtors (Accounts Receivable)		177.0	154.1	141.1	116.3	101.3	97.3	71.7	60.0
Current Liabilities (CL)		25.4	20.5	27.7	41.8	38.5	37.1	23.5	16.4
Creditors (Accounts Payable)		25.4	20.5	27.7	21.8	24.9	16.1	9.9	8.0
Bank Overdraft		122.9	105.6	74.5	73.2	61.4	50.0	29.3	13.8
Net Working Capital (NWC) = CA – (CL + Bank Overdraft)		102.2	107.2	78.5	67.4	50.5	56.2	62.8	57.6
RATIOS:									
OPBDIT/Interest & Finance Charges		3.2	3.8	4.0	3.5	3.3	3.8	4.0	4.8
OPBDIT/OI (%)		15.7	18.0	17.7	18.5	16.9	15.2	14.8	13.7
PAT/OI (%)		1.5	2.4	3.0	3.8	1.5	2.0	2.2	2.3
Net Block/Gross Block		0.4	0.5	0.5	0.4	0.4	0.4	0.5	0.5
Asset Turnover (Net) = OI/ Net Block		4.7	3.3	3.7	4.1	4.7	5.1	4.6	5.2

(Contd.)

(Rs million)	CAGR (%)	2012-13	2011-12	2010-11	2009-10	2008-09	2007-08	2006-07	2005-06
Asset Turnover (Gross) = OI/ Gross Block		1.8	1.7	1.9	1.8	1.8	2.2	2.4	2.4
Asset Turnover (Gross Trucks and Buses) = OI/ Gross Trucks and Buses		2.3	2.1	2.4	2.3	2.4	2.7	2.8	2.8
Asset Turnover Owned Vehicles (Net Block) = Turnover (Owned Vehicles)/ Net Block		3.0	2.1	2.4	2.8	3.2	3.1	2.8	2.7
Turnover per Owned Vehicle		2.1	2.1	2.0	1.8	1.7	1.8	1.8	–
Benchmark Turnover per Owned Vehicle @ 10% annual growth		3.2	2.9	2.6	2.4	2.2	2.0	1.8	–
Current Ratio = CA/(CL + Bank Overdraft)		1.7	1.9	1.8	1.6	1.5	1.6	2.2	2.9
Debtor Days = Debtors/ (OI/365)		95	91	90	94	87	83	72	77
Creditor Days = Creditors/ (OE/365)		19	17	25	25	30	19	13	13
NWC/OI (%)		15.1	17.3	13.7	14.9	11.9	13.2	17.3	20.2
Debt Service Cover (i) = NCA/TD (%)		25.9	24.1	28.8	26.9	25.7	27.8	26.7	27.9
Debt Service Cover (ii) = TD/OPBDIT		2.6	2.8	2.3	2.3	2.3	2.4	2.5	2.5
Debt Equity Ratio = TD/ TNW		2.3	2.8	2.4	2.7	3.1	3.3	3.6	3.2
Return on Capital Employed (ROCE) = PBIT/CE (%)		11.0	13.6	17.6	20.5	16.8	16.1	16.2	14.0
Return on Equity (ROE) = PAT/TNW (%)		9.1	14.6	21.1	27.4	12.9	19.9	22.9	21.6

Source: SHREEJI Communication

EXHIBIT 5**Route-wise Profitability of SHREEJI**

MAJOR ROUTES	CHENNAI-MUMBAI			CHENNAI-BENGALURU			CHENNAI-COCHIN			CHENNAI-AHMEDABAD		
	Chennai-Mumbai	Mumbai-Chennai	Combined	Chennai-Bengaluru	Bengaluru-Chennai	Combined	Chennai-Cochin	Cochin-Chennai	Combined	Chennai-Ahmedabad	Ahmedabad-Chennai	Combined
Km per trip	1400	1400	2800	350	350	700	700	700	1400	1850	1850	3700
Rate per trip	27000	38000	65000	13500	11500	24000	27000	4200	31200	38000	45000	83000
Mix of onward and return trip	73%	27%	100%	51%	49%	100%	76%	24%	100%	82%	18%	100%
Rate per km	19.29	27.14	21.44	38.57	32.86	35.74	38.57	6.00	30.71	20.54	24.32	21.23
Variable cost per km	16.36	16.36	16.36	17.07	17.07	17.07	16.64	11.36	15.37	16.50	16.50	16.50
a. Route advance	13.86	13.86	13.86	14.57	14.57	14.57	14.14	8.86	12.87	14.00	14.00	14.00
b. Repairs & maintenance	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Contribution per km	2.93	10.78	5.08	17.22	17.22	17.22	21.93	-5.36	15.34	4.04	7.82	4.73
Fixed cost per vehicle	60615	60615	60615	60615	60615	60615	60615	60615	60615	60615	60615	60615
Breakeven km	20718	5621	11936	3521	3521	3521	2764	—	3951	15002	7747	12819
Breakeven trips	6.19	2.34	4.26	5.08	4.98	5.03	4.28	1.36	2.82	5.67	1.26	3.46

(Contd.)

MAJOR ROUTES	BENGALURU-MUMBAI			BENGALURU-HYDERABAD			BENGALURU-TUTICORIN		
	Bengaluru-Mumbai	Mumbai-Bengaluru	Combined	Bengaluru-Hyderabad	Hyderabad-Bengaluru	Combined	Bengaluru-Tuticorin	Tuticorin-Bengaluru	Combined
Km per trip	1050	1050	2100	600	600	1200	650	650	1300
Rate per trip	21000	34000	55000	17000	15000	32000	22000	10000	32000
Mix of onward and return trip	40%	60%	100%	60%	40%	100%	86%	14%	100%
Rate per km	20.00	32.38	27.38	28.33	25.00	26.99	33.85	15.38	31.29
Variable cost per km	16.79	16.79	16.79	16.08	16.08	16.08	16.35	16.35	16.35
a. Route advance	14.29	14.29	14.29	13.58	13.58	13.58	13.85	13.85	13.85
b. Repairs & maintenance	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Contribution per km	3.21	15.59	10.59	12.25	8.92	10.91	17.50	-0.97	14.94
Fixed cost per vehicle	60615	60615	60615	60615	60615	60615	60615	60615	60615
Breakeven km	18883	3888	5723	4947	6795	5555	3464	-	4058
Breakeven trips	2.20	3.25	2.73	5.53	3.73	4.63	5.38	0.86	3.12

Note:

1. Break even km is considered based on each vehicle fixed cost and its deployment on particular route in terms of onward and return separately.
2. Break even trips calculated for onward and return as per the mix.

Fixed Cost Considered/Vehicle		To Stations										
Basic Parameters	Per Month	From	Ahmedabad	Bangalore	Chennai	Cochin	Hyderabad	Madurai	Mumbai	Tuticorin	Vapi	Total
(i) EMI	36698	Ahmedabad			2						7	9
(a) Cost of the new vehicle with 20% margin INR 1360000		Bangalore			122		15		50	62		249
(b) Loan tenure 46 Months		Chennai	9	125		26			71			231
(c) Interest Rate 11.50 %		Cochin		18	8					10		36
(ii) Insurance (INR 20000 per annum)	1667	Hyderabad		10	15							25
(iii) Road tax (INR 12000 per annum)	1000	Madurai		5	17							22
(iv) Permit & FC (INR 19000 + INR 20000 per annum)	3250	Mumbai		74	27	10	10					121
(v) Administrative OH allocated	15000	Tuticorin		10	40			22				72
(vi) Interest on working capital	3000	Vapi		7								7
TOTAL	60615	Total	9	249	231	36	25	22	121	72	7	772

Source: SHREEJI Communication

EXHIBIT 6
SHREEJI's Parcel Delivery Performance

2011-12	No of Articles	No of Lorry Receipts	Total Revenues (INR)	Total Days Used	Average Revenue per Article (INR)	Average Days of Delivery per LR
April	26,204	9,125	5,294,691	82,300	202.06	9.02
May	22,375	6,844	4,136,980	54,265	184.89	7.93
June	20,744	5,764	4,007,098	41,799	193.17	7.25
July	26,190	7,471	5,005,177	60,307	191.11	8.07
August	27,124	10,587	5,851,622	94,365	215.74	8.91
September	30,087	10,958	6,682,010	78,347	222.09	7.15
October	26,101	8,494	5,202,637	68,326	199.33	8.04
November	18,516	5,405	3,872,842	34,829	209.16	6.44
December	23,111	7,965	5,088,730	52,178	220.19	6.55
January	17,087	5,745	3,518,474	43,164	205.92	7.51
February	19,973	7,157	4,305,445	45,036	215.56	6.29
March	23,799	8,492	5,198,436	60,922	218.43	7.17
Total	281,311	94,007	58,164,143	715,838	206.76	7.61

2012-13	No of Articles	No of Lorry Receipts	Total Revenues (INR)	Total Days Used	Average Revenue per Article (INR)	Average Days of Delivery per LR
April	23,038	8,332	5,473,748	67,974	237.60	8.16
May	21,501	6,634	4,433,912	49,853	206.22	7.51
June	18,321	5,784	3,883,699	38,890	211.98	6.72
July	23,080	8,599	5,463,081	54,335	236.70	6.32
August	25,886	9,916	5,790,142	68,266	223.68	6.88
September	24,297	8,347	5,203,695	63,520	214.17	7.61
October	32,641	11,998	8,093,814	91,932	247.96	7.66
November	22,838	5,736	4,288,213	45,477	187.77	7.93
December	27,900	7,904	5,678,159	52,351	203.52	6.62
January	22,844	7,518	4,917,995	51,775	215.29	6.89
February	21,831	6,883	4,646,791	43,700	212.85	6.35
March	33,075	10,098	6,802,552	59,559	205.67	5.90
Total	297,252	97,749	64,675,799	687,632	217.58	7.03

Source: SHREEJI Communication

EXHIBIT 7**Paiya Gumao, Paisa Kamao Scheme**

Incentive Scheme 1							
Total No of Vehicles	140	Contribution (Rate minus Variable cost) (INR per km)				6.50	
Average km per Month per Vehicle	7,000	Current Total km per Month				980,000	
Average km per Annum per Vehicle	84,000	Slab in Multiples of (km)				500	
Base km for Variable Incentive	7,001	Flat Fixed Incentive for 7,000 km (INR)				1,500	
SLABS	Incentive (INR per km)			Achieved (km per Month)	Incentive Cost (INR per Month)	Benefit to Company (INR per Month)	% Spent
	Monthly	Quarterly	Total				
Up to 7,000 km	0.00	0.00	0.00	8,000	2,500	6,500	38.46
7,001 km to 9,000 km	1.00	0.00	1.00				
Above 9,000 km	1.50	0.00	1.50				

Incentive Scheme 2							
Total No of Vehicles	140	Contribution (Rate minus Variable cost) (INR per km)				6.50	
Average km per Month per Vehicle	7,000	Current Total km per Month				980,000	
Average km per Annum per Vehicle	84,000	Slab in Multiples of (km)				500	
Base km for Variable Incentive	7,501	Flat Fixed Incentive for 7,500 km (INR)				0	
SLABS	Incentive (INR per km)			Achieved (km per Month)	Incentive Cost (INR per Month)	Benefit to Company (INR per Month)	% Spent
	Monthly	Quarterly	Total				
Up to 7,500 km	0.00	0.00	0.00	8,000	2,750	6,500	42.31
Above 7,500 km	1.50	0.00	1.50				

(Contd.)

Incentive Scheme 3							
Total No of Vehicles	140	Contribution (Rate minus Variable cost) (INR per km)				6.50	
Average km per Month per Vehicle	7,000	Current Total km per Month				980,000	
Average km per Annum per Vehicle	84,000	Slab in Multiples of (km)				500	
Base km for Variable Incentive	7,001	Flat Fixed Incentive for 7,000 km (INR)				0	
SLABS	Incentive (INR per km)			Achieved (km per Month)	Incentive Cost (INR per Month)	Benefit to Company (INR per Month)	% Spent
	Monthly	Quarterly	Total				
Up to 7,000 km	0.00	0.00	0.00	9,000	3,500	13,000	26.92
7,001 km to 9,000 km	1.00	0.00	1.00				
Above 9,000 km	1.00	0.50	1.50				

Note: The three incentive schemes were analyzed in August 2011 and Scheme 1 was selected and implemented from September 2011.

Source: SHREEJI Communication

EXHIBIT 8**Payments as per Paiya Gumao, Paisa Kamao Scheme**

Year of make	No of trucks	Average km prior to incentive scheme	Total km	Average km post incentive scheme	Expected incentive payment (Rs)
2009	20	6,200	124,000	5,600	0
2010	20	6,200	124,000	5,600	0
2011	35	7,000	245,000	7,000	52,500
2012	65	7,100	461,500	7,200	110,500
2013	70	7,300	511,000	7,400	133,000
Total	210	6,979	1,465,500	6,928	296,000

The actual incentive payment for the 2013 trucks was as below:

Year of make	No of trucks	Average km	Total km	Actual total incentive (Rs)
2013	10	9,500	95,000	42,500
	60	7,050	423,000	93,000
Total	70	7,400	518,000	135,500

Source: SHREEJI Communication

SUGGESTED QUESTIONS

1. What does the Management Information System (MIS) on the routewise profitability information of Shreeji Transport Services Private Limited (SHREEJI) reflect? Is the information relevant, considering SHREEJI's business model?
2. What additional information should SHREEJI consider to work out the freight rate? What relevant analysis would help decisions in the Chennai–Cochin route, as discussed in the case?
3. How should the MIS of the parcel business be designed to help SHREEJI?
4. What are the likely distortions in the incentive schemes?

APPROACH FOR ANALYSIS

The MIS on routewise profitability is based on the assumption that the trucks make round trips and will be useful for taking managerial decisions only if the same truck is used for the towards and return journey. Examining it as a to and fro 'product' with the actual imbalanced share of the to and fro loaded movements would lead to inconsistencies. The MIS would be valid only if the share of loaded movements between the to and fro are close to 50-50. Hence, the 'combined column' might not be relevant for SHREEJI, as the product of SHREEJI is *point-to-point* service.

While taking managerial decisions as to whether to ply on a given route or not at a given rate, it is important for SHREEJI to account for all relevant costs as well as make an assessment of the use of the truck at the destination. The subsequent use could be empty or loaded. Apart from the revenue generated, all relevant costs including opportunity costs during loading and unloading need to be considered. The case of the Chennai–Cochin service is interesting. It is more like a to and fro journey due to significant load imbalance.

A spreadsheet model can be designed to serve as a tool for decision-making supported by scenario-based analysis.

The MIS of the parcel business should support relevant decisions like how to make a trade off between loading a truck fully and ensuring timely delivery. A related decision would be whether to club sources and/or destinations. Information to enable troubleshooting of extreme performance would also help while taking corrective action.

Incentive schemes can help motivate the drivers. However, it is also important to understand that such schemes, if not designed right may lead to unfavourable behaviour. If the incentive slabs are perceived as not being achievable, performance could be worse than normal, like in the case of the old vehicles.

Case

5

CASE CONTEXT

Kundanmal Mukanmal Trans Logistics Pvt. Ltd. (KM) was a well-known road transportation company in western India, operating out of its headquarters as a family-owned business in Jaipur. It functioned as a logistics provider for flatbed steel and finished automobiles (primarily four-wheeler passenger cars and light to medium cargo vehicles). The case highlights the challenges faced by KM in managing its workshop operations in an emerging economy with a contract labour pool. It also offers an opportunity to explain how operational delays are caused due to lack of interactions/improper coordination among resources (labour pools and physical bays).

KM Trans Logistics: Workshop Operations

In October 2013, Arihant Jain, co-executive director of Kundanmal Mukanmal Trans Logistics Pvt. Ltd., India (KM), arrived at his office to begin his day's work. KM was a road transportation company functioning as a logistics provider for flatbed steel and finished automobiles (primarily four-wheeler passenger cars and light to medium cargo vehicles).

Jain was in a pensive mood. The KM workshop in Jaipur was facing regular logistics issues and delays in repair and maintenance of trucks and carriers due to resource idiosyncrasies. Worker unavailability was a cause of concern on certain days, while excess capacity plagued the day-to-day operations at other times. With the Jaipur workshop dedicated to repair and maintenance of a large fleet of 175 trucks, management of labour manpower was a frequent cause of concern for the two executive directors, Jain and his cousin, Anuj Jain. There were difficulties with mechanics resorting to fraudulent means (showing false records of repair work done, stealing or selling off fuel, engine oil, lubricants and parts, etc.), loitering, arguing and teaming up with truck drivers to create a ruckus when unoccupied. All of these problems disrupted workshop operations, especially during festive seasons when labourers often did not even turn up for work.

Both directors were serious this time about rightsizing manpower at the KM workshop. Maximum labour issues happened around festive occasions, when time-consuming repair activities such as accidents, denting, cabin, wheel and axle repair issues continued to pile up and manpower idiosyncrasies exacerbated the situation. A schematic system to estimate or predict the number of labourers required in each department—and the workshop as a whole—was a solution the executive directors looked forward to. They hoped to estimate the right number of manpower resources (including seasonal variations), figure out a mechanism to allocate trucks to mechanics

Professor Debjit Roy and Mr Arindam Bandyopadhyay wrote this case solely to provide material for class discussion. The authors do not intend to illustrate either effective or ineffective handling of a managerial situation. The authors may have disguised certain names and other identifying information to protect confidentiality.

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and bays (a marked area in the workshop where a truck is positioned for repair (see Exhibit 3), and reduce the waiting time of trucks requiring repair, making workshop operations more efficient overall.

WARNING SIGNS BEFORE FESTIVAL TIME

Jain was interrupted from his work by a telephone call from Anuj. There had been three accidents within the previous 18 hours and the mechanical labourers had not shown up to work. Anuj reminded Jain that with the festive season of Diwali¹ approaching, the workers had requested leave from October 30 to November 7. Although he had asked the works manager to discuss the gravity of the situation with the mechanics and ask them to work a bit longer than the stipulated seven hours each day, Anuj was apprehensive since bays were expected to be occupied for stretches of four to 20 days when any accident cases arrived. Workers were threatening to leave, regardless of wages, and Anuj estimated that KM would incur opportunity costs of approximately INR 2,500² per truck for each day of delay.

Jain asked Anuj to do a rough analysis on the number of mechanics needed during the course of the month. He asserted that in the long term, KM should hire an operations consultant to address the company's problems in detail. If a solution could be developed which could predict or estimate the number of workers needed in each of KM's six departments, the company would hire that number of mechanics accordingly. Similarly, Jain wanted Anuj to examine bay utilization and do a comparison between the time each truck spent at the workshop and the maximum time KM could allow each truck to spend there.

ABOUT KM TRANS LOGISTICS

KM was founded as a family-owned business in Jaipur by brothers Kamal Kumar Chandwar and Prabhachand Chandwar on August 23, 1988. KM maintained a fleet of 625 carriers in three vehicle categories: flatbed carriers, car carriers and chassis carriers (see Exhibit 1). Nearly 600 (97 per cent) of the vehicle fleet were manufactured by TATA Motors. The car carriers segment transported nearly 17,000 cars per month, the chassis/truck carrier segment transported approximately 225 trucks per month and the flatbed steel segment carried nearly 11,000 tons of steel per month.

¹ *Diwali*—a five-day long Hindu festival—is known as the 'festival of lights' because houses, shops and public places are decorated with small earthenware oil lamps. Many Indians (particularly Northern Indians) prefer to take time off from work during the festival in order to be with their families. /www.bbc.co.uk/schools/religion/hinduism/diwali.shtml, accessed August 1, 2014.

² 60 INR (Indian Rupee)=1 USD (US Dollar)

The company owned two workshops—one in Gurgaon, Haryana, which was spread over a 0.5 acre open piece of land, and one in Gidani, Rajasthan, nearly 50 kilometres (km) from Jaipur, the capital city of Rajasthan. Out of the 625 carriers, 175 were repaired and maintained in the Jaipur workshop, whereas the remaining 450 were maintained by the Gurgaon workshop, which enjoyed locational advantage. However, since the Jaipur workshop was equipped with better technology and machinery, some carriers came for repairs to the Jaipur workshop en-route to delivery to the client. In addition, the Chandwar family was based in Jaipur and hence, the workshop there enjoyed direct care and attention from a number of the company family members. The Gurgaon operations faced minimum labour problems as the labourers there were paid on salaried terms and conditions (unlike Jaipur where payment was on a per job basis). The salaried payment structure worked well there because of a professionally managed team, which was well trained and more educated and hence, demanded a fixed minimum salary.

MANPOWER AND WORKFORCE STRUCTURE AT THE KM WORKSHOP

The Manager Tier

Anuj Jain, in his capacity as executive director, headed the operations of the workshop, with two works managers (engineers by profession) reporting to him.

The Supervisor Tier

There were a few supervisors reporting to the works manager, on an ad hoc basis. Workers could assume the role of supervisor after reaching a certain level of seniority.

There were certain supervisors engaged in recording the in and out times of trucks to the workshop, as well as drivers, job cards and worker assignment duties. These supervisors also took note of tracking data for trucks, in the form of truck number, client information, loading point, destination and driver information, among other details. At the end of the day, the final status of each truck in-service was transferred to a spreadsheet for records and future reference. The workshop was planning global positioning system (GPS) integration with a new Enterprise Resource Planning (ERP) system to track carrier movements automatically. All desk operations were carried out by these supervisors. A few call supervisors were also present at the support desks; these individuals engaged in negotiations with clients and performed financial and other book-keeping activities. There were nearly 10 such supervisors present at the workshop as of October 2013.

The Mechanic/Technician/Assistant Tier

There were 36 workers spread across six functional groups: mechanical, electrical, denting, balancing, tire and welding. The workers had no formal training and were largely unskilled when

they joined. However, with experience, they acquired varied skills and at varying levels. They could be classified as high-, medium- or low-skilled workers (see Exhibit 2).

WORKSHOP LAYOUT AND BAYS

The Jaipur workshop was fairly self-sufficient as far as repair and maintenance of trucks was concerned. The family decided not to engage authorized service centres for repair and maintenance of trucks, not only because they cost more per repair, but also because they caused excessive delays, taking up to five days to repair small problems that could be fixed in a matter of a few hours if done in-house—provided mechanics and all spare parts were made available. In March 2014, the workshop acquired a TATA-authorized service centre status. However, it continued to hold repair operations for its own carriers and the management did not plan to engage in repair work for carriers owned by other parties.

The workshop procured all its spare parts inventory from authorized dealers and stocked them in its own stores in the workshop after batch inspections were completed at Jaipur. It took an average of two days for parts to arrive at the sales and marketing office in Jaipur and then another day from the Jaipur office to the workshop. The mean lead time for procurement was therefore approximately three days.

Spare parts were issued to mechanics for repair and maintenance. Shortage of spare parts was generally not a major problem for the workshop. When a truck arrived at the workshop, the driver would be expected to first inform the security personnel at the gate about the problems in the truck that require repair. If it was a very minor issue requiring less than 30 minutes of repair time (e.g., broken headlight, minor lubrication, small wiring changes, etc.), it was not allowed to enter the premises. Repair was done outside the gate directly on the service lane outside the workshop.

Once a truck was allowed to enter, it spent at least 45 minutes getting in, finding a space, parking the carrier, being inspected, being repaired and then exiting the workshop premises. Job cards, if necessary, also had to be prepared. There were avoidable and unnecessary delays due to human factors (such as driver unavailability for driving out of the workshop, etc.). Hence, it was always better to minimize the waiting time of trucks.

The workshop had eight numbered service bays (see Exhibits 1 and 3). A ninth inspection bay was intended for inspection of the truck from beneath. However, drivers were reluctant to drive over the inspection bay, worrying that some of the carrier wheels might fall into the pit (as there was not enough room to manipulate a large-sized vehicle comfortably) and the carrier would either get stuck or parts would break; in either case it would be very difficult to extricate/repair the fallen part of the vehicle. Bay nine was therefore largely unused, as of October 2013.

Management had decided to convert a large unused space into four extra bays. These bays were to be used exclusively for accident, denting, welding, cabin setting and tire repair cases, in addition to making new horse³ cabins out of irrecoverably damaged trucks. All jobs taking four days or more were to be serviced in these four side bays (accident jobs could take up to 20 days to repair). These new bays would improve workshop operations tremendously as time-consuming jobs would be separated from the speedier jobs.

Other important structures in the workshop included the spares store, the driver and mechanic training room, lubricants storage room, tire storage, supervisors room, works manager room, lathe room, engine repair room and a few other amenities for workers and drivers (pantry, rest room with nearly 20 beds and canteen).

WORKSHOP OPERATIONS

A detailed list of carrier arrivals for servicing showing the count of jobs from April 1, 2013 to June 12, 2013, is given in Exhibit 4. The service time for each of these types of jobs is detailed in Exhibit 5. These service times varied according to the skill level of the worker employed to do the job. The given times are for skill level 10 (expert) mechanics. Hence, for four- (low) rated mechanics, the service time increased by a ratio of 10 to four or 2.5 times of the time taken by an expert mechanic.

Mechanics worked in day-long shifts from 10:00 a.m. until 7:00 p.m. at the latest, with one hour designated for lunch break and an additional hour allowed for in-work breaks. Each mechanic therefore worked approximately seven hours each day. This figure did not change much on a seasonal basis.

Accidents were a critical and special type of workshop operation, which required maximum amount of bay time and labour effort (see Exhibit 6). The accident case of a truck generally occupied the bay and a huge percentage of labour effort for any duration between 12 to 15 days—even up to 20 days in some severe cases. For that duration of time, the whole bay was occupied and no other work could be performed there. Sometimes, the carrier was damaged beyond repair and only the mangled horse was brought back to the workshop. If the horse was not repairable, it was broken down and any salvageable engine and mechanical parts were extricated to construct another horse.

The criticality of accident cases was so high that in Exhibit 5 (Mechanic Requirements), the numbers have been scaled to reflect the actual utility of each department in fixing accident cases. For example, a value of 0.1 for Balancer showed that a worker was needed for wheel balancing

³ Front portion of the truck

for only 10 per cent of the job service time. Sometimes, carrier accidents involving axle damage or tire damage were so severe that the whole axle needed to be changed. There were 16 cases of accidents from April to June 2013, and these cases occupied the maximum portion of work time available to the labour workforce and management alike, aside from all the legal hassles and police interrogations the concerned parties also had to undergo in case of an accident. Seeing this problem, the brothers decided to construct the four extra bays on the unused side of the workshop. Jobs were taken up in “shortest job first” order and the priority of car carriers was always higher than flatbed steel carriers.

While a majority of incoming trucks were driver-reported problems, there were certain routine checks and repairs carried out on trucks as well. The ERP system used at the workshop carefully tracked the routes on which every truck was plying, repair required on each truck by its registration number, last job card and repair report, total distance travelled by the truck since last repair and a few other technical or truck-specific parameters (see Exhibit 7). The process of truck position tracking was manual as of October 2013; however, GPS integration was being planned. The ERP system even notified supervisors as to any routine repairs required on each truck as soon as it entered the workshop and supervisors queried its repair history and last job sheet. Hence, no truck left the workshop without completing a preventive maintenance checklist (see Exhibit 8).

MAINTENANCE MODEL

All repairs were carried out in-house using spare parts procured from authorized dealers. Some parts were occasionally procured from local dealers at lower cost (quality notwithstanding) but the advice of expert technicians and the works manager was generally taken in cases of deviation from original component purchases.

The bays and mechanics (resources) were reserved for the KM fleet only. With regards to outsourced repair, a few cases of accident, engine overhaul, repairs related to fuel injection pumps, steering, radiators, turbochargers, boring engines and wheel alignment were subcontracted to third parties, who sometimes brought mobile vans to the workshop for conducting repairs. On occasion, employing these mobile repair vans worked well to avoid delays. Some tasks such as wheel balancing had to be necessarily outsourced since it was not feasible for the company to incur high fixed costs of purchasing and maintaining computerized high technology machinery, which was to be used sparingly. In case of outsourced engine overhaul, the truck occupied the bay for the entire duration of time when the engine was under repair (separated from the horse). These carriers weighed several tons and it was expensive to invest in a machine that could tow away the carrier while the engine was disassembled for repair. This was another factor contributing to lowered efficiency of operations.

Some spare engines, engine components, gears, radiators and a few critical components were repaired and kept spare on a rotational basis to save time and money during emergency delivery situations. Delays were greatly minimized using these spare components.

Seasonality of jobs also played a role in worker selection—on both skill level and number of mechanics to be kept. For example, in the rainy season, tire problems and accidents were more frequent. During summers, engine overheating and head repairs were more common; while during winters, lamp repairs were frequently reported by drivers.

WORKSHOP COMPETITION

There were several small to medium-sized workshops owned by similar transporters in the vicinity. Consequently, KM faced considerable competitive threat with respect to availability of labour in times of need. The notable competing workshops were: Rajesh Motors (30 km away from the KM workshop), Anand Motors (12 km away) and Fast-Speed Motors (50 km away). These workshops were very attractive job-hopping destinations for the labourers, who gained tremendous bargaining power due to the locational advantage they had on offer—i.e., with the workshops being within such close distances of one another. The compensation terms were also very competitive. Labourers often formed cartels and bargained with workshop managers to get their terms accepted. This was a significant concern for a majority of transportation providers in North India.

HUMAN RESOURCE ISSUES OR SEVERE CHALLENGES?

The same morning after his telephone call to Jain, Anuj arrived at the workshop, pondering over the long list of trucks awaiting repairs. His main concern was the labourers, who were adamant about taking long leaves—10 to 15 days in duration—that KM could not afford to allow. If they took such long leaves, all pending transportation orders for car transportation to showrooms in North India would need to be cancelled during the festive season. Each day of delay meant incurring heavy opportunity costs and causing dissatisfaction to the showroom owners.

The workers threatened to leave the job, knowing that there were several competing workshops in and around Jaipur, even though they were much smaller in size and scale of operations than KM. This made labour problems very delicate to handle, with respect to both truck drivers and mechanics.

Anuj noted:

[For many workers], the time that they spend idling in the workshop is not only wasteful but also dangerous for regular streamlined operations. They cause mischief, loiter around,

gossip and misbehave with co-workers to distract even those mechanics who are at work! The drivers leave for rest breaks and come back at their own will. Sometimes, they even come up with faulty excuses and false alarms as if there is a functional problem with the truck requiring repair, just to idle in the waiting room. That is why we fix small issues outside the gate itself. The security guards have been instructed not to allow any truck into the workshop that does not need repair. On certain occasions, a mechanic goes out and checks if repairs are needed at all on a waiting truck. Only if the truck is cleared for inspection, it is allowed to enter the premises.

In spite of all these measures, many fraudulent cases entered the workshop.

A bigger challenge for large transport companies in India was the problem of corrupt drivers. They quoted a lower amount to the client company for carrying the load than the quoted figure in the KM contract terms and then took the work as a private job. Though most of KM's clients were professionally run organizations, some of the lesser known companies such as small town car showrooms and dealers did agree to pay the driver for transportation services. Some drivers even started casual businesses out of these practices, utilizing the client contacts acquired during their work for KM. Though the driver indulged in such malpractices for small gains, the end loser was the transporter company.

Both fuel and parts were occasionally stolen. Even worse than other malpractices, sometimes, the loaded material in the truck was stolen. Brand new cars were stolen from car carriers. Steel slabs and sheets were stolen from flatbed carriers. Corrupt drivers often had the audacity to demand higher salaries and threaten to leave when confronted with their malicious actions. Due to driver problems, 10 per cent of the fleet was always off road, parked at arbitrary places, even in loaded condition.

Jain and Anuj knew that the critical success factors in the transport business were extreme patience, courage and resilience. Gaurav Benera, another senior workshop executive, said:

Clients such as car retailers, showrooms and even steel manufacturers demand on-time, perfect delivery in mint condition. If any premium customer's ordered car gets delayed, they threaten the dealers with severe consequences such as barging into the dealer's showroom with armed goons. If such an incident happens, the first blame for delay always comes to the transporter and you have to be patient enough to listen to the complaints they hurl at you.

For the steel and cement industry, there are measurable parameters. Say, an hour of delay will get you one black star in transporter evaluation criteria. Repeat that delay three times, and you may not be able to renew the contract. Raw material procurement is one of the most critically tracked activities in the steel and cement industries. You simply cannot delay it. This is why such human [resource] factors are affecting daily

operations in our workshop. There is just too much at stake for a single hour of delay.

RECRUITMENT

While the senior executives (works managers and above) were recruited through professionally conducted interviews, the mechanics were hired on an ad-hoc basis. They typically learned from their seniors who had been in the business of truck repairs for a long period of time. Some mechanics trained at local workshops or vocational training schools were hired occasionally, but they usually did not stay for a long time. The works manager said:

These mechanics generally are able to do quality work, even without any formal education. We do not worry about how long they are going to stay with us. There is no shortage of manpower available from nearby localities close to the highway. Also, we cannot afford to hire trained mechanics. Their demands are just too much. A better strategy is to hire an experienced and trained mechanic for short periods of time—say seven to 10 days—for the purpose of training our mechanics.

LIMITED ENTRY BARRIERS TO TRANSPORT BUSINESS IN INDIA

Entry barriers to the logistics business in India were quite low. Small loans of only INR 400,000 to 500,000 were sufficient to purchase a truck. Alternatively, one could rent a truck to drive for a few years, earn some requisite amount to purchase trucks and other assets and then gradually expand the business. There was no minimum qualification in terms of formal education required to start up on one's own business, which is why any truck driver could start a casual transportation business on the side. However, to scale the business to large proportions (INR 10 to 20 million in turnover annually), a professional scheme of management had to be adopted.

CORE ISSUES

The brothers believed that poor manpower planning was hurting the timely repair of the trucks. It was possible that a shortage of repair personnel and the staff's low skill levels introduced long waiting delays for the trucks to be repaired; however, too many repair personnel also disrupted the maintenance operations. Nevertheless, there were other factors that could be responsible for the long repair delays, which could not be ruled out. They pondered upon several other reasons for long delays: Was the number of repair bays sufficient to meet the truck repair demand? Were the repair processes designed efficiently? Were other organizational problems marring the operational performance? How could they optimize workshop performance?

EXHIBIT 1

The Workshop in Gidani (District Dudu, Rajasthan)

Numbered Bays (Side Views)



Inspection Bay – Largely unused – Drivers are reluctant to drive over it.



Chassis Carriers



Car Carriers



Flatbed Steel Carriers

Source: Company files.

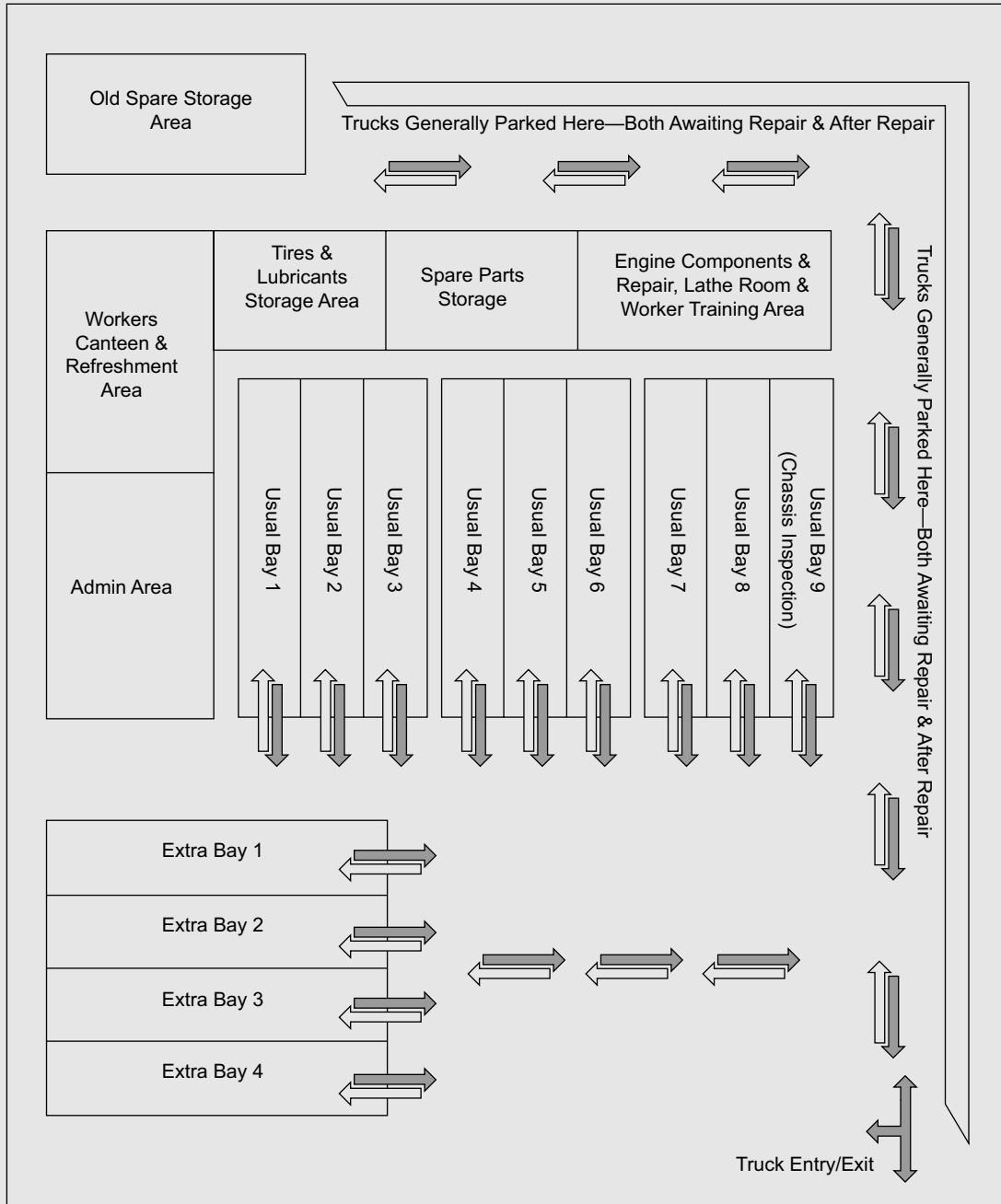
EXHIBIT 2

Worker Skill Map

Number of workers in each department is tabulated below, segregated on skill level.

Department	High Skilled	Medium Skilled	Low Skilled	All
Mechanical	3	8	3	14
Denting	3	1	1	5
Balance Rod	3	0	0	3
Electrician	3	0	0	3
Welder	1	4	1	6
Tire	5	0	0	5
Total	18	13	5	36

Source: Company documents and interviews of personnel.

EXHIBIT 3**Workshop Layout**

Source: Company records.

EXHIBIT 4
Number of Arrivals of Trucks for Repairs [73 days-April to June'13]

Job Type	Usual OR Extra Bay	Flatbed	Car Carrier	Std. Deviation (Arrivals/Day)	Labour Cost (INR)
Accident	Extra	7	9	0.31	15,000
Air Filter Change	Usual	39	10	0.64	30
Balance Rod Alignment (Leaf Spring)	Usual	89	9	1.39	100
Battery Check Or Change	Usual	45	6	0.75	100
Brake Lining Change	Usual	13	8	0.35	15
Brake Oil	Usual	9	8	0.36	30
Brake Setting	Usual	58	30	0.82	10
Cabin Setting	Extra	9	8	0.36	250
Clutch Overhaul	Usual	15	20	0.49	700
Clutch Setting	Usual	53	33	0.90	50
Compressor Overhaul	Usual	13	5	0.39	300
Coolant Tank Repair	Usual	6	1	0.21	70
Coolant Change	Usual	29	11	0.56	50
Cross Change	Usual	1	6	0.21	50
Crown Oil Change	Usual	15	6	0.44	75
Denting	Extra	23	6	0.49	4,000
Diesel Filter Change	Usual	49	38	0.94	40
Diesel Tank Repair	Usual	4	1	0.18	350
Engine Oil Change	Usual	31	16	0.72	75
Engine Oil Top-up	Usual	92	27	1.24	75
Engine Overhaul	Usual	9	6	0.27	5,000
Fan Belt Change	Usual	7	4	0.29	50
Fifth Wheel Check	Usual	15	4	0.44	50
Fuel Injection Pump Repair	Usual	22	26	0.62	500
Gear Lever Setting	Usual	36	18	0.68	50
Gear Oil Change	Usual	16	7	0.42	75
Gear Overhaul	Usual	15	7	0.36	600
Horse Hub Grease	Usual	31	16	0.55	65
Hosepipe Change	Usual	13	3	0.35	40
Pressure Leakage	Usual	114	89	1.28	40

Job Type	Usual OR Extra Bay	Flatbed	Car Carrier	Std. Deviation (Arrivals/Day)	Labour Cost (INR)
Radiator Service New	Usual	39	7	0.68	325
Relay Valve	Usual	13	8	0.41	200
Self-Alternator Service	Usual	14	7	0.41	200
Steering Box Oil Filter	Usual	42	12	0.83	35
Tappet Setting Change	Usual	26	11	0.48	100
Thermostat Valve Repair	Usual	1	1	0.12	70
Trolley Grease	Usual	63	23	0.99	65
Turbo Check Change	Usual	11	1	0.30	50
Tire	Extra	90	64	1.24	40
Water Body Change	Usual	3	0	0.14	100
Window Glass Or Machining	Usual	8	11	0.39	50
Wiring	Usual	317	134	2.89	1,000

Source: Company documents and interviews of personnel. 1) Includes frequently bundled jobs. 2) Costs mentioned above are only indicative, for calculation purposes, actual costs may vary greatly especially for accident, denting and few other unpredictable cases.

EXHIBIT 5

Service Times and Mechanic Requirements

Service Times

Job Type	Expected Time Taken (Minutes)	Mean Time (Minutes) *
Accident	Uncertain (Generally > 15 Days)	6,300
Air Filter Change	5	5
Balance Rod Alignment (Leaf Spring)	90	90
Battery Check Or Change	30	30
Brake Lining Change	90 (per wheel)	540
Brake Oil	30	30
Brake Setting	30	30
Cabin Setting	Uncertain	180
Clutch Overhaul	180Mins	240
Clutch Setting	30	30
Compressor Overhaul	90	90
Coolant Tank Repair	60-90 (Metal)	75

(Contd.)

Job Type	Expected Time Taken (Minutes)	Mean Time (Minutes) *
Coolant Change	30	30
Cross Change	60-75	67
Crown Oil Change	30	30
Denting	Uncertain	240
Diesel Filter Change	30	30
Diesel Tank Repair	Leyland - 240/TATA - 90	100
Engine Oil Change	30	30
Engine Oil Top-up	10	10
Engine Overhaul	2400	900
Fan Belt Change	30	30
Fifth Wheel Check	60	60
Fuel Injection Pump Repair	180	180
Gear Lever Setting	30	30
Gear Oil Change	30	30
Gear Overhaul	180	210
Horse Hub Grease	30 (per wheel)	180
Hosepipe Change	60	60
Pressure Leakage	30	30
Radiator Service New	60	60
Relay Valve	90	90
Self-Alternator Service	60	60
Steering Box Oil Filter	30-45	36
Tappet Setting Change	30-60	45
Thermostat Valve Repair	30-45	36
Trolley Grease	30 (per wheel)	195
Turbo Check Change	90	90
Tire	10-20Mins	30
Water Body Change	60-90	75
Window Glass Or Machining	50-60	55
Wiring	20-60	45

*(1) Includes frequently bundled jobs. (2) Service Times indicated here are those expected for expert mechanics (Skill level 10). For low skilled workers, service times are expected to increase as per skill level. (3) Service Times have low standard deviation (maximum 0.3) except for accident, denting and outsourced engine overhaul cases. Suitable assumptions may be made regarding the mathematical distribution of service times.

Source: Company documents and interviews of personnel.

Mechanic Requirements

Job Type	Mechanical	Denting	Balancer	Electrician	Welder	Tire
Accident #	0.3	0.7	0.1	0.3	0.6	0.1
Air Filter Change	1	0	0	0	0	0
Balance Rod Align (Leaf Spring)	0	0	1	0	0	1
Battery Check Or Change	0	0	0	1	0	0
Brake Lining Change	1	0	0	0	0	1
Brake Oil	1	0	0	0	0	0
Brake Setting	1	0	0	0	0	0
Cabin Setting	0	1	0	0	0	0
Clutch Overhaul	2	0	0	0	0	0
Clutch Setting	1	0	0	0	0	0
Compressor Overhaul	1	0	0	0	0	0
Coolant Tank Repair	1	0	0	0	0	0
Coolant Change	1	0	0	0	0	0
Cross Change	1	0	1	0	0	0
Crown Oil Change	1	0	0	0	0	0
Denting	0	2	0	0	0	0
Diesel Filter Change	1	0	0	0	0	0
Diesel Tank Repair	0	1	0	0	1	0
Engine Oil Change	1	0	0	0	0	0
Engine Oil Top-up	1	0	0	0	0	0
Engine Overhaul	1	0	0	0	0	0
Fan Belt Change	1	0	0	0	0	0
Fifth Wheel Check	0	0	2	0	0	0
Fuel Injection Pump Repair	1	0	0	0	0	0
Gear Lever Setting	1	0	0	0	0	0
Gear Oil Change	1	0	0	0	0	0
Gear Overhaul	2	0	0	0	0	0
Horse Hub Grease	2	0	0	0	0	1
Hosepipe Change	1	0	0	0	0	0
Pressure Leakage	1	0	0	0	0	0
Radiator Service New	1	0	0	0	0	0

(Contd.)

Job Type	Mechanical	Denting	Balancer	Electrician	Welder	Tire
Relay Valve	1	0	0	0	0	0
Self-Alternator Service	0	0	0	1	0	0
Steering Box Oil Filter	2	0	0	0	0	0
Tappet Setting Change	1	0	0	0	0	0
Thermostat Valve Repair	1	0	0	0	0	0
Trolley Grease	2	0	0	0	0	1
Turbo Check Change	1	0	0	0	0	0
Tire	0	0	0	0	0	2
Water Body Change	1	0	0	0	0	0
Window Glass Or Machining	0	1	0	0	0	0
Wiring	0	0	0	1	0	0

[#] Figures in decimals indicate the pro-rated quantum of labour time needed in that particular department with respect to other departments using whole number of labourers for that job type. In other words, a mechanic is needed on 3 accidents out of 10 (0.3), while a balancer is needed in 1 accident of 10 (0.1), assuming all accidents take equal time to repair.

Source: Company documents and interviews of personnel.

EXHIBIT 6

Accident Cases in April, May and June 2013

Vehicle No	Date	Vehicle Type
GC-3420	01-04-2013	Flatbed Carrier
GC-6533	06-04-2013	Flatbed Carrier
GC-7223	02-05-2013	Flatbed Carrier
GC-3421	14-05-2013	Flatbed Carrier
GC-6779	24-05-2013	Flatbed Carrier
GC-6953	04-06-2013	Flatbed Carrier
GD-2622	19-06-2013	Flatbed Carrier
GC-9117	09-04-2013	Car Carrier
GC-6947	15-04-2013	Car Carrier
GC-9115	24-04-2013	Car Carrier
GD-1913	16-05-2013	Car Carrier
GD-2839	19-05-2013	Car Carrier

Vehicle No	Date	Vehicle Type
GD-8714	13-06-2013	Car Carrier
GC-5829	12-06-2013	Car Carrier
GC-5432	08-06-2013	Car Carrier
GC-9513	17-06-2013	Car Carrier

Source: Company Records.

EXHIBIT 7

Routine Checks & Repairs

Job Type	Conducted Every Regular Interval
Engine Oil Change	21,000 kms
Set of 3 (Oil Filter, Diesel Filter, Water separator)	21,000 kms
Horse Hub Grease	45,000 kms
Trolley Grease	40,000-80,000 kms
Gear Oil	72,000 kms
Crown Oil	72,000 kms

Source: Company Records.

EXHIBIT 8

Truck IN & OUT Times

Sample Data (Showing 7 out of 340 Cases)

Vehicle No	In Date	In Time	Out Date	Out Time
GA-5988	01-09-2013	10:00:00	01-09-2013	18:30:00
GA-9388	01-09-2013	10:10:00	01-09-2013	16:50:00
GE-1706	01-09-2013	10:25:00	01-09-2013	16:00:00
GD-4542	01-09-2013	10:30:00	01-09-2013	11:00:00
GB-6778	01-09-2013	10:35:00	06-09-2013	19:30:00
GD-8714	01-09-2013	15:00:00	01-09-2013	18:45:00
GA-7292	02-09-2013	09:45:00	02-09-2013	12:15:00

(Contd.)

Vehicle Statistics on Time Spent in Workshop
[Data Available for 340 cases from April 2013 to June 2013]*

Trucks Spent Less Than 1 Day	310
Trucks Spent More Than 1 Day	30
Trucks Spent More Than 2 Days	8
Trucks Spent More Than 5 Days	5
Trucks Spent More Than 20 Days	1

(* These time duration statistics below are inclusive of value added (VA), non-value added (NVA) and waiting times. Driving in and out times are a portion of NVA time.)

Max No. of Days [^]	1	2	3	4	5	6	8	21	>=22
Mean Times (Minutes) [#]	259.5	358.3	366.7	366.7	401.2	446.8	505.8	592.4	592.4
Std. Dev. Times (Minutes) [@]	259.8	455.1	479.9	479.9	653.1	879.5	1163.9	1974.0	1974.0

[^] = It is a Data Table. If data for trucks spending more number of days (than Max # Days) are ignored, these would be the mean and standard deviation of time spent in the workshop.

[#] = Mean of time spent by trucks in the workshop in Minutes (those spending maximum N or more days).

[@] = Standard Deviation of time spent by trucks in the workshop in Minutes (those spending maximum N or more days).

Source: Company documents and analytics performed on the data by the case writer.

■ SUGGESTED QUESTIONS ■

1. What are the workshop resources that affect the throughput time of the truck repairs? Why is rightsizing the labour pool important?
2. Which resource do you think is causing delays in repair—the bays or the labourers? What should be the right size of both the resources to minimize the delays?
3. Is the interaction among the resources (i.e. the delay caused by a worker or a truck waiting for a bay to be available) significant?
4. What are the other issues faced by Kundanmal Mukanmal Trans Logistics Pvt. Ltd. (KM) management at the workshop? What remedial measures or management practices would you suggest to counter these issues?

■ APPROACH FOR ANALYSIS ■

The goal is to estimate the right number of workshop resources given an estimate of the job volumes. The maintenance job completion time is dependent on both, the number of bays as well as the number of workers. However, based on the case facts it is evident that extra manpower resources create a disturbance by colluding with the drivers. Lower manpower resources can cause excessive waiting time before job completion. Hence, to streamline the workshop operations it is essential to have an optimal number of resources.

To identify the resource responsible for causing the delay in repairs, it is necessary to calculate the individual utilization of the labour groups by department and bays. For labour groups, if the utilization value is more than 100 per cent, it indicates that the overall available bandwidth of all labourers taken together in that department is less than the work piled up in that department. On the other hand, if the utilization value is too low, it indicates that the department is overstaffed and the number of workers in that department can be reduced to reach a desirable level of utilization. Recommendations can be made from the calculation of bay utilization along similar lines.

Apart from rightsizing the number of bays and the number of labourers, the case highlights several other issues affecting the operational efficiency of KM such as the skill level of the labourers, job segregation, etc.

Case

6

CASE CONTEXT

Kundanmal Mukanmal Trans Logistics Pvt. Ltd. (KM) was a well-known road transportation company in western India, operating out of its headquarters as a family-owned business in Jaipur. It functioned as a logistics provider for flatbed steel and finished automobiles (primarily four-wheeler passenger cars and light to medium cargo vehicles). The case highlights the spare part inventory management challenges faced by KM in managing its workshop operations.

Spare Parts Procurement Planning at KM Trans Logistics

"We want to turn our inventory faster than our people."

James Senegal

"Less emphasis on inventories, I think, may tend to dampen business cycles, because business cycles are typically in the grasp of inventory cycles and heavy industry cycles."

Paul A Volcker

It was a clear and sunny winter morning of February 2014 in Gidani. However, the people in the office of the Executive Director of workshop operations, KM Trans Logistics India Pvt. Ltd, were in a somber mood. Anuj and Arihant Jain, the Executive Directors in-charge, were discussing fresh problem created by store managers of the workshops in Gidani and Gurgaon. The problem was disorderly procurement of spare parts (for repair and maintenance of trucks) by store managers. Every few days, adhoc purchase orders were raised for vendors in batch quantities of 50 or 100.

Anuj picked up his phone to call the store manager in Gurgaon while Arihant paced the room thinking what could be done. The store managers were only harbingers of the larger issue at hand. The challenge was to start seeking alternative solutions to stabilize ordering of spare parts. Better inventory management tools would prove to be just the right thing at a time when the company had started to make losses owing to a slow and sluggish manufacturing sector. Kundanmal Mukanmal Trans Logistics Pvt. Ltd. was a road transportation company functioning as a logistics provider for flatbed steel and finished automobiles (primarily for passenger cars and light to medium cargo vehicles).

With the Gidani workshop dedicated to repair and maintenance of a large fleet of 175 trucks; management of spare parts inventory was a major cause of concern. A software programme to calculate what to order and when to order seemed to be the best possible solution to them at that moment. A software solution named 'MIST'—MIS for Transporters—was procured from a

Prepared by Professor Debjit Roy, Indian Institute of Management, Ahmedabad and Mr Arindam Bandyopadhyay.

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vendor in Delhi. Though it was a miniature Materials Requirement Planning (MRP) system, providing features such as alarms, notifications, automatic invoicing, and inventory control; the software was not capable to estimate the values of inventory control input parameters.

THE COMPANY

KM Trans was founded by two brothers, Kamal Kumar Chandwar and Prabhachand Chandwar in the Pink City, Jaipur, in India on August 23, 1988. Their father, Madan Lal Chandwar migrated to India at the time of partition between India and Pakistan. The family started business with textile retail stores in Pakistan and India, and then sold the business to start a Spices Trading business, naming the company as Kundanmal Mukanmal Traders Pvt. Ltd. When the business did not perform as per the expectations, they started manufacturing storage tankers for diesel, petrol, and lubricants, including the gigantic ones seen at depots owned by large oil companies. This too, did not work out too well and the Chandwar brothers decided to venture into logistics and transportation business throughout India. An organizational structure chart is given in Exhibit 1. A detailed family tree is presented in Exhibit 2. Exhibit 3 highlights the income statements for three fiscal years—2010-11, 2011-12, and 2012-13.

The company did fairly well in the lucrative logistics and road transportation business, with the lion's share (96%) of the total revenues of the company coming from road transportation of flatbed steel and manufactured automobiles. It chose to transport only those goods such as steel and cars which had higher turnover and profits, in addition to the benefit of having to deal with only professional managements in both categories. Hence, even after 25 years of business, the company was not considering transporting any other commodity in the near future. The rest of the revenues (4%) of KM Trans came from Kota stone polishing and some real estate activities.

KM Trans maintained a fleet of 625 flatbed and car carriers, and had recently added chassis carriers to the fleet – making it three categories of vehicles in all. Nearly 600 (97%) of the owned vehicle fleet were manufactured by TATA Motors.

The 'car carriers' segment transported nearly 17,000 cars per month. The 'chassis/truck carrier' segment transported around 225 trucks per month, while the 'Flatbed Steel' business segment carried nearly 11,000 tons of steel per month.

The company owned two workshops. The Gurgaon workshop was spread on a sprawling 0.5 acre open land near Manesar, Haryana, whereas the Jaipur workshop in question was located in Gidani, a village in Dudu District of Rajasthan which was nearly 50 kms from Jaipur, the capital city of Rajasthan. Out of the 625 trailers, 175 were repaired and maintained in the Gidani workshop, whereas the remaining 450 trailers were maintained by the Gurgaon workshop which enjoyed locational advantage being close to Delhi, the national capital. The Gurgaon operations faced minimum labor problems as the laborers there were paid on salaried terms and conditions

(unlike Gidani where payment was on per job basis). The salaried payment structure worked well there because of a professionally managed team and trained and more educated workers who demanded a fixed minimum remuneration. However, since the Gidani workshop was equipped with better technology and machinery, some trailers would come for repairs en-route their delivery to the client. The family was based in Jaipur city and hence, the Gidani workshop enjoyed direct care and attention from the owners.

KM Trans faced competition only from small time flatbed steel transporters in West and North India, and a few from South India. In car carriers business, there were small to medium sized transporters who generally associated with known contacts of dealers. Hence, there was competitive rivalry amongst them. Also, there was stiff competition from steel transporters from the East. There were a number of steel manufacturers including large conglomerates such as TATA Steel and JSW Steel, which had long term contracts with transporters making it very difficult to get new clients in the East. The company, therefore, had almost all of its loading points located in the northern and western half of India – Jammu and Kashmir, Himachal Pradesh, Delhi, Punjab, Haryana, Rajasthan, Madhya Pradesh, Maharashtra, Andhra Pradesh, Karnataka, Kerala, and Tamil Nadu.

Unloading points, however, were spread throughout the country. “You will find KM Trans unloading points including warehouses right from Srinagar in the North to Kanyakumari in the South. At least one KM Trans unloading point could be located at every 50-100 kms on the map of India. However, the same cannot be said about loading points,” said Arihant. “Even drivers are reluctant to go to the East for picking up loads since they are not aware of the routes and fear bad roads and weather due to incessant rains. Most of the drivers are from the North and West,” he added.

KM Trans executives decided to transport only flatbed steel since hot rolled/cold rolled (HR/CR) coils were huge and needed special machinery and cranes to be loaded and unloaded. During the early formative years of the business, there were a few cases of the HR/CR coil loosening from the shackles, getting untied and ramming into the horse¹ of the truck, badly damaging the horse and killing the driver instantly. After such instances, the company decided to transport only flatbed steel. Since majority of steel plants were located in East India, the major transporters were located in East, East-North, and South-East parts of India exclusively. KM Trans enjoyed locational advantage since the steel plants in western India had them as a major transporter, primarily because Eastern part of the country was handled by other key players such as East India Transport Agency (EITA), DARCL, and several other small players with an annual gross

¹ In a truck, the front part containing the locomotive machinery with the driver, engine and cabin is called the horse, whereas the latter part which carries and contains the load is called trailing part or trailer. The horse part is self-sufficient for locomotion and powers the truck whilst the trailer is just a passive carriage with no power or propulsion mechanism. The truck cannot move without the horse part.

turnover varying from INR 100 to 1,000 million annually. Other players in flatbed steel and automobile carriers business across the country were—SVLL, IDEAL, Del-Baroda-Road Carriers, Del-Gujarat-Freight Carriers, Chetak, Mahavira, etc.

What have I done!!

Before the clock on the desk struck 10AM, Anuj wanted to act. As he stared at the computer printout of an invoice, he prepared to call Suresh, the store manager in Gurgaon to make him understand the seriousness of the situation created by adhoc ordering. His fingers trembled in anxiety.

In Gurgaon, the store manager was enjoying his early morning tea with the fellow mechanics at the workshop. Suddenly, his phone rang. He fumbled to take the call, knowing whom it was from, feeling nervous already.

Suresh: [In a disturbed voice] Hello Mr Anuj. How have you been doing? I hope everything is going perfectly.

Anuj: Good morning Suresh! I called to check if you're aware of Invoice # 3128906 dated 4th January 2014 sent to Advance Automobiles; 3 barrels² of engine oil. I hope it sounds familiar.

Suresh: Yes. Dinesh (store helper) placed the order 2-3 days back. Has anyone from Advance Auto replied as to when they are going to supply it? I'm expecting the barrels to be here before evening.

Anuj: They'd rather not deliver it. I want the order cancelled.

Suresh: [cutting short] But why? Trucks were waiting last week due to engine oil shortage. I didn't want a repeat of that situation and hence I ordered the barrels that would take care of the demand for next 15 days! Are you sure we need to cancel it?

Anuj: Suresh, for the past several months, I have been noticing the irregularities in making spares available on time. On several occasions trucks have to wait due to shortage and at other times you order in huge excess. Do you realize that we incur an interest cost which amounts to a staggering 10% of the excess inventory?! Had we been required to pay rent for the storage space or very high insurance premiums, our business would not be running till this date! I hope you understand my point. Also, please do the order cancellation as soon as possible.

Suresh: Yes, I understand, Mr. Anuj. I thought I had predicted the demand correctly last week but two accident and five oil change cases came in together which consumed lots of engine

² One *barrel* equals 210 liters of fluid (oil or lubricant). In workshops, fluids are ordered in multiple units of barrels. Opened or unsealed barrels are generally rejected at the time of inspection.

oil. After that, I could do nothing but to make the next trucks wait. Hence, this time I thought it better to order in excess. Did I make a mistake?

Anuj: Suresh, we need to be very careful from now on. We cannot continue like this. Our income statements have begun to show losses for the first time in several years. Next order onwards, we need to provide a better order quantity estimate for each spare part that you include in the e-mail every time you place an order. I hope you will be able to do that.

Suresh: Yes. I will ensure that I calculate properly before ordering next time.

Workshop Operations

The Gidani workshop was fairly self-sufficient as far as repair and maintenance of trucks was concerned. The family decided not to engage authorized service centers for repair and maintenance of trucks because they not only increased the cost per repair, but also caused excessive delays, taking up to five days to repair small problems which could be fixed in a matter of a few hours if done in-house, provided mechanics and all spare parts were made available. On some occasions, service centers even performed unnecessary repairs, that is, parts that might not need repairs in the near future were replaced or tampered with unnecessarily. Recently, the workshop acquired a TATA authorized service center status. It continued to hold repair operations for its own trailers. The management did not plan to engage in repair work for trailers owned by other parties as it would be hard to deliver others' trucks on time, when they were struggling to keep pace with their own fleet. The number of trailers owned by KM Trans (with the categorized breakup) during the last three years is given in Exhibit 4.

The workshop procured all its spares inventory from authorized dealers of spare parts and stored them in its own stores in the workshop after batch inspections at Jaipur sales office. Spare parts were issued to mechanics for repair and maintenance. Shortage of spare parts was generally not a major problem for the workshop. When a truck arrived at the workshop, the driver was expected to first inform the security personnel at the gate about the problems in the truck that required repair. If it was a very minor issue requiring less than 30 minutes of repair time (for example, headlight broken, minor lubrication, small wiring changes), it was not allowed to enter the premises. Repair was done outside the gate directly on the service lane outside the workshop.

All repairs were carried out in-house. Some parts were procured from local dealers at lower cost – which might be of inferior quality, but the advice of expert technicians and the works manager was generally taken in cases of deviation from genuine component purchases.

The bays and mechanics were reserved for KM Trans fleet only. With regards to outsourced repair, a few cases of accident, engine overhaul, Fuel injection pump (FIP), steering, radiator, turbocharger, boring engines, and alignment were contracted to third parties who were allowed to bring mobile vans to the workshop for conducting repairs. Sometimes, giving a call to mobile repair vans worked well to save time and trouble. Some tasks such as wheel balancing had to

be necessarily outsourced as it was not feasible for the company to incur high fixed costs of purchasing and maintaining computerized high technology machinery which would be used sparingly. In case of outsourced engine overhaul, the truck would occupy the bay for the entire duration of time the engine was under repair (separated from the horse). These trailers weighed several tons and it would be costly to invest on a machine that could tow away the trailer while the engine had gone for repair. This was another factor contributing to low efficiency of operations.

Some spare engines, engine components, gears, radiators, and a few critical components were repaired and kept as standby on rotational basis to save time and money during emergency delivery situation. Delays were greatly minimized using these spare components.

Seasonality of jobs also played a role in spare parts ordering – for example, in the rainy season, tyre problems and accidents were more frequent. During summers, engine overheating and head repairs were more common; while in winters, lamp repairs were frequently reported by drivers. Anuj neither wanted to use the MIST software for ordering seasonal items, nor was he interested in calculating inventory parameters for such items since they could be ordered on-demand and at will.

Store Operations

The stores were located within the workshop premises in both Gurgaon and Gidani. The Gidani workshop was established in June 2004 when the company decided to carry out repairs on their wholly-owned fleet rather than involving authorized service centers. The stores were established in 2009 and renovated once in 2011 to create space for more spare parts.

Prior to 2009, spare parts were managed by a local third party vendor in Jaipur. The vendor was given some space in the workshop to stock parts and operate efficiently. However, things did not work out well as there were frequent problems of trucks waiting for spare parts. Also, there were repeated issues of over-pricing and fraudulent billing. Hence, the vendor was de-contracted and the company decided to start stocking parts on their own.

Exhibit 5 shows the layout of the stores. The engine room as shown was also established in 2011 when the company started stocking spare engine, gear and clutch components. As seen in the layout, there was a tyre and lubricant storage room where, in addition to five barrels of engine oil and 1-2 barrels of lubricant; new and used tyres were kept. Tyres were ordered by very senior executives of the company because of heavy inspection and high level of adherence to minimum specifications and quality and high expense incurred in purchasing. Each tyre was procured for a price of minimum INR 18,000, ordered only from specialized vendors, inspected thoroughly for marks, proper treading, thickness, sturdiness, shape, design, and several other parameters and was tested at the workshop before being accepted. After it passed inspection, it was stored in the room as given in the layout. Because of these reasons, “we would like to keep tyres out of our calculations, they were procured by senior executives anyway,” said Anuj.

The main store room, as seen in the layout, was 5m X 6m in size and had four rows of storage racks, each row having five racks making it a total of 20 racks. There were six shelves in each rack and these shelves were separated from one another by a vertical gap of nearly two feet. When all the shelves were full, the spares which would not be affected by dust, moisture, water, chemicals or pests and rodents were kept on the floor. This room could hold 5 to 10 units of each spare part. Exhibit 6 contains the list of top 50 spare parts used in the workshop. These were either the most expensive or the most fast-moving components used in trucks, in other words, of utmost interest and importance for the store manager. Exhibit 7 contains the usage pattern of each of these parts for 36 months i.e. from January 2011 to December 2013.

The fast moving (highest demand) items were kept close to the stores helper for easy accessibility. The heaviest items were kept in the lower shelves whilst the lighter ones on the top. Engine Oil was the most frequently used item followed by light bulbs. Engine oil arrived in barrels and the barrels were taken directly to the lubricants and tyre storage room. There was an electric-mechanical extraction system that pumped out required amount of oil from the barrel in varying amounts corresponding to each type of truck. This prevented any oil contamination or back-flow into the barrel. There was less than 0.5 per cent oil wasted due to spillage or pilferage. The same applied to other spare parts as well. Wastage, in whatever small amounts, happened only if there was some technology upgrade or the truck for which the part was intended got irrecoverably damaged or was sold. There was negligible loss incurred due to bad recordkeeping.

The spares room cleaning and maintenance cost was nearly INR 7,500 per month. The store manager got a salary of INR 15,050 per month and the store assistant got INR 13,000 per month as compensation. Both these executives were present at the store during regular working hours of the workshop from 10.00 AM to 6.00 PM daily with an hour of break in between. They were responsible for tracking parts arrival, issuing parts to mechanics, updating job sheets and parts requisition, and updating the inventory level on computer. Mechanics generally did not have to wait for more than five minutes to get the requisite spare parts.

KM Trans paid an insurance premium of INR 18,685 per annum for the spare parts and the stores. The opportunity cost was nearly INR 2,500 per truck per day hence it was crucial for all parts to be made available on time. Any delay in parts availability that made a truck wait for the next day to get repaired was unacceptable. The cost of processing orders-forms, paper, phone, email, labor, and other things was nearly INR 1,500 per month.

The workshop did not use any computer-based intelligence or software for inventory management. The MIST software was to bring in a welcome change, reducing manual effort and errors in procurement schedules.

Procurement Policy

Parts were ordered via a two-leg transportation mechanism wherein the Jaipur sales office acted like a miniature warehouse for preliminary counting and inspection of the next incoming order.

A bunch of vendors catering to the orders of all the transporters in Gidani area packed the combined set of spare parts into a van such that all the space in the van was fully utilized. The van did the rounds in Jaipur almost daily and each transporter got his orders delivered, counted, and inspected before the van left for the next transporter. The van was released from duty only when it was empty. KM Trans got some or the other invoice delivered every day. On average, every spare part got delivered twice a week – mostly due to mismanaged inventory orders by store managers. This comprised the first leg of transportation.

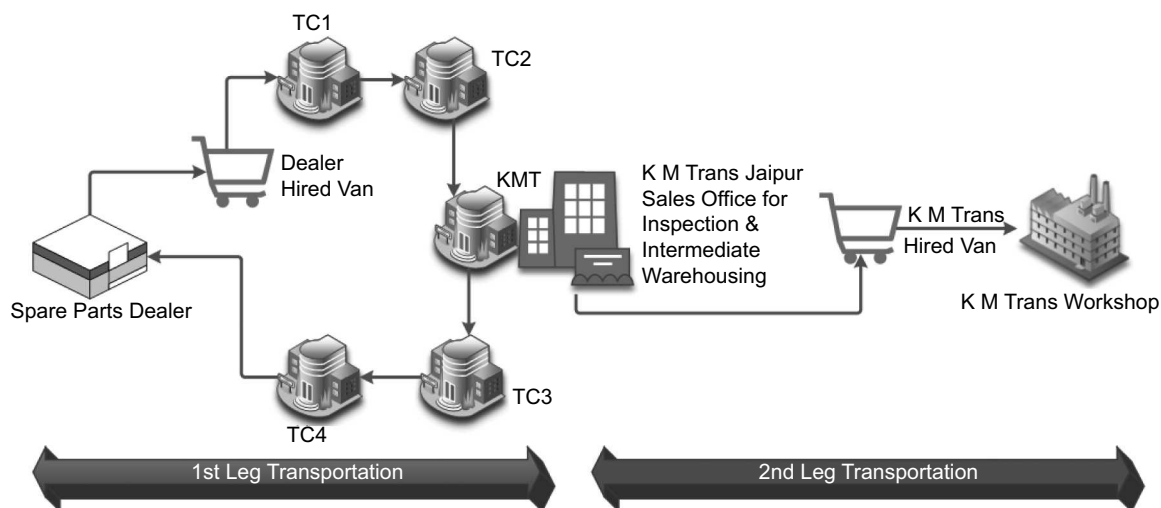


Figure 1 Two-leg transportation at KM Trans workshop stores in Jaipur.

Note: TC1 to TC4 denote the other transportation companies in Jaipur being served by the same dealer. The same van distributes parts to all the companies in the vicinity. As many parts as possible are filled in the van before it leaves for its rounds. This is done by the dealer to save transportation costs.

In the second leg, the parts from the Jaipur sales office were taken to the workshop stores as and when the need arose. The order quantity and procurement schedule in the second leg too depended on the discretion of the store manager, rather than an analytical or quantified mechanism of calculating when and how much to order (see Figure 1). The van used for the second leg transportation was hired by KM Trans and not by the parts dealer or any other party. If a part was required urgently such that waiting for a van to be hired would make the trucks under repair wait on the bay; an executive of the workshop was authorized to carry the part(s) in his personal vehicle on way to office.

Shipping Costs came to nearly INR 20,000 per month (tempo, carriage of parts, packaging items, etc.). Handling costs (loading, unloading, and miscellaneous expenses), generally incurred once every week, was nearly INR 980 per order for the first leg from dealer to Jaipur office and INR 200 per order for the second leg from Jaipur office to workshop.

Most transporters in the vicinity of Jaipur followed this two-leg transportation scheme since it allowed for the registered sales office to do a preliminary inspection and intermediate warehousing. Also, it prevented shocks in inventory – when there was either too low or too high demand for repairs. After KM Trans started their own stores, they actually saved transportation costs, out of schedule deliveries, and also streamlined the procurement to a great extent. Price fluctuations reduced, fraudulent billing was eliminated completely, and most importantly, the instances of trucks waiting at the bays requiring repair due to shortage of spare parts reduced considerably.

The average time for arrival of parts from the dealer to the intermediate Jaipur warehousing office was generally 1.5 days with a standard deviation of 0.2 days. From the warehouse it took an average of one day for the parts to reach the workshop store with a standard deviation of 0.2 days. Hence, from the time orders were placed, parts generally reached within three days.

The Mystery of MIST!

As Anuj and Arihant pondered over the issues plaguing their store operations and whether, how and when the MIST software could be put in place to streamline their inventory procedures, the phone rang once again at 4.15 PM.

Caller: “Hello Mr. Arihant.”

Arihant: “Yes, who is it?” Arihant switched on the loudspeaker for Anuj to hear.

Caller: “This is Hari calling from Delhi regarding our MIST software deal with KM Trans.”

Arihant: “Hello and Good Morning. We need to discuss a few things. The most important among those is - What all parameters do we need to supply to the software to make it take over inventory control all by itself?”

Caller: “You need to provide maximum inventory order-up-to level, inter-order time period in days, and the reorder level for each of the spare parts. After that, it should be able to take over.”

Arihant: “OK. When can you send a technician over to set things up here?”

Caller: “Not before 21st February but definitely before 1st March. We only have a single visiting technician earmarked for semi-premium customers and he is going to leave for Calcutta on 1st of March.”

Arihant: “That is going to be a problem. We do not have the calculations in place at the moment. The server hardware hasn’t been set up as yet. It is hard to believe that you do not have any other technician who can guide us. Please make alternate arrangements.”

Caller: “Sorry for the inconvenience, Mr. Arihant. The only advice that I can give you is to ask you to upgrade your membership to a premium category. Then we can give you a dedicated technical advisor and consultant. This will cost you INR 254,000 in addition to your current subscription.”

Arihant: "We will think about that. But as for now, please book 28th February as our meeting date with your executive. There is no way we can finish our inventory calculations before that."

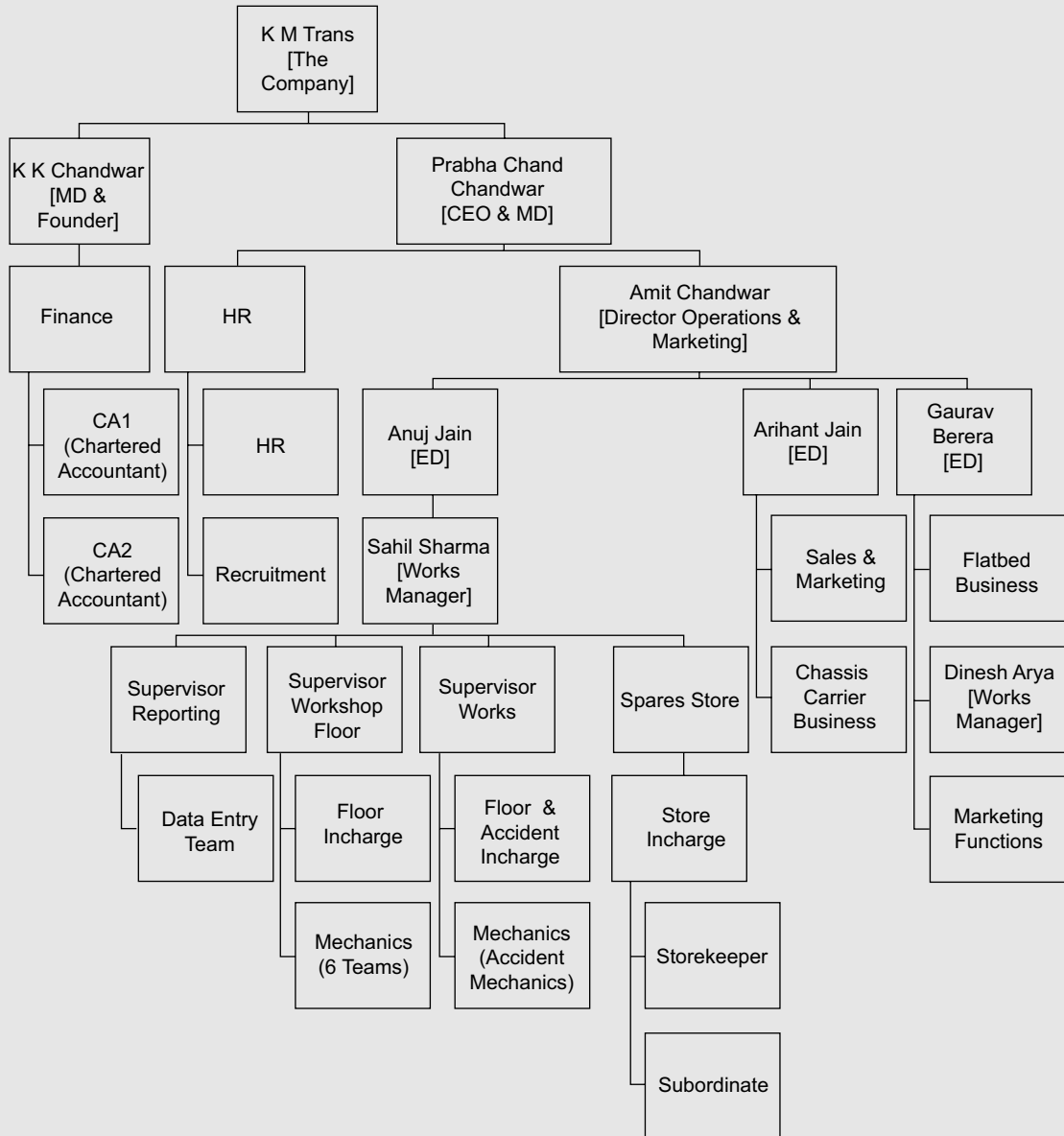
Caller: "Definitely. Goodbye."

Arihant: "Goodbye."

Anuj stared at Arihant trying to absorb his brother's predicament. February 28 was fast approaching. There was hardly any chance of them completing their number work till the executive arrived but it had to be done anyway to prevent inefficient inventory ordering in future. INR 254,000 for a dedicated consultant was too much of a price which they could do well without spending. They wondered what to do.

EXHIBIT 1

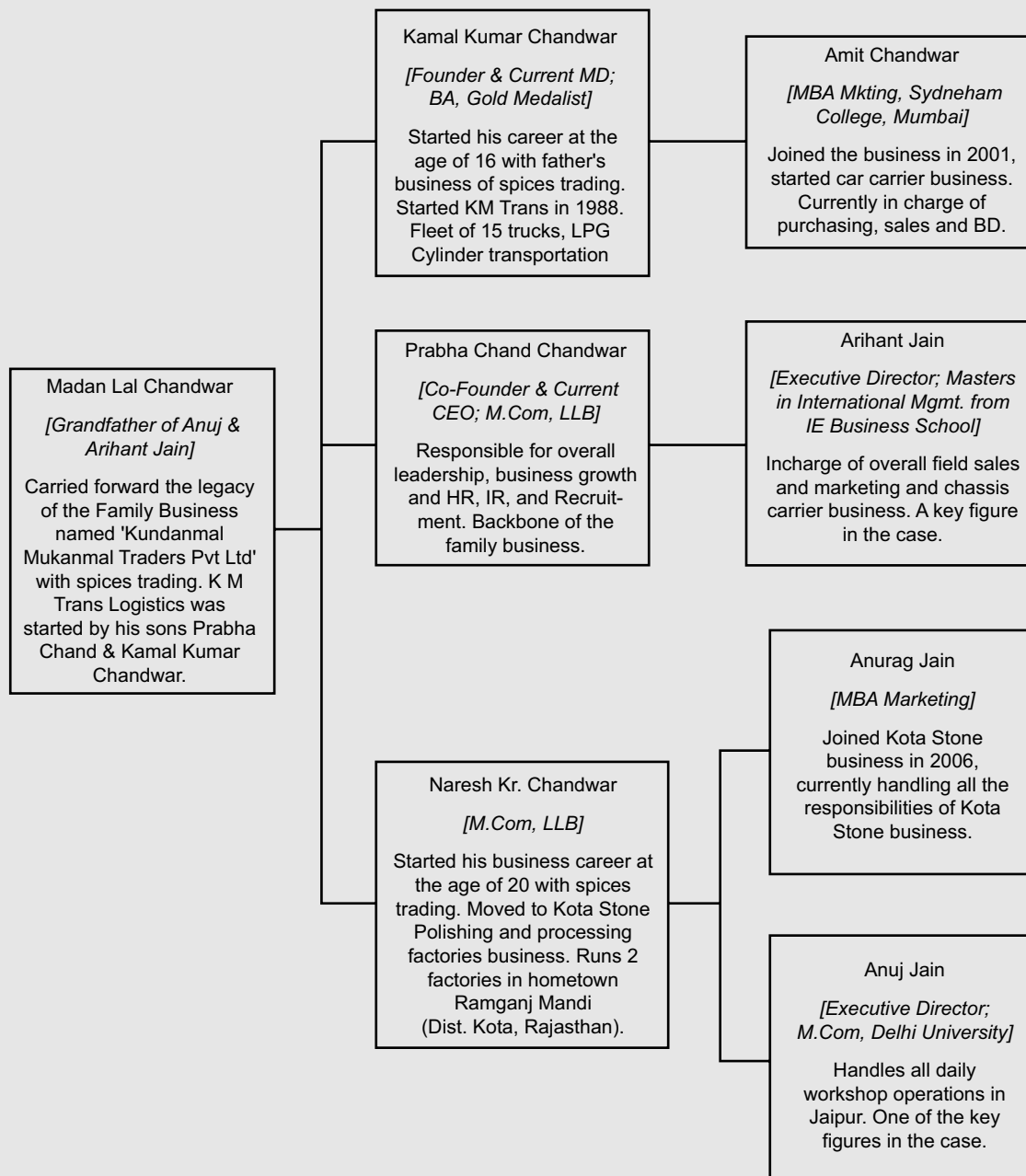
KM Trans Organizational Structure



Source: Interview and Author's Analysis

EXHIBIT 2

Family Tree



Source: Interview and Company Records

EXHIBIT 3**KM Trans - Income Statements**

Income Statements (in INR crores)	2010-11	2011-12	2012-13
Revenues	155.75	181.13	190.87
Operating Costs	120.70	140.41	153.90
Gross Profit	35.05	40.72	36.97
Admin Expenses	2.03	2.53	2.91
Selling Expenses	22.53	26.59	23.86
Employee Benefit Exp.	2.59	3.35	4.49
PBIT	7.63	8.25	5.71
Interest Expense	6.48	7.69	7.13
PBT	1.15	0.56	-1.42
Tax	0.26	0.19	-0.15
PAT	0.89	0.37	-0.32

Source: Interview and Company Records

EXHIBIT 4**Fleet Size Variation**

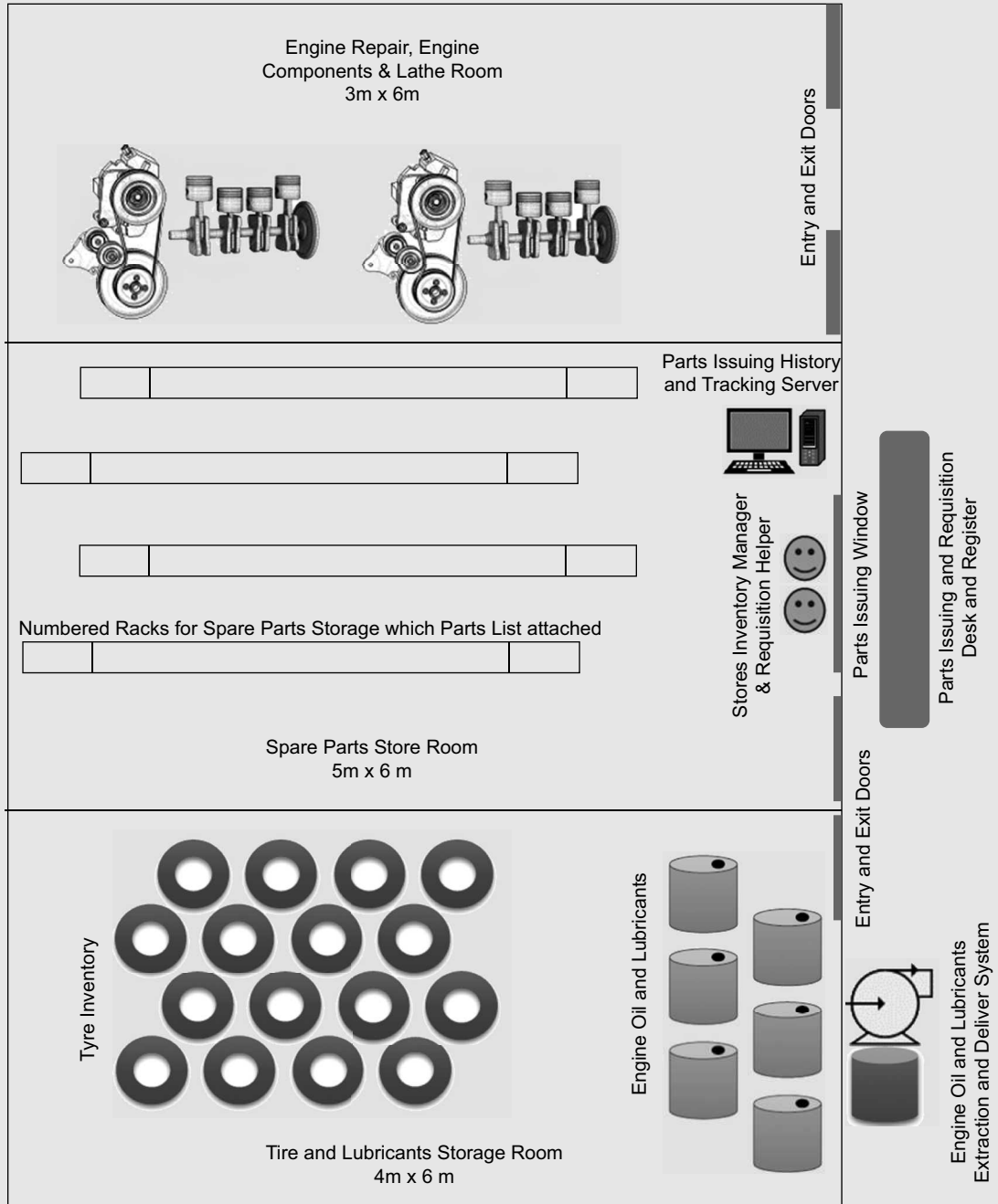
(September 2010 - December 2013)

As on Date	Car Carrier	Flat Bed Carrier	Chassis Carrier	TOTAL
30/09/2010	356	140	0	496
31/03/2011	359	142	0	501
30/09/2011	401	174	0	575
31/03/2012	412	160	0	572
30/09/2012	417	152	05	574
31/03/2013	412	143	25	580
30/09/2013	420	119	53	592

Source: Interview and Company Records

EXHIBIT 5

Stores Layout



Source: Company Records

EXHIBIT 6**Spare Parts List- Top 50**

(Most Expensive & Most Frequently Used)

Part No.	Part Name	Part Cost INR	Supplier	Supplier Name	Min Order Qty.	Cycle Service Level	Co/Cu
P_0000M1	Engine Oil Ch4	167	Shell	Advance Tacmte	209	100	0.010
P_275225200106	Clutch Plate 60No.	4,200	Tata Motors	Vijay Automobiles	5	100	0.005
P_275225400105	Pressure Plate 60No.	9,600	Tata Motors	Vijay Automobiles	5	100	0.005
P_278609139908	Air Filter Outer	1,001	Dealer	Vijay Automobiles	20	100	0.005
P_278607989916	Water Separator	371	Tata Motors	Vijay Automobiles	24	100	0.005
P_0000M5	Crown Oil 85W140	158	Shell	Advance Tacmte	209	100	0.010
P_0000M2	Engine Oil Ci4	175	Shell	Advance Tacmte	209	100	0.010
P_272425200134	Clutch Plate 75No.	5,796	Tata Motors	Vijay Automobiles	3	100	0.005
P_252718130145	Oil Filter N/M	1,052	Tata Motors	Vijay Automobiles	10	100	0.020
P_272425400129	Pressure Plate 75No.	10,062	Tata Motors	Vijay Automobiles	3	100	0.005
P_0000M4	Gear Oil 80W90	158	Shell	Advance Tacmte	209	100	0.010
P_278609119904	Diesel Filter	185	Tata Motors	Vijay Automobiles	24	100	0.005
P_278609139909	Air Filter Inner	330	Dealer	Vijay Automobiles	20	100	0.002
P_0000M7	Coolant	135	Valvoline	Vijay Automobiles	50	100	0.001
P_278618139902	Oil Filter	210	Tata Motors	Vijay Automobiles	24	100	0.005
P_265172300105	Door Lock	221	Vendor	Ramanuj Motor	20	100	0.005

(Contd.)

Part No.	Part Name	Part Cost INR	Supplier	Supplier Name	Min Order Qty.	Cycle Service Level	Co/Cu
P_269126204623	Synchro Cone	1,690	Dealer	Vijay Automobiles	10	100	0.002
P_278605999928	Tappet Cover Gasket	67	Tata Motors	Vijay Automobiles	120	80	0.005
P_257681100153	Side Glass	83	Vendor	Shubh Laxmi	48	100	0.005
P_10000012467	2467 Bulb	15	Dealer	Goyal Automobiles	220	80	0.010
P_10020010	Clutch Booster 3518	4,587	Dealer	IMPL	4	100	0.005
P_269126204635	Synchro Cone 5/6	1,754	Dealer	Vijay Automobiles	6	100	0.002
P_278609999920	Fuel Strainer	108	Tata Motors	Vijay Automobiles	20	80	0.005
P_27861599996302	Fan Belt	398	Tata Motors	Vijay Automobiles	10	50	0.001
P_278620999937	Viscous Ass. 3516	4,700	Dealer	Bhagwati Intl.	2	100	0.002
P_100001566563	Wheel Bearing 566/563	857	Nbc	Metro Sales	5	100	0.002
P_10000012441	2441 Bulb	14	Dealer	Goyal Automobiles	220	80	0.010
P_278615999902	Fan Belt Tensioner	1,849	Tata Motors	Vijay Automobiles	5	80	0.002
P_100001580572	Wheel Bearing 580/572	820	Nbc	Metro Sales	5	100	0.001
P_278620999959	Water Pump Bs2	2,013	Tata Motors	Vijay Automobiles	3	100	0.002
P_4000041243	Head Light Bulb 12V 43T	181	Dealer	Goyal Automobiles	20	80	0.002
P_0000M9	Brake Oil 250Ml	233	Tvs-Girling	IMPL	10	100	0.002
P_278613999920	Kit 1/226	357	Webco	IMPL	10	80	0.005
P_257689100149	Cabin Shocker	422	Tata Motors	Vijay Automobiles	10	80	0.002
P_4000042443	Head Light Bulb 24V 43T	201	Dealer	Goyal Automobiles	20	80	0.002

Part No.	Part Name	Part Cost INR	Supplier	Supplier Name	Min Order Qty.	Cycle Service Level	Co/Cu
P_278614605802	Hump Hose	172	Vendor	Modi Motor	10	100	0.005
P_300003070	Kit 3/70	357	Webco	IMPL	10	80	0.005
P_278613999916	Kit 1/215	193	Webco	IMPL	10	80	0.005
P_261854249910	Horn 24V	255	Dealer	Shubh Laxmi	10	100	0.005
P_266835607701	Rear Wheel Oil Seal	55	Silver Seal	Modi Motor	30	100	0.002
P_269854209980	Horn 12V	151	Dealer	Shubh Laxmi	10	100	0.005
P_300003066	Kit 3/66	236	Webco	IMPL	5	80	0.005
P_257633403103	Wheel Bearing 32308	493	Nbc	Metro Sales	6	100	0.001
P_7000000001	Three Bond Big	90	Vendor	Modi Motor	20	100	0.005
P_26216033	Alternator Cutout 6033	737	Dealer	Shubh Laxmi	3	70	0.001
P_80000001601	Joint Socket 6Way	55	Dealer	Shubh Laxmi	20	100	0.001
P_261854500101	Combination Switch	401	Vendor	Shubh Laxmi	5	100	0.003
P_257633407801	Front Wheel Oil Seal	35	Silver Seal	Modi Motor	30	100	0.002
P_266835605301	Axle Packing 8Hole	6	Moto	Modi Motor	60	100	0.001
P_600006001	Fog Lamp	177	Dealer	Shubh Laxmi	48	70	1.000

Source: Interview and Company Records

EXHIBIT 7
Parts Usage (2011)

(Month-wise Count)

Part No.	Part Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
P_0000M1	Engine Oil Ch4	0	451	580	468	489	692	535	1634	1170	633	840	878
P_275225200106	Clutch Plate 60No.	6	3	3	4	11	3	5	14	15	6	19	22
P_275225400105	Pressure Plate 60No.	0	0	1	2	0	1	4	4	9	3	8	7
P_278609139908	Air Filter Outer	8	14	20	14	25	28	20	18	51	12	31	32
P_278607989916	Water Separator	40	37	26	36	47	40	39	106	68	48	124	116
P_0000M5	Crown Oil 85W140	0	45	46	55	62	80	30	288	202	107	45	97
P_0000M2	Engine Oil Ci4	501	149	0	0	0	0	0	0	0	0	0	0
P_272425200134	Clutch Plate 75No.	1	1	1	0	0	0	0	1	2	1	2	0
P_252718130145	Oil Filter N/M	0	0	0	0	0	0	0	0	0	0	1	0
P_272425400129	Pressure Plate 75No.	2	0	0	0	0	0	0	1	1	0	1	0
P_0000M4	Gear Oil 80W90	0	0	0	42	50	289	41	244	149	106	94	79
P_278609119904	Diesel Filter	4	37	26	36	47	40	39	105	68	49	124	119
P_278609139909	Air Filter Inner	10	15	17	11	25	28	20	20	50	15	26	29
P_0000M7	Coolant	49	54	34	41	38	62	49	47	77	68	52	41
P_278618139902	Oil Filter	22	29	15	24	46	34	27	110	53	32	107	89
P_265172300105	Door Lock	23	21	22	23	25	14	22	38	22	33	88	99
P_269126204623	Synchro Cone	0	0	0	0	0	0	2	5	9	8	0	0
P_278605999928	Tappet Cover Gasket	42	39	46	34	7	10	54	101	98	93	226	138

Part No.	Part Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
P_257681100153	Side Glass	48	53	49	24	45	45	57	49	132	84	123	151
P_10000012467	2467 Bulb	305	172	204	344	312	267	332	443	641	424	474	532
P_10020010	Clutch Booster 3518	0	0	0	0	0	0	0	0	0	0	0	0
P_269126204635	Synchro Cone 5/6	0	0	0	0	0	0	2	5	5	5	0	0
P_278609999920	Fuel Strainer	16	9	9	7	4	12	15	19	24	11	38	36
P_27861599996302	Fan Belt	3	13	4	10	4	4	7	7	9	3	8	7
P_278620999937	Viscous Ass. 3516	0	0	0	0	0	0	0	0	0	2	2	0
P_100001566563	Wheel Bearing 566/563	1	0	1	2	0	0	1	3	3	3	4	1
P_10000012441	2441 Bulb	446	280	250	207	228	309	353	615	546	484	468	471
P_278615999902	Fan Belt Tensioner	1	1	1	3	0	2	3	1	1	0	0	0
P_100001580572	Wheel Bearing 580/572	2	1	4	1	2	1	1	6	5	3	2	2
P_278620999959	Water Pump Bs2	0	0	0	1	0	1	1	0	2	0	1	1
P_4000041243	Head Light Bulb 12V 43T	15	0	4	11	24	7	8	18	20	16	24	18
P_0000M9	Brake Oil 250Ml	9	9	6	11	4.5	8	10	8	15	15	30	14
P_278613999920	Kit 1/226	2	5	5	5	4	0	4	2	4	5	10	3
P_257689100149	Cabin Shocker	1	0	2	0	2	1	2	3	4	4	3	3
P_4000042443	Head Light Bulb 24V 43T	12	17	20	16	28	14	16	14	25	22	26	17
P_278614605802	Hump Hose	3	1	6	3	6	3	4	11	11	12	9	13
P_300003070	Kit 3/70	1	3	2	2	1	6	4	5	5	3	14	17
P_278613999916	Kit 1/215	5	4	3	4	2	3	6	6	2	4	7	13
P_261854249910	Horn 24V	5	4	2	2	4	2	15	3	20	10	35	5

(Contd.)

Part No.	Part Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
P_266835607701	Rear Wheel Oil Seal	7	8	6	13	10	2	2	11	24	13	12	30
P_269854209980	Horn 12V	1	3	9	9	12	10	11	22	27	25	8	10
P_300003066	Kit 3/66	1	1	1	3	4	1	3	8	3	4	14	14
P_257633403103	Wheel Bearing 32308	5	2	0	0	0	0	2	1	2	0	0	3
P_70000000001	Three Bond Big	14	5	3	4	2	4	6	14	10	12	8	15
P_26216033	Alternator Cutout 6033	1	0	1	1	0	0	0	0	0	0	1	0
P_80000001601	Joint Socket 6Way	9	10	16	19	20	17	25	24	26	25	44	21
P_261854500101	Combina- tion Switch	3	1	0	1	0	2	2	1	5	0	3	2
P_257633407801	Front Wheel Oil Seal	4	6	0	2	0	0	0	5	3	2	9	14
P_266835605301	Axle Packing 8Hole	12	6	5	11	6	6	1	4	35	21	13	43
P_600006001	Fog Lamp	0	0	0	0	0	0	0	0	3	5	8	6
Parts Usage (2012)													
Part No.	Part Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
P_0000M1	Engine Oil Ch4	803	1191	555	0	0	0	0	0	274	496	520	633
P_275225200106	Clutch Plate 60No.	12	29	29	9	22	28	31	17	10	16	6	10
P_275225400105	Pressure Plate 60No.	7	9	6	8	0	14	8	9	10	6	5	3
P_278609139908	Air Filter Outer	62	116	77	52	46	80	42	92	63	93	35	46
P_278607989916	Water Separator	69	200	87	43	232	234	116	103	148	153	90	119
P_0000M5	Crown Oil 85W140	86	304	70	105	67	32	67	371	239	157	176	42
P_0000M2	Engine Oil Ci4	0	0	0	0	0	0	0	0	228	351	205	256

Part No.	Part Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
P_272425200134	Clutch Plate 75No.	1	1	2	6	0	1	1	0	1	1	2	1
P_252718130145	Oil Filter N/M	0	2	1	51	54	21	1	7	39	27	33	47
P_272425400129	Pressure Plate 75No.	1	1	2	6	3	2	3	2	0	0	1	1
P_0000M4	Gear Oil 80W90	72	284	47	91	48	36	52	191	148	81	37	55
P_278609119904	Diesel Filter	70	199	88	43	232	234	116	104	147	153	90	117
P_278609139909	Air Filter Inner	61	111	76	52	46	81	40	78	57	91	35	46
P_0000M7	Coolant	36	73	130	155	114	193	88	107	124	207	55	59
P_278618139902	Oil Filter	55	163	78	28	146	79	92	63	116	107	62	82
P_265172300105	Door Lock	68	84	55	58	35	45	155	52	58	31	35	41
P_269126204623	Synchro Cone	0	0	0	0	11	15	4	0	12	6	7	6
P_278605999928	Tappet Cover Gasket	140	159	88	244	183	131	192	133	168	174	82	200
P_257681100153	Side Glass	81	122	169	52	149	59	166	54	136	75	152	59
P_10000012467	2467 Bulb	472	370	594	518	339	621	578	605	900	438	716	743
P_10020010	Clutch Booster 3518	0	3	1	0	1	1	0	1	2	4	5	2
P_269126204635	Synchro Cone 5/6	0	0	0	0	18	7	5	0	8	2	3	5
P_278609999920	Fuel Strainer	47	48	28	46	111	127	70	106	93	41	92	54
P_27861599996302	Fan Belt	12	35	9	8	37	27	9	9	15	7	7	3
P_278620999937	Viscous Ass. 3516	1	1	0	0	0	1	2	2	1	2	2	1
P_100001566563	Wheel Bearing 566/563	8	2	0	1	6	10	1	4	15	4	23	3
P_10000012441	2441 Bulb	421	345	262	262	290	257	385	482	410	347	429	649
P_278615999902	Fan Belt Tensioner	1	2	6	12	0	1	2	2	3	3	3	2
P_100001580572	Wheel Bearing 580/572	5	1	1	5	1	13	1	5	15	7	21	2

(Contd.)

Parts Usage (2013)													
Part No.	Part Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
P_0000M1	Engine Oil Ch4	635	594	480	686	1010	491	639	866	633	671	304	548
P_275225200106	Clutch Plate 60No.	21	19	12	14	15	15	31	28	28	12	8	7
P_275225400105	Pressure Plate 60No.	8	5	5	5	4	2	7	9	15	3	6	0
P_278609139908	Air Filter Outer	85	59	49	35	77	34	54	32	74	13	48	19
P_278607989916	Water Separator	171	66	73	107	73	41	69	175	96	48	19	55
P_0000M5	Crown Oil 85W140	159	301	125	278	216	151	286	87	95	239	359	306
P_0000M2	Engine Oil Ci4	244	237	169	316	481	255	207	431	252	230	89	165
P_272425200134	Clutch Plate 75No.	12	3	9	10	9	4	12	25	13	3	5	4
P_252718130145	Oil Filter N/M	67	27	50	75	27	45	12	61	25	27	14	14
P_272425400129	Pressure Plate 75No.	1	2	2	3	6	2	5	8	9	2	2	0
P_0000M4	Gear Oil 80W90	94	104	85	154	157	144	103	101	142	156	193	151
P_278609119904	Diesel Filter	171	67	73	107	73	41	69	175	96	48	20	55
P_278609139909	Air Filter Inner	77	53	46	33	71	35	36	29	67	15	23	15
P_0000M7	Coolant	107	66	78	114	136	125	115	126	377	290	88	128
P_278618139902	Oil Filter	80	19	70	28	17	21	23	93	24	28	7	14
P_265172300105	Door Lock	52	42	20	126	31	119	61	67	109	48	13	27
P_269126204623	Synchro Cone	5	4	5	14	1	4	12	27	19	11	4	6
P_278605999928	Tappet Cover Gasket	90	216	76	54	61	56	288	216	366	147	93	128
P_257681100153	Side Glass	66	44	39	142	129	121	68	135	89	85	97	54
P_10000012467	2467 Bulb	316	383	293	347	561	782	414	338	643	606	485	537
P_10020010	Clutch Booster 3518	2	1	0	2	0	1	6	9	5	5	4	2

(Contd.)

Part No.	Part Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
P_269126204635	Synchro Cone 5/6	3	4	0	4	4	7	9	15	9	4	1	1
P_278609999920	Fuel Strainer	47	53	48	116	51	97	48	112	108	73	24	39
P_27861599996302	Fan Belt	47	7	12	9	25	8	17	54	23	8	5	14
P_278620999937	Viscous Ass. 3516	1	0	2	1	4	4	1	4	4	2	2	0
P_100001566563	Wheel Bearing 566/563	22	28	4	1	1	6	4	16	22	12	3	6
P_10000012441	2441 Bulb	240	292	270	117	484	208	195	340	288	445	293	344
P_278615999902	Fan Belt Tensioner	5	1	9	0	3	3	7	11	4	2	0	2
P_100001580572	Wheel Bearing 580/572	15	27	1	5	0	2	15	12	3	9	4	4
P_278620999959	Water Pump Bs2	1	0	0	7	0	2	10	1	3	2	1	2
P_4000041243	Head Light Bulb 12V 43T	28	36	16	20	23	31	24	41	81	44	26	52
P_0000M9	Brake Oil 250Ml	16	15	14	15	15	39	36	42	28	18	17	18
P_278613999920	Kit 1/226	10	12	18	20	3	28	10	21	22	6	9	17
P_257689100149	Cabin Shocker	14	8	7	9	15	15	18	19	26	12	13	2
P_4000042443	Head Light Bulb 24V 43T	12	3	12	9	6	15	9	21	79	30	9	12
P_278614605802	Hump Hose	45	9	12	6	19	16	27	23	21	10	15	3
P_300003070	Kit 3/70	7	8	3	6	3	2	9	12	10	6	3	14
P_278613999916	Kit 1/215	8	24	6	29	4	30	12	35	23	6	10	14
P_261854249910	Horn 24V	9	12	12	22	6	21	8	26	7	1	3	3
P_266835607701	Rear Wheel Oil Seal	37	48	23	150	37	15	49	68	43	116	68	42
P_269854209980	Horn 12V	10	9	4	5	8	10	25	28	16	15	19	3
P_300003066	Kit 3/66	12	14	18	8	8	4	18	13	12	5	5	4

Part No.	Part Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
P_257633403103	Wheel Bearing 32308	4	17	1	3	4	4	9	4	3	17	5	5
P_7000000001	Three Bond Big	22	13	16	28	14	26	24	86	55	35	16	37
P_26216033	Alternator Cutout 6033	4	2	4	5	1	0	4	2	4	3	3	5
P_80000001601	Joint Socket 6Way	11	10	15	11	117	10	22	30	32	39	16	14
P_261854500101	Combina- tion Switch	13	5	0	2	2	2	6	4	1	2	3	5
P_257633407801	Front Wheel Oil Seal	26	40	19	92	29	9	41	48	78	103	103	36
P_266835605301	Axle Packing 8Hole	49	247	22	170	59	18	265	64	65	153	81	91
P_600006001	Fog Lamp	8	6	2	1	0	0	0	0	0	0	5	2

Source: Interview and Company Records

SUGGESTED QUESTIONS

1. How should Kundanmal Mukanmal Trans Logistics Pvt. Ltd. (KM) decide about the frequency of placing the spare part orders with its vendors?
2. How much quantity should KM order while placing an order with its vendor? What factors affect the optimal ordering quantity?
3. Should all parts follow the same or a differentiated inventory review policy?
4. Based on this analysis, which trucks would you propose to put on annual maintenance contracts? What other fleet attributes would you consider to perform this analysis?

APPROACH FOR ANALYSIS

Initially, the analysis may begin with the categorization of parts into A, B, and C categories – holding 70, 20 and 10 per cent of the entire investment cost on the purchase of the 50 spare parts respectively. Investment cost is the product of the unit price of the part and its yearly usage count (demand). This classification should guide the reader to identify a suitable inventory model for each category of parts. Then the different inventory cost components such as purchase cost, carrying (holding) costs and ordering (setup), and stock-out expenses should be identified for each part. Finally, the optimal ordering quantity and possible ordering frequencies should be identified for certain customer service level criteria.

Case

7

CASE CONTEXT

Novire Technologies, an IT-based logistics solutions provider, had introduced a new system called Automatic Vehicle Location (AVL) which used the Global Positioning System to track vehicles. ABC Private Ltd, a cement manufacturing company, conducted a pilot study of this system on five of its trucks. The company was considering implementation of AVL which would enable better capacity utilization and effective management of cement distribution. The focus of this case is on analysing the data obtained from the pilot study, identifying the additional data requirements, and examining the scalability, implementation feasibility and flexibility of the AVL system.

Novire Technologies: Automatic Vehicle Location

On Monday, March 3, 2008, Mr Dhaval Verma, General Manager, Logistics, of ABC Private Ltd (ABC), a cement manufacturing company, walked into the conference room where he was to have a meeting concerning the implementation of a new technology in ABC. The other participants of the meeting were Mr Kaushik Somanathan, Executive Director of Novire Technologies (NT) and Mr Aman Bansal, Senior Product Development Manager, NT. The meeting's main agenda was to discuss the outcome of a pilot project of a new technology for a fleet management system called Automatic Vehicle Location (AVL) which had been implemented for ABC. The results of the pilot project implemented on five trucks had just come in. ABC was considering implementing a fleet management system which supposedly, would enable them to have better capacity utilization and effective management for cement distribution. ABC had cooperated with NT for carrying out the pilot fleet run and tracking of data to visualize the usefulness and feasibility of the system.

ABC PRIVATE LTD

ABC was the third largest cement manufacturer, with an aggregate grey cement capacity of 13.41 million tons per annum spread across India. It had a broad product portfolio including a variety of cements. Recognizing the fact that a large product portfolio did not necessarily ensure success in the intensely fragmented and competitive cement industry, ABC offered a host of value added services to customers, including concrete mix design, cube testing services, non destructive testing and training and site visits by qualified engineers. Additionally, ABC was in the process of implementing modernization and capacity expansion projects for debottlenecking.

The company had a bulk cement terminal at Jawaharlal Nehru Port Trust (JNPT) with a capacity of 2600 tons per day, from where it supplied cement to all its customers and dealers. This terminal was also responsible for supplying bulk cement to all its Ready Mix Concrete (RMC) plants in and around Mumbai. The entire radius of operations for this plant was approximately

Prepared by Professor G Raghuram, Indian Institute of Management, Ahmedabad and Mr Aditya Goyal.

Assistance provided by Ms Aswathy is acknowledged. We thank Mr Kaushik Somanathan for inputs from the company.

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150 Km. The terminal received cement from the port which was at a distance of about 40 Km (see Exhibit 1 for a map of the Mumbai area). The company used a dedicated fleet for the supply of cement, both from the port and to the customer locations. The capacity of the trucks varied between 9 and 24 tons.

NOVIRE TECHNOLOGIES

Novire was incorporated in India in the year 2004. The brain behind the Novire strategy was a team of five professionals. Between them, they had over 150 years of experience in global technology, product development, marketing, and building a world class organization.

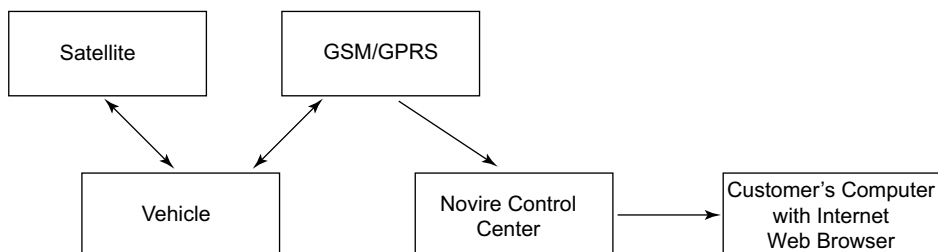
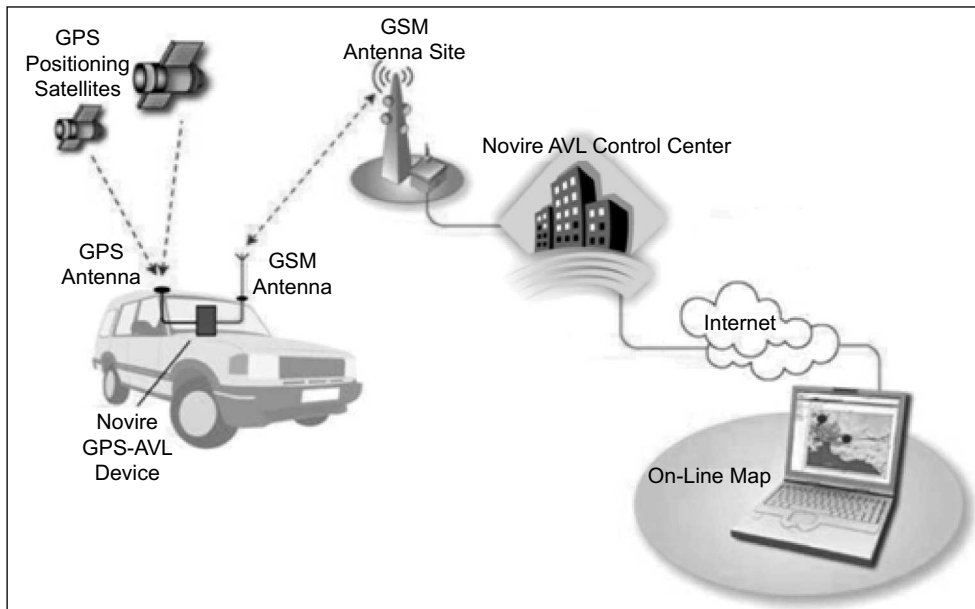
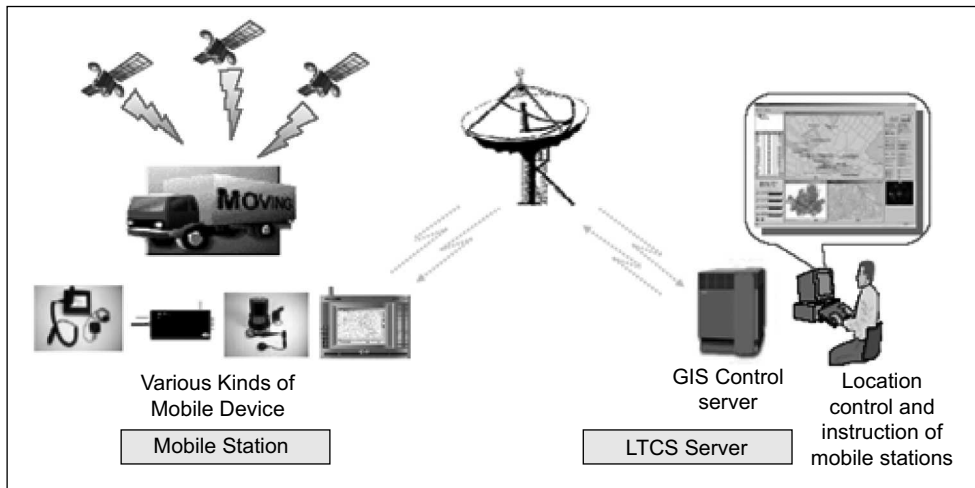
- Mr Sudhir Awasthi (Ex Managing Director of Godrej Industries), a professional with 27 years experience in handling administration, production, sales and marketing activities, was spearheading the Indian operations.
- The technical savoir-faire was provided by Mr P Ramani (Ex National Semi Conducts), who brought with him over 12 years of experience in the areas of architecture, design, and development of integrated circuits for wireless applications.
- NT's research was powered by Dr Gurusamy who had completed his PhD from IIT Bombay and was also involved in the incubation unit of IIT Bombay. He was a former director at Trellis Labs Private Ltd. Dr Gurusamy was a full time director with NT and was responsible for all the research and development work the company was undertaking.
- The marketing team was led by Mr Kaushik Somanathan, who had an entrepreneurial background. He had been involved in various startup ventures. NT was his third venture.
- Product development was bolstered by Mr Aman Bansal who joined NT directly after finishing his Master of Sciences from the University of Southern California.

For core support, NT had a team of high calibre, certified professionals who had the requisite expertise in implementing and supporting enterprise IT infrastructure with a wide range of products and technology exposure.

AUTOMATIC VEHICLE LOCATION¹

AVL was a system that provided up to date location information for emergency vehicles, delivery trucks, freight trucks, service vehicles, etc. The AVL system primarily consisted of a Global Positioning System (GPS) receiver on the truck or vehicle, a communications link between the vehicle and the dispatcher, web-based tracking software and a digital map. Communication between the GPS receiver and the server could happen via a Global System for Mobile

¹ Source: www.vehiclelocationsystem.com retrieved on April 5, 2008.



Communications (GSM) or a Code Division Multiple Access (CDMA) network using Short Message Service (SMS) or General Packet Radio Service (GPRS).

The prime advantages of AVL were:

- ❑ Ability to locate and send the nearest vehicle to the customer
- ❑ Greater number of pickups and deliveries per day
- ❑ Increased on time deliveries
- ❑ Increased number of vehicles that a dispatcher could manage
- ❑ Tracking report documentation

The beneficiaries of AVL were:

- ❑ Transportation: Real time fleet management services
- ❑ Emergency Vehicles: Law enforcement, fire and paramedic services
- ❑ Utilities: Locating nearest available vehicle to respond to a service
- ❑ Delivery services: Courier, newspapers and fast food where prompt customer service was critical.

The Novire GPS AVL worked on simple network logic. A GPS tracking device was installed in a vehicle and it was used to record the coordinates. The tracking device had a built in capability to send messages over the GSM network to NT servers which in turn used the same data to exhibit on a map. A customer simply needed to login to NT's website with the unique username and password to locate their vehicle.

THE PILOT PROJECT MEETING

Place: Conference room, Time: 11:15 am

Mr Dhaval was sitting in the room accompanied by two executives from ABC, one from Logistics and the other from Distribution. Mr Kaushik and Mr Aman entered the room.

Kaushik & Aman: Good Morning Mr Verma.

Dhaval: Good Morning!

Kaushik: Sorry for the delay. Mumbai traffic is hell! I can start the presentation right away.

(Mr Kaushik moved to the presentation area and connected his notebook to the projection equipment. The screen glowed with the slide presentation.)

Kaushik: Well, firstly I would like to congratulate Mr Bansal on the successful completion of the pilot study conducted on the fleet of five trucks. We tracked five trucks of ABC using our

AVL system. This was done in accordance with the scope of work provided by ABC (shown in Exhibit 2). In our previous discussions, we discussed the final deliverables and processes provided (see Exhibit 3 for deliverables agreed by NT). Let me give you a quick overview of the approach adopted by us while monitoring the fleet.

(Exhibit 4: Approach for the AVL system, on the screen)

It can broadly be categorized under the following heads:

- *Identification of the time spent by the truck in the parking bays*
- *Identification of the time spent inside the plant area*
- *Understanding the driving pattern of a driver*
- *Capturing delivery compliance*

We tracked five trucks out of which three were bulk trucks and remaining two were bag trucks.

(Exhibit 5: Analysis of Fleet Utilization, on the screen)

The average utilization of the trucks was close to 20%. Analysis of fleet utilization indicates a lot of idling time.

Dhaval: May I know what this idle time means? I mean, is it included in the trip or not?

Kaushik: Idle time is the time during which the truck was stationary. So part of idle time is in the trip i.e. wait at octroi check post, traffic signals, etc. and part of it signifies the time between trips. It also includes loading and unloading time.

Dhaval: That clarifies it. Thank you!

Kaushik: While the overall utilization is low, for bag trucks, it is even lower.

(Exhibit 6: Trip Analysis, on the screen)

Kaushik: All the trucks were tracked as per the trips and here we see the trip times which are quite high for bag trucks indicating longer trips or actually more time per trip. Trips/day for bag trucks are also very less.

Dhaval: Pardon me! The average trip time for bulk truck 764 is 12.28 hrs, while the median is 2.38 hrs. Can you please explain this variation?

Kaushik: This was because the truck took numerous short trips and a few long trips.

Dhaval: Interesting, since we try to avoid using bulk trucks for delivering into the city.

(Exhibit 7: Idle Time Snap Shot, on the screen)

Kaushik: The bar diagram clearly indicates that the idle time for bag trucks was more when compared to bulk trucks, particularly in the case of bag truck 9778 which had a maximum idle time of 805.4 hrs, which is mere 13% utilization.

Dhaval: Can you throw some light on the causes behind this observation?

Kaushik: Bag vehicles are responsible for delivery towards south Mumbai customers due to which they have to follow city driving regulations and cannot move the vehicle at certain times during the day.

(Exhibit 8: Idling Frequency Analysis, on the screen)

Kaushik: As you can clearly see, around 44% of the idle time is at a single location only.

(Exhibit 9: Locations with Highest Idling, on the screen)

Kaushik: This location was the ABC Bulk Terminal itself. Idling at RMC plants was also significant and surprisingly, the total idling time in transit was very less. The contribution of all RMCs was close to 40%.

Dhaval: That's a finding for sure. We have been blaming the traffic congestion for poor utilization of our fleet and now I see that the major idling is at the terminal itself.

(Exhibit 10: Time-wise Idling, on the screen)

Kaushik: Idling is maximum between 12 and 16 hrs and this idling is high across all the vehicles, while the bulk cement vehicles do not enter the city limits. It also indicates that movement is most optimized during the night and more movement should occur in the night.

(Exhibit 11: Novire Uptime Performance Review, on the screen)

Kaushik: We have been able to provide an uptime of 97.98% across the five vehicles and there were no incidents of device failure or malfunctioning during this pilot phase.

(Mr Kaushik concluded the presentation, reinforcing the benefits of the AVL to ABC.)

Dhaval: AVL is quite useful, but I was just wondering about the capital investment required. Do you have some figures related to the required investment?

(Mr Kaushik searched through his notebook and opened a new presentation containing cost figures.)

(Exhibit 12: Cost Data, on the screen)

Kaushik: As you can see, the system is not expensive. When we implemented this system on five trucks, an investment of around ₹12.5 lakhs was made. If we increase the number of trucks, we only need to put GPS equipment and a SIM card per truck. The infrastructure and broadband connection specified will suffice for around 150 trucks.

Dhaval: Impressive and satisfactory. It's a real value addition, I must say. What are the future prospects? I mean how flexible is this system?

Kaushik: Well, this system can easily be integrated with other technologies. I think Aman can better answer this question.

Aman: This system can be tailored to add upcoming technologies like Bluetooth, fuel sensors, speed sensors and Geofencing at later stages (see Exhibit 13 for information on upcoming technologies). These technologies can be applied for better utilization of trucks and following traffic regulations.

Dhaval: That's great! What about software requirements?

Aman: We supply all the modules and plugins required for the installed hardware. For instance, we are already developing an application to define routes and enable a routing engine.

Dhaval: Yes. That's essential for future expansions and optimization possibilities. I would like to discuss this with my team and get back to you at the earliest.

Kaushik: Please let me know in case of any queries.

Dhaval: Yeah, sure.

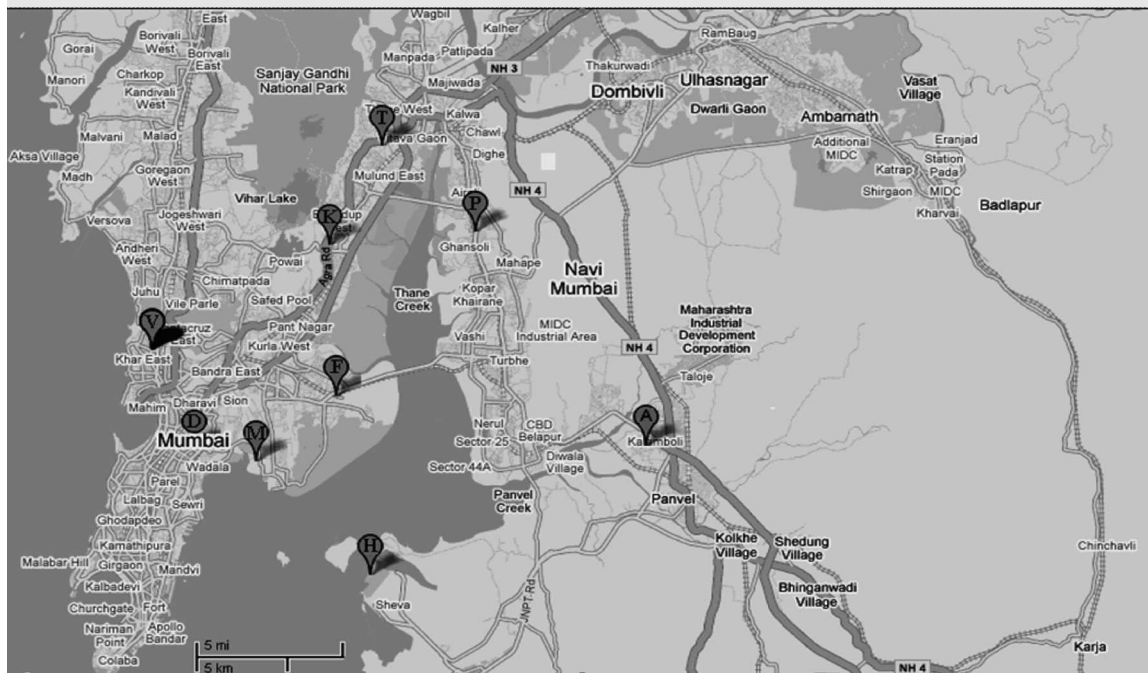
(Mr Kaushik and Mr Aman bid adieu to Mr Dhaval after collecting their belongings and left the room.)

After this session, Mr Dhaval continued the discussion with his executives, raising the following questions:

- ❑ Has the data collected been satisfactory or do we need deeper insights? What additional variables should be tracked and what additional information would be required by us?
- ❑ What more benefits could be drawn after implementing AVL?
- ❑ How flexible is the system in terms of upcoming technologies? How easily can new technologies be integrated into the existing system?
- ❑ Has the pilot project on the five trucks been successful enough to implement the system on the whole fleet?

EXHIBIT 1

Map of Mumbai Area



A	ABC Bulk Terminal
D	Deonar RMC
F	Mankhurd Railway Station
H	JNPT
K	Kanjurmarg RMC, Kanjur Railway Station
M	Mahul RMC
P	Pawne RMC
T	Thane RMC
V	Vithalbhai Patel Road

Source: Company Data 2008

EXHIBIT 2**Scope of Work Defined by ABC**

Scope of Work	Deliverable (Yes/No)	Process Given (Yes/No)	Comments by Novire
Turnaround time of a vehicle	Yes	Yes	
Waiting time at yard	Yes	Yes	Georeference
Waiting time within plant	Yes	Yes	Radio Frequency Identification (RFID) Suggested
Transit time	Yes	Yes	Way Points
Dealer/depot reporting time	Yes	Yes	Georeference
Dealer/depot release time	No	No	More inputs needed
Return time	Yes	Yes	
Comparison with predefined benchmarks	Yes	No	Report formats needed
Vehicle-wise summary	Yes	No	Report formats needed
Kilometre reading	Yes	Yes	Inaccuracy with GPS/digital input
Geofencing facility	Yes	No	
Transporters performance summary	Yes	No	Report formats needed
Check on secondary diversion	Yes	No	Not in scope for pilot
Provide online facility on location of vehicles	Yes	Yes	
Route creation and calibration	Yes	Yes	Not in scope for pilot

Source: Company Data 2008

EXHIBIT 3

Deliverables Agreed by NT for the Pilot

Deliverables	Input	Output
No. of trips made per day	Define trips (start and end points) Define route Date/time	Trip-wise report Daily/Weekly/Monthly Vehicle-wise report
Time taken per trip	Trip details (start and end points)	User defined report format
Details of time taken between tracking points	Tracking points	Time interval and reporting time
Cumulative weekly, monthly and up to date reports	No input required. Data available for reports	Weekly, monthly reports
Systems live on screen	Date/Time/Latitude/Longitude	Maps
ETA and route creation	Define route	Transit deviation in time and distance
Waiting time in plant	RFID based trigger for IN and OUT	In plant time sheet

Source: Company Data 2008

EXHIBIT 4

Approach for the AVL System

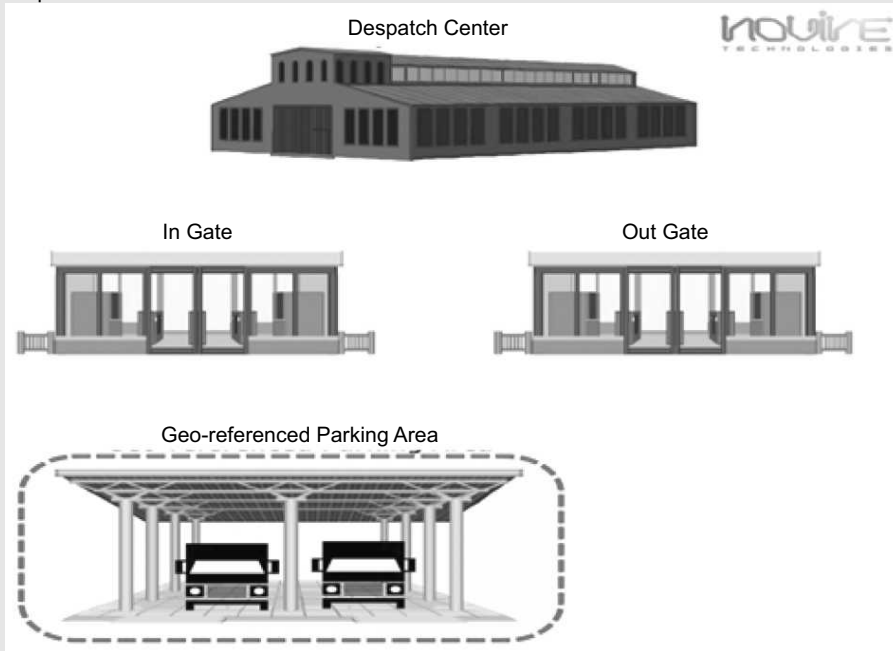
Identification of the Time Spent by the Truck in the Parking Bay



NT understood from their meeting with ABC that the parking bay was not always part of the plant area; hence usage of any RFID technology was not possible. What NT could do was Georeference the entire parking bay taking into consideration a tolerance factor of 15%. This meant that if the vehicle was anywhere around the parking bay $\pm 15\%$, their system would identify the vehicle and tag the vehicle in the parking bay.

Identification of the Time Spent Inside the Plant Area

Step 1



NT had two options,

- a. Use the same Georeference option and mark the factory
- b. Use RFID technology

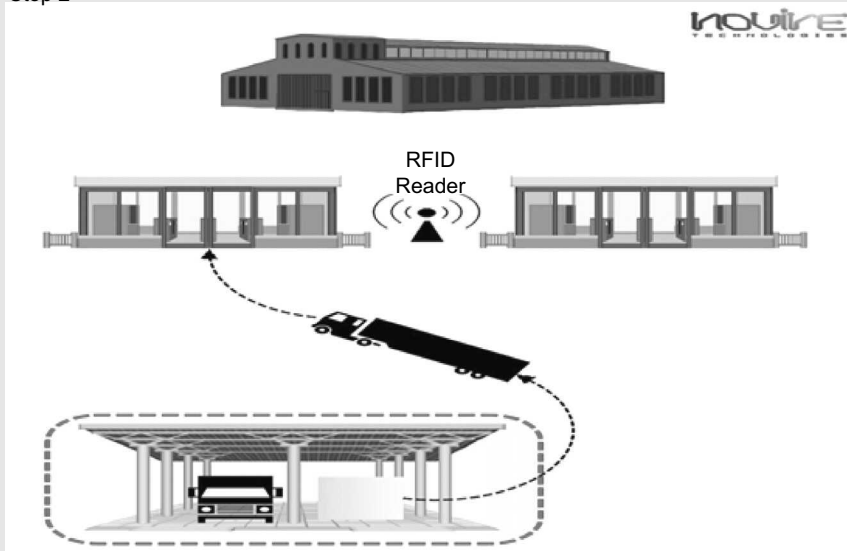
They further analyzed and researched on this topic and found out that Georeferencing would not be a good idea because a GPS receiver had an inbuilt deviation which meant that they would never have accurate information of the vehicle entering their plant. Also, it could happen at times, that the vehicle was standing in the parking bay but the system would report the vehicle in the plant.

To overcome this problem, NT suggested using RFID technology. Novire's GPS equipment was inbuilt with an RFID reader. In this scenario, when the vehicle entered the gate, an active RFID reader would capture the details from the gate and send it to the control centre. This technology would always give them accurate information about the truck's IN and OUT time. They could use these readers from both the gates (if any).

(Besides, the system would automatically change the status of the vehicle from 'Parked' to 'Plant' once the vehicle entered the plant, hence providing the logistics manager with absolute clarity.)

(Contd.)

Step 2



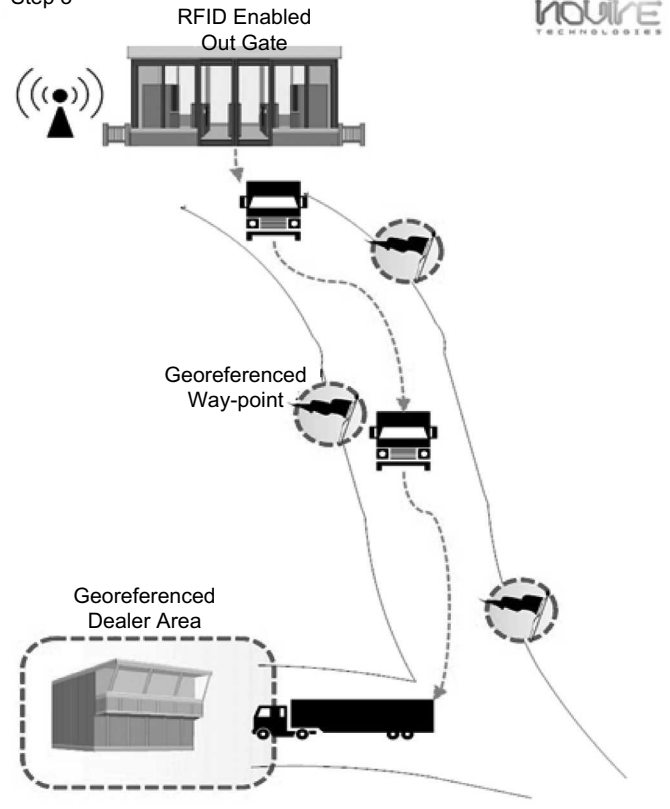
Understanding the Driving Pattern of a Driver

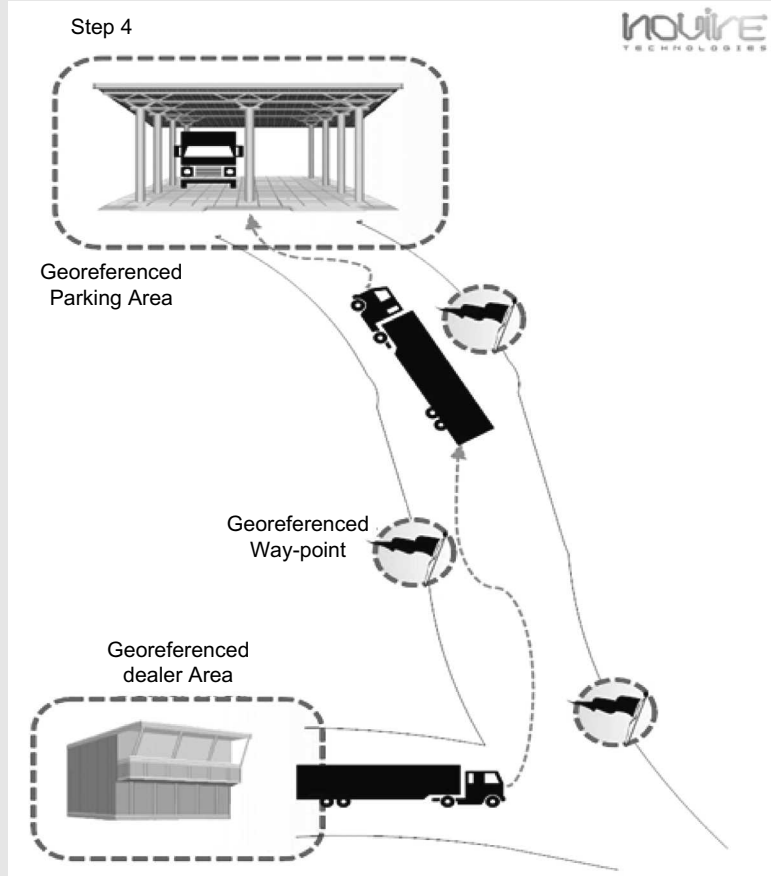
NT was able to understand all the given routes for delivery and add way points on these routes. Every time the truck crossed this way point, they would get an intimation in their system. This would also help them understand the time taken to travel between two way points. They were also able to monitor this data and improvise route/driver efficiency.

Capturing Delivery Compliance

NT suggested that ABC add their entire dealer network in their Georeferenced database. The moment the vehicle approached the dealer, their system would identify the dealer and intimate them about the arrival. This system had to be built with a certain amount of tolerance level and integrated with the order system so that the system could wait till the correct dealer name was thrown up before it would release the alert.

Step 3



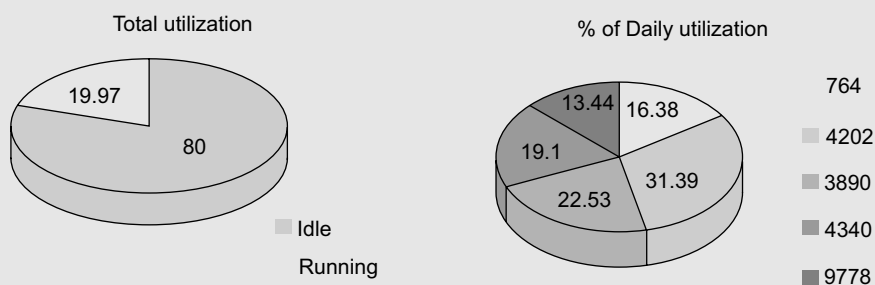


Source: Company Data 2008

EXHIBIT 5

Analysis of Fleet Utilization

Vehicle Number	764 (Bulk)	4202 (Bulk)	4340 (Bag)	3890 (Bulk)	9778 (Bag)	Total
Time Tracked (hrs)	784.54	685.51	629.23	641.05	930.48	3670.81
Days Tracked	32.69	28.56	26.22	26.71	38.77	152.95
Idle Time (hrs)	656.01	470.33	509.04	496.22	805.40	2937.00
Running Time (hrs)	128.53	215.18	120.18	144.42	125.08	733.39
% of Daily Utilization	16.38	31.39	19.10	22.53	13.44	19.98

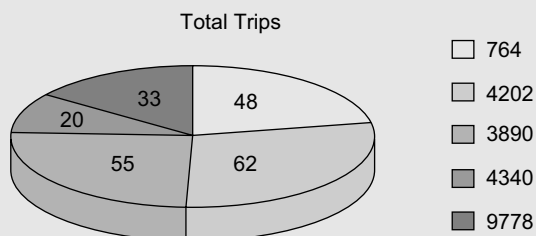


Source: Company Data 2008

EXHIBIT 6

Trip Analysis

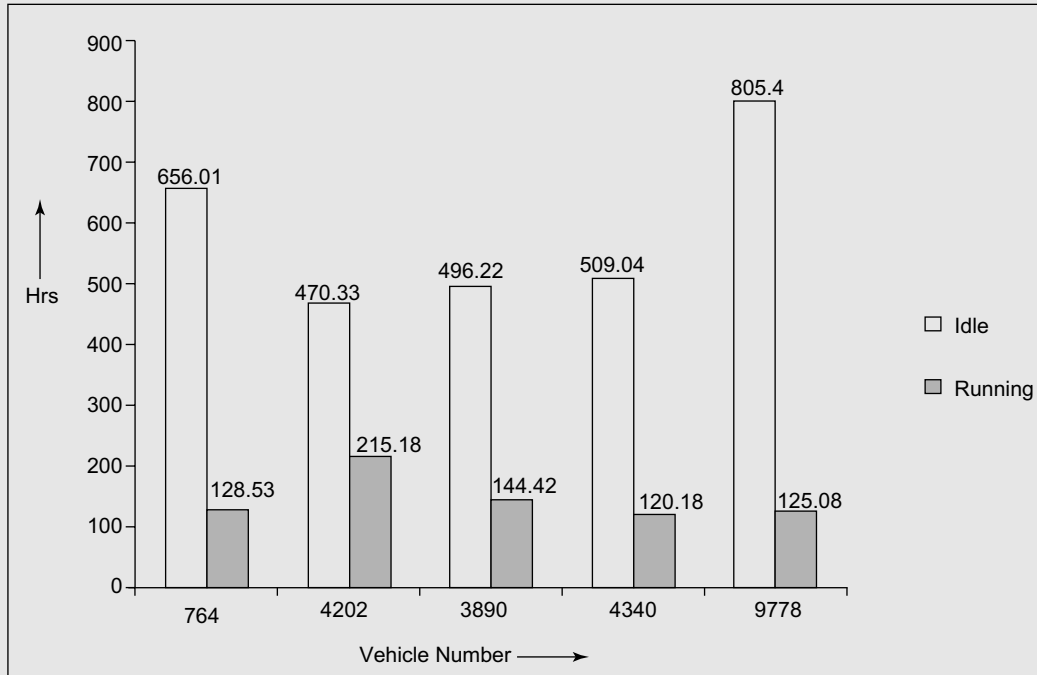
Vehicle Number	764 (Bulk)	4202 (Bulk)	3890 (Bulk)	4340 (Bag)	9778 (Bag)
Total No.	48	62	55	20	33
Average (hrs)	12.28	4.04	6.25	22.59	10.42
Median (hrs)	2.38	3.09	2.16	19.45	10.33
Trips/Day	1.47	2.17	2.10	0.75	0.85



Source: Company Data 2008

EXHIBIT 7

Idle Time Snapshot



Source: Company Data 2008

EXHIBIT 8

Idling Frequency Analysis

Time	No. of Locations	Time Spent	%
0-20 mins	200	22.05	0.75
20 mins-1 hr	36	23.08	0.79
1-2	37	51.52	1.76
2-4	18	50.34	1.72
4-6	12	54.21	1.85
6-10	13	100.39	3.43
10-50	9	246.40	8.41
50-100	9	1089.37	37.18
100 and above	1	1292.59	44.12
Total		2929.95	

Source: Company Data 2008

EXHIBIT 9

Locations with Highest Idling

Location	Total Time Spent (hrs)
Thane RMC	52.13
Vithalbhai Patel Road, Span Cement	53.28
Kanjurmarg RMC	54.37
Deonar RMC	61.14
Pawne RMC	83.26
Mahul RMC	123.51
Mankhurd Railway Station	127.32
JNPT Port	165.24
Kanjur Railway Station	367.50
ABC Bulk Terminal	1292.59
Total	2380.34

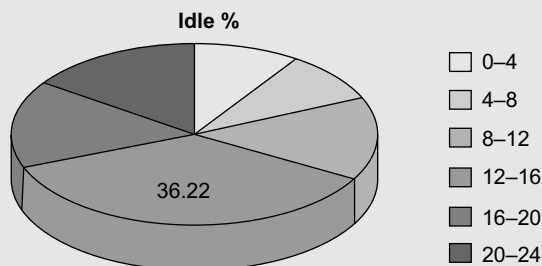
Source: Company Data 2008

EXHIBIT 10

Time-wise Idling

(Percentage)

Hrs	764	3890	4202	4340	9778	Average
0-4	7.32	14.72	13.19	8.40	6.72	9.54
4-8	4.15	13.54	11.92	5.39	10.42	8.92
8-12	6.53	11.97	16.38	15.60	20.83	14.52
12-16	63.52	20.92	15.95	31.96	37.92	36.22
16-20	6.56	16.94	17.65	21.02	16.89	15.42
20-24	11.93	21.91	24.90	17.63	7.23	15.39
Total	100	100	100	100	100	100



Source: Company Data 2008

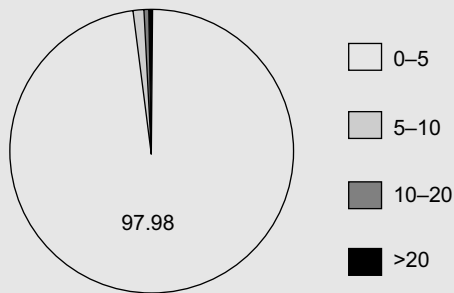
EXHIBIT 11

Novire Uptime Performance Review

(Percentage)

Data Polling Interval (min)	764	4202	4340	3890	9778
0–5	95.01	98.42	98.27	98.53	99.71
5–10	3.26	1.00	0.81	1.01	0.22
10–20	0.83	0.25	0.18	0.20	0.01
>20	0.88	0.31	0.72	0.24	0.03

Performance



Source: Company Data 2008

EXHIBIT 12

Cost Data

	Type	Cost (₹)
A	GPS equipment	18,247
B	Digital map	500,000
C	Broadband connection	10,000
D	Infrastructure (upto 150 trucks)	552,500
D.1	Air Conditioner	20,000
D.2	Servers (3 are required)	300,000
D.3	UPS	76,000
D.4	Computer	30,000
D.5	Software	120,000
D.6	Switch	6,500
E	Cost of buying spares (initially)	150,000

(Contd.)

	Type	Cost (₹)
F	Monthly costs	
F.1	Broadband charges	2,000
F.2	SIM Charges (per truck)	100
F.3	Salary (4 persons are required)	40,000
F.4	Inventory	3,000

(The above figures do not include the cost of Civil Engineering)

On road cost of truck with a payload of 24 tons = ₹12 lakhs

On road cost of truck with a payload of 10 tons = ₹7 lakhs

Source: Company Data 2008

EXHIBIT 13

Upcoming Technologies

- ❑ **Bluetooth:** Bluetooth is a wireless protocol utilizing short range communications technology facilitating both voice and data transmissions over short distances from fixed and/or mobile devices, creating wireless personal area networks. Bluetooth provides a way to connect and exchange information between devices such as mobile phones, telephones, laptops, personal computers, printers, GPS receivers, and digital cameras over a secure, globally unlicensed industrial, Scientific, and Medical 2.4 GHz short range radio frequency bandwidth.
- ❑ **Fuel Sensors:** These sensors sense the level of fuel in the vehicle and thus can indicate current fuel levels and fuel consumption over a period of time.
- ❑ **Speed Sensors:** Speed sensors are machines used to detect the speed of an object, usually a transport vehicle. They include Wheel speed sensors, Speedometers, Pitometer logs, Pitot tubes, Airspeed indicators and Piezo sensors.
- ❑ **Geofencing:** Geofencing refers to the practice of limiting mobile employees to a specific geographic location by tracking their whereabouts via the technology of GPS. The premise of geofencing is to make sure a company's mobile employees, or rather those that travel locally or drive company vehicles as part of their job, stay within the boundaries the company deems productive. Companies who have fleets of company vehicles available to employees are the most likely to employ the concept of geofencing. Delivery drivers, service technicians, and outside sales representatives are examples of jobs where geofencing may apply. For geofencing to work, the company's vehicles must be fitted with a GPS tracking unit or the employees themselves must carry a wireless phone or other device equipped with GPS technology. Whenever a given person or vehicle goes somewhere off limits, an alert is sent back to the company's monitoring headquarters.

Source: Company Data 2008

SUGGESTED QUESTIONS

1. Has the data collected through AVL been satisfactory or do we need deeper insights? What additional variables should be tracked and what additional information would we need?
2. What would be the additional benefits after implementing the AVL?
3. How flexible was the system in terms of upcoming technologies? How easily can new technologies be integrated into the existing system?
4. Has the pilot project on the five trucks been successful enough to implement the system on the whole fleet?

APPROACH FOR ANALYSIS

The data collected through AVL helped Novire Technologies' customer, ABC Private Ltd. (ABC) to determine the average fleet utilization, the location-wise idle time and the time of day-wise idling. Whether the data available is sufficient or not, however, depends on the decisions to be made. ABC would ideally like to decide on the route structure, allocation of truck sizes to a route and the timing of the route. It would also like to monitor the loading time at the plant and the unloading time at various destinations. Towards this, road segment-wise time monitoring and time of day-wise travel would be important.

Apart from planning related applications, there would be scope to support such movements at an operational level through better online coordination. Systems for this need to be thought through.

To integrate with new technologies, it would be useful to think of all upcoming technologies and the potential application areas for better decision making. Examples of such technologies could be Bluetooth, Fuel sensors, Speed sensors, Geofencing, etc.

To work out the implementation feasibility of the system, it would be useful to evaluate the returns on the investment in the AVL. The analysis would require careful thought on the relevant revenue and cost additionality.

CASE CONTEXT

With the expansion in the scale of business operations of its express cargo/logistics business, Instant Transport Solution Private Limited (ITSPL) was looking for an IT solution to support its managerial decisions. Initially, ITSPL had maintained the data pertaining to vehicle tracking, availability of vehicle, location-wise profit and loss and speeding reports in Excel. However, the data in Excel could not be integrated with the global positioning system (GPS) and payments from/to the clients. There was a high possibility of error at the time the data was entered. Further, the security of data was also a major concern. Considering the lack of informational support available from the current methods of storing data, ITSPL was looking for an integrated solution for all its data requirements.

Instant Transport Solution Private Limited

INTRODUCTION

Instant Transport Solution Private Limited (ITSPL) provided transport solutions in the Express cargo/logistics segment. Rajbir Singh Chaudhary and his partner started the company with just two trucks in 2003, which increased to ten trucks in a year. However, the partnership failed in 2005. Chaudhary continued on his own and between 2005 and 2008, acquired more than 40 trucks. In 2011, Rajbir's brother, Jasveer Singh joined the company as the CEO. Over the next three years, from 2011 to 2014, the brothers expanded the number of vehicles to 300 including trucks and trailers. In 2014–15 they bought another 100 trucks and now wanted to review their operations in a holistic way to facilitate future growth. While they had largely used a manual system to manage their operations, some of the information was now available to them on Excel and GPS.

However, with the increase in operations, Jasveer was feeling the pressure of not being able to keep track of cash flows and the management of truck operations. He wondered whether the Excel based system was good enough going forward. There were a number of questions that he had in his mind. Which model(s) of truck had the lowest maintenance cost? Which driver had the best safe driving record? Which of the clients had a good repayment history? He was not sure if the current system could answer these questions. These apprehensions were primarily related to Location, Markets and Customers, Employees, Finance and Operations.

Locations

ITSPL had offices in Chennai, Pantnagar, Bangalore, Pune, Saharanpur, Bilaspur and its head office in Delhi. Dharuhera and Manesar were its major trucking hubs, especially for trucks going out of Delhi. 60 per cent of ITSPL routes were major truck routes whereas 40 per cent were local.

Most trucking companies were either in the local or long haul segments, but ITSPL was in both. Long haul consisted of routes across major cities. Material delivered within the city or deliveries to and from Delhi to nearby locations covering a radius of nearly 250 kms, such as Meerut and Ambala were considered local haul.

Prepared by Professor Rekha Jain, Indian Institute of Management, Ahmedabad.

Research support provided by Ms Ajita Shukla and Ms Akshara Anand is acknowledged. The author may have disguised certain names and other identifying information to protect confidentiality.

Case material of the author is prepared as a basis for class discussion. It is not designed to present illustrations of either correct or incorrect handling of administrative problems.

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Markets and Customers

ITSPL provided all types and sizes of containers to their clients on fixed routes at fixed costs. They were known for on-time delivery of cargo. The company provided consultancy on distribution/delivery management, fleet management, load consolidation management, operational cost handling, etc.

Its clients included express delivery and other companies who supplied components to firms in the auto sector such as TVS and Nippon. In the express segment, its clients included several leading logistic companies. The auto companies that TVS and Nippon supplied to were Nissan, Ford, Yamaha and Bajaj. Most of the companies in the auto sector were Japanese. These companies gave global contracts for logistics, sometimes including warehousing and transport, to specific companies, who then worked with domestic companies to provide the logistics. ITSPL worked as a part of the set of such domestic companies. When these companies expanded, ITSPL's business also expanded.

When Jasveer joined the company, the turnover of ITSPL was ₹5 crore. It was able to grow at 100 per cent every year even when the market was down. This growth could be attributed to both the brothers who worked hard.

Apart from being reliable, the company had been loyal to its customers. It gave exact information to its customers about the location of the vehicle when the vehicle was late. This was in a situation where many truckers either did not have GPS that would enable them to provide this information or felt that the customer should not be informed when the vehicle was late.

ITSPL felt that it got good contracts and good companies to work with because of its professional attitude which was unlike other trucking companies. Many of the trucking companies did not have educated people to interact with the client. Since a large number of customers were companies with educated professionals, this lack of education/training made it difficult for ITSPL to win contracts.

ITSPL claimed that they had maintained their service levels on a continuing basis. Blue Dart Express informed the case writer that they were very comfortable working with ITSPL. The placement of vehicles was on time and they were very prompt in their response. The selection of people for field duty was based on their ability to be responsive to Blue Dart's needs. The Blue Dart representative also mentioned that they did not have to seek any tracking information themselves since ITSPL provided it proactively. ITSPL had a strong maintenance record and treated their drivers well.

ITSPL always deployed two drivers in each vehicle as per the norms of its clients. Furthermore, the drivers were not allowed to drive at night and worked only for a specified number of hours. The Japanese companies were very particular about following norms. For example, if the ITSPL

vehicle reached earlier than expected, they were questioned as to how they were able to do so, and were asked to clarify whether or not any unsafe practices, such as overspeeding or taking short cuts, had been adopted. On the other hand, courier companies wanted more efficient deliveries and would be happy if ITSPL could deliver the consignments to them before time.

Employees

ITSPL had staff of 80 people and 500–525 drivers. They had established a customer care centre and a national number from where the live tracking data and daily MIS were generated. With the setting up of the HR function formally, ITSPL was required to provide for provident fund, ESI and GIC. This would lead to an increase in costs. Jasveer felt that this would increase the prices ITSPL charged its customers.

Finance

ITSPL needed cash every day to buy diesel and pay its drivers for expenses on journeys. For example, each day, on an average, it bought diesel worth ₹10 lakhs and spent about ₹4 to 5 lakhs. ITSPL was a young company and most of the vehicles were still paying EMIs. Jasveer wanted that payments from the clients and the EMIs should converge for him to manage his business properly.

Operations

While recruiting its drivers, ITSPL asked them to fill a “joining form” that had basic information, such as the driver’s name, date of joining, license details, guarantor, etc. Since drivers were selected by existing drivers who knew them, ITSPL made sure of the credentials by having a guarantor. After that the truck driver was allocated a truck. The driver was then provided training on how to drive safely.

Based on their needs, clients indicated their daily requirement of trucks to ITSPL. One staff member was designated to manage the operations of a single client. Before starting on a trip, the driver took the truck to a designated petrol-pump from where he got the fuel for the journey. ITSPL also gave him a pre-decided cash advance for the journey. The cash was required for incidental expenses and for the payment of various road and freight taxes *en route*. ITSPL had designated petrol pumps whose owners/staff were informed about the requirements by telephone. The amount of diesel for different routes at various petrol pumps had been worked out and was used to fill the trucks when they arrived.

The petrol pump owner prepared a receipt in triplicate mentioning the cash advance and the amount of fuel. One copy was retained by the petrol pump owner, the second by the driver and the third was sent to ITSPL. The petrol pump owner sent an excel sheet with the above details along with a signed hard copy to ITSPL.

With the increase in its fleet size, ITSPL had set up a workshop for repairing and maintaining its trucks. Since the information about parts in the workshop was not electronically maintained, it was difficult to track the availability of parts. Often it bought a part only to find that it was available on location. The physical stock verification was done once a month.

Jasveer benchmarked the performance of his routes based on the total to and fro distance of various locations and the total number of trips done. This gave an idea about the distances a truck could ideally cover. Exhibit 1 shows such a benchmark for the Delhi–Bengaluru route. Jasveer negotiated the per trip freight price based on a per trip cost based on the above.

A large part of the operational information was stored manually. In addition, ITSPL had GPS systems that gave the location of the trucks, monitored fuel use and provided information about overspeeding. ITSPL had acquired a variety of GPS equipment from different vendors. These were stand-alone systems. Based on a pilot project, ITSPL was able to obtain information from the overspeeding dashboard and late vehicle information electronically. ITSPL used Tally for accounting. It stored the following operational information in Excel sheets:

1. *Tracking Management System*: It stored details ranging from the vehicle number, the driver's name to the departure details (Exhibit 2).
2. *Daily Vehicle Availability across all Locations*: The status and the destination of vehicles on a particular date were stored (Exhibit 3).
3. *Profit and Loss across All Locations*: The vehicle-wise monthly expenses and revenue for calculating the profit or loss for the month is shown in Exhibit 4.
4. *Overspeed Report*: The speed and other details of the vehicles across all locations where they had oversped were stored (Exhibit 5).

DRAWBACKS OF THE CURRENT SYSTEM

Jasveer felt that there were several problems with the way he was currently using IT.

The Tracking Management system in Exhibit 2 did not integrate with the GPS. Further, it was difficult to consolidate and analyse information across various time periods, clients, expected and actual time of arrival, drivers, trucks, fleet type, etc. This was also not linked to the payments due or received from clients.

While Exhibit 3 captured the Daily Vehicle Availability at various locations, Jasveer could not easily consolidate this information across vehicles or locations to find out which of his trucks spent how much time for loading after unloading, which locations had higher time for loading after unloading, were there periods during the month/year where the time between unloading and loading was higher, were there trucks/drivers that had higher time between unloading and loading and so on.

He was not able to get an overall perspective on the profitability of his operations. While Exhibit 4 gave him the truck-wise profitability on a monthly basis, he was not able to compare this on the basis of routes, clients and the age of the truck. It did not give him information about the maintenance expenditure across trucks and whether long or short haul was more profitable. He was also not able to match payments received against those due, as clients would sometimes club two or more payments or pay in parts carrying over the amount due to the next payment.

Even with the overspeed report (Exhibit 5), he was not able to get the driver-, route- or client-wise information on overspeeding.

Additionally, these were some other problems he encountered:

- ❑ The system used Excel as the database software, where the data was not completely secure. It did not allow simultaneous multiple user access, and the data was not safeguarded against erroneous entries.
- ❑ It did not keep track of the tyre life cycle.
- ❑ Often the data entry was erroneous, repetitive or incomplete or there was missing information (as shown in Exhibit 2, which had missing information in the Driver column and Loading Details columns). Similarly, in the overspeed table (Exhibit 5), information was repeated in rows and was redundant.
- ❑ The drivers indicated the kilometres travelled and the expenses incurred, which were manually entered into a register.

Planned Software

To overcome the above problems, Mr Jasveer planned to obtain new software from a company known as G-fleet system. The cost was ₹25,000 for service and installation, ₹30,000 for software and hardware cost per location and ₹125 per month per vehicle for running expenses. The company would provide a month's training to the staff and visit weekly for resolution of problems. This software would also cover the tyre management and maintenance and stock keeping applications. This requirement had become important especially as ITSPL has also opened its own workshop and therefore needed to worry about inventory and stock management. Furthermore, ITSPL had GPS equipment from two different companies which it needed to integrate. A company called Sobhagaya Enterprises had been able to integrate the fuel sensors with one of their existing GPS systems. For the old GPS, the payment was ₹550 per device per month including service tax. ITSPL did not have to pay any installation charges as they had negotiated hard. For the new GPS, the price was ₹3,500 per device + ₹350 as the service part.

Before finalizing the details, Mr Jasveer wanted to ensure that G-fleet had understood the data capture and data flow requirements properly. He wanted the software company to come up with a broad design of the system in terms of the data to be captured, the processes to be used and to identify who would be responsible for the data at each stage of the process. Once he had verified this, he would focus on the workshop computerization.

EXHIBIT 1**Delhi-Bengaluru Analysis**

Total to-and-fro distance	
Delhi-Bengaluru	4400 km
Transit time	84–96 hours one way – say 96 hours
Loading time	24 hours (say)
Unloading time	24 hours (say)
<p>Thus, a to-and-fro trip takes 10 days. Taking 30 days in a month, a truck on this route could cover 3 to-and-fro trips. Since each trip is approximately 4,400 km, total distance a truck should cover 3×4400 km is 13,000 km.</p>	

Source: Internal company documents

EXHIBIT 2

Tracking Management System

Sr. No.	Vehicle Details						Loading Details	
	Vehicle	Driver	Mobile	Type	Model	Fleet	From	To
1	HR 55 F 3432	THAIR	9730110791	28 FEET MXL	LEYLAND	STONESYSTEM		
2	HR 55 F 3560	NARESH	9818312989	28 FEET MXL	LEYLAND	STONESYSTEM	D.T.S	CHN
3	HR 55 F 6596	SHOKIN	9529110818	28 FEET MXL	LEYLAND	STONESYSTEM		
4	HR 55 F 6598	NASHIR	9541229721	28 FEET MXL	LEYLAND	STONESYSTEM		
5	HR 55 N 9179	SANTOSH	9766773764	32 FEET MXL	EICHER	STONESYSTEM	CHN B.K.I	2 POINT GGN
6	HR 55 N 9180	JAHUL	9649108217	32 FEET MXL	EICHER	STONESYSTEM	CHN N.S.K	FARUK-NAGAR
7	HR 55 N 9181	KHURSHED	9772555761	32 FEET MXL	EICHER	BRL	HOSUR	NALAGARH
8	HR 55 N 9182	JAMIL	8890727786	32 FEET MXL	EICHER	STONESYSTEM	TVS JMPL	HOSUR
9	HR 55 N 9183			32 FEET MXL	EICHER	BRL		
10	HR 55 P 1572	MANNAN	9813237191	32 FEET MXL	EICHER	STONESYSTEM	CHN T.S	D.T.S
11	HR 55 P 1573	ALIM	9772287073	32 FEET MXL	EICHER	BRL		
12	HR 55 P 1574	IKBAL	8502801219	32 FEET MXL	EICHER	STONESYSTEM	TVS JMPL	CHN
13	HR 55 P 1575	ARSHAD	9928479910	32 FEET MXL	EICHER	BRL	CHN B.K.I	GGN
14	HR 55 P 1576	RAZAK	9813256858	32 FEET MXL	EICHER	BRL		
15	HR 55 P 5729	SHER .MO.	8607436436	32 FEET MXL	EICHER	STONESYSTEM		
16	HR 55 P 5730	GULMUDEEN	9813614935	32 FEET MXL	EICHER	STONESYSTEM	CHN T.S	D.T.S
17	HR 55 P 5731	VIKRAM	9017898516	32 FEET MXL	EICHER	BRL	CHN PAND-CHERI	REWARI + JMPL
	HR55 Q 9138	KARTAR		32 FEET MXL	EICHER	BRL		
18	HR 55 Q 9139	SOMASH	9536255053	32 FEET SXL	EICHER	BRL	CHN T.S	D.T.S
	HR55 Q 9140	NIRANJAN		32 FEET SXL	EICHER	BRL	TVS JMPL	CHN
19	HR 55 S 3801	NUR MOH.	8955027109	32 FEET SXL	EICHER	STONESYSTEM	D.T.S	CHN
20	HR 55 S 3802	ABDUL	9828121283	32 FEET SXL	EICHER	STONESYSTEM	CHN FORD	BAWAL + JMPL
21	HR 55 S 3803	SAHUHN		32 FEET SXL	EICHER	PANDA	HONDA	PATAUDI
22	HR 55 U 0607	JUBER		24 FEET SXL	LEYLAND	ADL	NOIDA	PUNE
23	HR 55 U 4144	HASAN MOHAMAD		32 FETT MXL	MAHINDRA	ADL		

Source: Internal company documents

Depart		Arrival		Time	5:00 AM		Location	Load/Unload		
Date	Time	Date	Time	Given Hrs	Current Hrs	Remaining Hrs	At 9 AM	Status 9 AM	Remarks	Follow Up
					(from GPS)		BLSP	UNLOAD		ANURAG
25-Feb-15	9:00 PM	02-Mar-15	9:00 PM	120	8	112	JAIPUR			ANURAG
	(Trip sheet)					0	CHN T.S	NOT UNLOAD		ANURAG
						0	HOSUR	UNLOAD		ANURAG
24-Feb-15	5:00 AM	28-Feb-15	9:00 AM	100	48	52	JALGAON			ANURAG
22-Feb-15	1:00 AM	27-Feb-15	1:00 AM	120	100	20	BLSP			ANURAG
21-Feb-15	7:00 PM	27-Feb-15	5:00 AM	130	106	24	JIND			ANURAG
26-Feb-15	5:00 AM	02-Mar-15	9:00 AM	100		100	BAWAL			ANURAG
						0	CHN FORD	NOT UNLOAD		ANURAG
26-Feb-15	9:00 AM	03-Mar-15	9:00 AM	120		120	CHN			ANURAG
						0	CHN	UNLOAD		ANURAG
25-Feb-15	3:00 AM	29-Feb-15	7:00 AM	100	26	74	CHITORGARH			ANURAG
24-Feb-15	4:00 PM	28-Feb-15	8:00 PM	100	37	63	HINGOLI			ANURAG
						0	CHN	ON LOADING		ANURAG
						0	BLSP	ON LOADING		ANURAG
23-Feb-15	8:00 PM	28-Feb-15	8:00 PM	120	57	63	SENDHWA			ANURAG
25-Feb-15	1:00 AM	29-Feb-15	5:00 AM	100	28	72	NANDED			ANURAG
						0	CHN FORD	ON LOADING		
26-Feb-15	3:00 AM	03-Mar-15	3:00 AM	120	2	118	NELLORE			ANURAG
24-Feb-15	2:00 PM	28-Feb-15	6:00 PM	100	39	61	JALGAON			
22-Feb-15	5:00 PM	27-Feb-15	5:00 PM	120	84	36	BIJAPUR			ANURAG
25-Feb-15	1:00 PM	01-Mar-15	5:00 PM	100	16	84	NALGONDA			ANURAG
LOCAL TRIP						0	BLSP			ANURAG
						0	PUNE			ANURAG
						0	CHN	ON LOADING		ANURAG

EXHIBIT 3
Daily Vehicle Availability across all Locations

Sr. No.	Date	Current Location	Vehicle No.	Status
1	01-Jan-15	Bilaspur	HR55S5081	ON MAINTENANCE (ACCIDENTED)
2	01-Jan-15	Bilaspur	HR55S5192	NOT UNLOAD REWARI
3	01-Jan-15	Bilaspur	HR55S9684	NOT UNLOAD JAMALPUR
4	01-Jan-15	Bilaspur	HR55S9905	NOT UNLOAD SEC 37 BREAKS INDIA
5	01-Jan-15	Bilaspur	HR55S9906	NOT UNLOAD REWARI
6	01-Jan-15	Bilaspur	HR55P1574	ON LOADING JAMALPUR FOR FORD
7	01-Jan-15	Bilaspur	HR55N9179	ON LOADING DHARUHERA T.S
8	01-Jan-15	Bilaspur	HR55P5729	ON LOADING DHARUHERA T.S
9	01-Jan-15	Bilaspur	HR55F6596	ON LOADING DHARUHERA T.S
10	01-Jan-15	Bilaspur	HR55R2963	UNLOAD BILASPUR HONDA PROJECT
11	01-Jan-15	Bilaspur	HR55F4669	UNLOAD BILASPUR HONDA PROJECT
12	01-Jan-15	Bilaspur	HR55S3803	UNLOAD BILASPUR GATI PROJECT
13	01-Jan-15	Bilaspur	HR55U0607	UNLOAD AT HOME NUH DHL PROJECT
14	01-Jan-15	Bilaspur	DL1GC3408	UNLOAD BILASPUR DHL PROJECT
15	01-Jan-15	Bilaspur	DL1GC3422	UNLOAD BILASPUR DHL PROJECT
16	01-Jan-15	Bilaspur	HR55T9391	ACCIDENTED (REPAIR WORK GOING ON)
17	01-Jan-15	Chennai	HR55S5079	NOT UNLOAD CHENNAI NISAN
18	01-Jan-15	Chennai	HR55S5089	NOT UNLOAD CHENNAI NISAN
19	01-Jan-15	Chennai	HR55S5090	NOT UNLOAD CHENNAI FORD
20	01-Jan-15	Chennai	HR55S5091	NOT UNLOAD CHENNAI FORD
21	01-Jan-15	Chennai	HR55S5092	ON LOADING LUKAS FOR PANTNAGAR
22	01-Jan-15	Chennai	HR55S5094	ON LOADING PONDICHERI
23	01-Jan-15	Chennai	HR55S5193	ON LOADING PONDICHERI
24	01-Jan-15	Chennai	HR55S5194	NOT UNLOAD CHENNAI NISAN
25	01-Jan-15	Chennai	HR55S9683	ON LOADING BKI 2ND POINT
26	01-Jan-15	Chennai	HR55S9685	ACCIDENTED
27	01-Jan-15	Chennai	HR55S9907	NOT UNLOAD CHENNAI FORD
28	01-Jan-15	Chennai	HR55S9908	NOT UNLOAD CHENNAI FORD
29	01-Jan-15	Chennai	HR55S9909	NOT UNLOAD CHENNAI NISAN
30	01-Jan-15	Chennai	HR55P1572	UNLOAD CHENNAI T.S

Sr. No.	Date	Current Location	Vehicle No.	Status
31	01-Jan-15	Chennai	HR55U7797	NOT UNLOAD CHENNAI NISAN
32	01-Jan-15	Chennai	HR55U1755	NOT UNLOAD CHENNAI NISAN
33	01-Jan-15	Chennai	HR55U3702	NOT UNLOAD CHENNAI NISAN
34	01-Jan-15	Chennai	HR55T7406	NOT UNLOAD CHENNAI T.S
35	01-Jan-15	Chennai	HR55T9702	NOT UNLOAD CHENNAI FORD
36	01-Jan-15	Chennai	HR55T7538	UNLOAD CHENNAI
37	01-Jan-15	Chennai	HR55T6747	LOADED FOR PUNE/ SERVICING GOING ON
38	01-Jan-15	Hosur	HR55F3432	UNLOAD
39	01-Jan-15	Hosur	HR55F3560	NOT UNLOAD HOSUR FEEM COMPANY
40	01-Jan-15	Hosur	HR55T9787	UNLOAD
41	01-Jan-15	Hosur	HR55T8175	NOT UNLOAD TVS MOTORS
42	01-Jan-15	Hosur	HR55T2990	NOT UNLOAD TVS MOTORS
43	01-Jan-15	Hosur	HR55U6249	UNLOAD
44	01-Jan-15	Nalagarh	HR55U6198	LOADED FOR NALAGARH NOW AT BILASPUR DUE TO HOLIDAY
45	01-Jan-15	Nalagarh	HR55U7869	LOADED FOR NALAGARH NOW AT BILASPUR DUE TO HOLIDAY
46	01-Jan-15	Nalagarh	HR55T8869	NOT UNLOAD NALAGARH
47	01-Jan-15	Nalagarh	HR55T8454	LOADED FOR NALAGARH NOW AT BILASPUR DUE TO HOLIDAY
48	01-Jan-15	Nalagarh	HR55U8177	LOADED FOR NALAGARH NOW AT BILASPUR DUE TO HOLIDAY
49	01-Jan-15	Nalagarh	HR55U7591	NOT UNLOAD NALAGARH
50	01-Jan-15	Nalagarh	HR55U7084	LOADED FOR NALAGARH NOW AT BILASPUR DUE TO HOLIDAY
51	01-Jan-15	Nalagarh	HR55T7728	LOADED FOR NALAGARH NOW AT BILASPUR DUE TO HOLIDAY
52	01-Jan-15	Nalagarh	HR55U7926	LOADED FOR NALAGARH NOW AT BILASPUR DUE TO HOLIDAY
53	01-Jan-15	Other	HR55S9682	WAITING FOR LOAD IN BANGLORE DHL
54	01-Jan-15	Other	HR55U4144	WAITING FOR LOAD IN BANGLORE DHL
55	01-Jan-15	Other	HR55U4656	NOT UNLOAD IN BALLABGARH DHL
56	01-Jan-15	Other	DL1GC3416	NOT UNLOAD IN BALLABGARH DHL
57	01-Jan-15	Other	DL1GC3417	NOT UNLOAD IN BALLABGARH DHL

Source: Internal company documents

EXHIBIT 4

Profit and Loss

[illegible]

Source: Internal company documents

EXHIBIT 5**Overspeed Report on Daily Basis**

Vehicle Number	Tracking Time	Address	Speed (km/hr)
HR-55-F-6596	Feb 11 2015 4:24AM	SH2-Narkatpalli-Addanki-Medarametla Road (State High Way) Guntur Andhra Pradesh India	96
HR-55-U-4144	Feb 11 2015 7:40AM	NH 48 Chitradurga Karnataka India	81
HR-55-U-4144	Feb 11 2015 7:40AM	NH 48 Chitradurga Karnataka India	81
HR-55-U-4144	Feb 11 2015 8:10PM	National Highway 7 Krishnagiri Tamil Nadu India	86
HR-55-U-4144	Feb 11 2015 8:10PM	National Highway 7 Krishnagiri Tamil Nadu India	95
HR-55-U-4144	Feb 11 2015 8:25PM	National Highway 7 Krishnagiri Tamil Nadu India	82
HR-55-U-4144	Feb 11 2015 9:13PM	National Highway 7 Krishnagiri Tamil Nadu India	96
HR-55-U-4144	Feb 11 2015 9:13PM	National Highway 7 Krishnagiri Tamil Nadu India	82
HR-55-U-4144	Feb 11 2015 9:14PM	National Highway 7 Krishnagiri Tamil Nadu India	88
HR-55-U-4144	Feb 11 2015 9:14PM	National Highway 7 Krishnagiri Tamil Nadu India	84
HR-55-U-4144	Feb 11 2015 9:15PM	National Highway 7 Krishnagiri Tamil Nadu India	80
HR-55-U-3748	Feb 11 2015 1:49AM	National Highway 7 Krishnagiri Tamil Nadu India	89
HR-55-U-3748	Feb 11 2015 2:02AM	National Highway 7 Krishnagiri Tamil Nadu India	84
HR-55-U-3748	Feb 11 2015 2:08AM	National Highway 7 Krishnagiri Tamil Nadu India	84
HR-55-P-5731	Feb 11 2015 1:48AM	National Highway 7 Krishnagiri Tamil Nadu India	91
HR-55-P-5731	Feb 11 2015 2:02AM	National Highway 7 Krishnagiri Tamil Nadu India	81
HR-55-P-5731	Feb 11 2015 2:12AM	National Highway 7 Krishnagiri Tamil Nadu India	83
HR-55-S-5093	Feb 11 2015 2:23PM	National Highway 3 Palasner Dhule Maharashtra India	87
HR-55-S-5093	Feb 11 2015 2:24PM	National Highway 3 Palasner Dhule Maharashtra India	81
HR-55-S-5094	Feb 11 2015 6:04AM	National Highway 7 Krishnagiri Tamil Nadu India	82
HR-55-S-5094	Feb 11 2015 6:19AM	National Highway 7 Krishnagiri Tamil Nadu India	85
HR-55-S-5094	Feb 11 2015 6:31AM	National Highway 7 Krishnagiri Tamil Nadu India	90
HR-55-S-5094	Feb 11 2015 6:32AM	National Highway 7 Krishnagiri Tamil Nadu India	84

Source: Internal company documents

SUGGESTED QUESTIONS

1. What are the data requirements and process flows that Instant Transport Solution Private Limited (ITSPL) needs to answer the managerial decision questions that it faces?
2. What factors does ITSPL need to consider before investing in a software solution?

APPROACH FOR ANALYSIS

Apart from maintaining the data for tracking/availability of a vehicle, ITSPL needs to have information to support various business decisions, such as – which model(s) of truck had the lowest maintenance cost? Which driver had the best safe driving record? Which of the clients had a good repayment history?

To get this data for operations, it is necessary to come up with a broad design of a system. For this purpose, it may be necessary to identify the details of one time data and per trip information. Unlike per trip information, one time data usually changes less frequently and would include details of the truck, the driver and the customer. The trip information includes all the details at the loading point, during the trip and at the unloading point.

The information necessary would also include: who would capture the data, at what point in the operations should the data be input and what should be the device capabilities at the point of capture? For example, if a driver is responsible for capturing data at the loading and unloading point, then it is important that he must have a handheld device. Also, at the least, this device must have the capability to download the data periodically to the main system. For example, while GPS will provide real-time information regarding the location and other details of the vehicle, details of taxes paid during the trip may be downloaded at the end of day. It would be necessary to develop the flow of information along with the source (one time or per trip) for different types of data, to generate the reports which might enable decision-making.

While analyzing the choice of software, it is critical to highlight that using Excel for generating reports may not be appropriate as it is not easy to review/compare the data stored in an ad-hoc way, across different categories such as trucks, trips, customers. Data in Excel is also not completely secure. It does not support multiple users and the data is not safeguarded against erroneous entries (as mentioned in the case).

Additionally, the choice of new software should be guided by the total cost of acquisition (Capex and Opex) and its ability to integrate data with the GPS data and fuel sensor, take data from a variety of devices including mobile and handheld devices, generate responses to ad-hoc queries and provide a secure environment for updating data.

CASE CONTEXT

This case focuses on the issue of additional fleet acquisition by Ispaat Parivahan Limited (IPL) for its contract obligation fulfilment with Solid Steel Limited. As per the contract, IPL was to transport overall 15,000 tons per month (tpm) till July 31, 2015 to the North and West India. But IPL failed to uphold its part of the contract and fell short of the target for the North. IPL could transport only 12,800 tpm, leading to a penalty payment. To avoid this, the company proposed the acquisition of more fleet. One of the issues was the additional time due to return loads. The Board wanted IPL to assess scenarios with and without return loads.

Ispaat Parivahan Limited: Additional Fleet Acquisition

It was September 30, 2014. The Board of IPL was mulling over the purchase of 45 new special vehicles (Tata LPS 4923) for deployment with Solid Steel Limited (SSL). The capital expenditure (capex) requirement was ₹19.44 crore.

IPL was an Indian end to end transport and logistics company, earning revenue of ₹1712 crore in 2012-13 from all its operations in India. SSL, an Indian steel manufacturer, had one existing steel plant at Jamshedpur, Jharkhand which manufactured 9.15 million tons in 2013-14. SSL had another steel plant, of 6 million tons, scheduled to commission its first phase by March 2015 at Kalinganagar, Odisha.

As per the contract (Exhibit 1) between IPL and SSL, IPL was to transport steel by road from Jamshedpur to Delhi, Ghaziabad, Faridabad, Gurgaon and Kushkhera in the North, and Nagpur in the West, till July 31, 2015. The total steel to be transported was 15,000 tons per month (tpm). Of this, 12,500 tpm was to be transported to the North and 2,500 tpm to the West. It was estimated that IPL would earn revenue of around ₹70 crore per year from the contract fulfilment. According to company data, as on August 31, 2014, the IPL fleet towards the SSL contract fulfilment numbered 174 special vehicles, for both the North and West. Out of this, 89 were Tata LPS 4018 (Exhibit 2), having a payload of 24 tons, and 85 were Tata LPS 4923 (Exhibit 3), having a payload of 30 tons. With this fleet, IPL transported 10,300 tpm to the North and 2500 tpm to the West, resulting in a shortage of 2,200 tpm to the North

As per the contract, the maximum permissible weigh scale (PWS) variation was 0.2% of the assigned load. The shortage being well above the maximum PWS variation, IPL had to pay a penalty to SSL at the rate of 1.5 times the freight rate mentioned in the invoice document. The freight rate in September 2014, as per the price variation clause, was ₹4110 per ton for the North and ₹3238 per ton for the West.

In order to avoid the penalty, the proposal (Exhibit 4) to acquire additional fleet was put forward. Exhibit 4 gives the approval note as an agenda item placed before the Board Meeting

Prepared by Professor G Raghuram, Indian Institute of Management, Ahmedabad and Mr Souhardhya Chakraborty.

The authors gratefully acknowledge assistance provided by IPL (name changed) and its Board while providing the necessary information pertaining to the case.

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of September 5, 2014, followed by the minutes on this item, and subsequent questions raised by an Independent Director with the answers provided by IPL.

Some salient features of the contract (Exhibit 1) were:

- (i) "IPL is free to operate with/without backhaul for the specialized vehicles deployed for SSL transportation job subject to fulfilment of service level requirement of SSL.
- (ii) The volume mentioned is indicative volume and does not amount to any commitment from SSL.
- (iii) An average payload of 28.5 tons per trip per vehicle would be carried.
- (iv) In the event that a new destination, other than the destinations mentioned above, is requested by SSL, IPL will arrange the movement, maximum within one month time after completion of all necessary formalities/establishments.
- (v) A penalty would be charged for late delivery and weigh scale variation of the consignment."

IPL and SSL first entered into a contract on May 1, 2010, valid until July 31, 2013 for transportation of 10,000 tpm. Before the extension of the contract from August 2013, the load of 10,000 tpm was being comfortably transported with the fleet of 174 special vehicles. Since August 2013, IPL allocated 45 special vehicles for the West and 129 special vehicles for the North. Of the 45 vehicles for the West, 32 vehicles carried a return load (RL), and out of the 129 vehicles for the North, 48 vehicles carried an RL. (An RL did not necessarily have to be from the specific destination to the specific origin. It could also be in the general return direction from locations near the destination and similarly to locations near the origin.) The performance with this fleet allocation suffered in the North, where the actual transport fell short of the target by around 2,200 tons. Exhibit 5 gives details of the load transported from April to July 2014. All the loads from Jamshedpur in the recent past had been for Faridabad and were expected to be so in the future also.

IPL had been catering to four RL routes (Exhibit 6) while servicing the North:

- (a) Jamshedpur-*Faridabad-Rudrapur*-Jamshedpur,
- (b) Jamshedpur-*Faridabad-Rudrapur-Kolkata*-Jamshedpur,
- (c) Jamshedpur-*Faridabad-Panipat-Kolkata*-Jamshedpur,
- (d) Jamshedpur-*Faridabad-Gurgaon-Kolkata*-Jamshedpur.

Based on experience, IPL felt that there was an equal chance of getting any of the above RLs. The company further felt that at least one of the RL possibilities would materialize on each occasion. From each of these locations, an RL of 30 tons per trip per vehicle (Tata LPS 4923) was expected. The average rate for RL was ₹2600 per ton.

Exhibit 7 gives a route map with the locations. Exhibit 8 shows the monthly gross margins earned on the four routes after deducting variable costs. Exhibit 9 gives the other semi variable and fixed costs of operation for plying the vehicles.

It was expected that one special vehicle would make two round trips per month to the North with an RL, carrying 30 tons per trip. Based on this, 37 special vehicles (Tata LPS 4923) would be required to overcome the shortage of 2200 tpm. Keeping in view any other contingencies, IPL proposed to acquire 45 special vehicles. Capex required per vehicle was ₹42 lakh for purchase and ₹1.2 lakh for insurance and registration. At ₹43.2 lakh per vehicle, the total capex required was ₹19.44 crore for 45 vehicles.

However, the Board Members wanted IPL to assess the following:

- (i) Estimation and consequences of the penalty being paid
- (ii) Impact of increasing the number of trips per month of each vehicle
- (iii) Impact of purchasing new special vehicles which returned to Jamshedpur, with an NRL
- (iv) Impact of purchasing new special vehicles which returned to Jamshedpur, with an RL

Based on this, the IPL Board wished to deliberate on the capex requirement, while being concerned about the performance of the overall fleet.

QUESTIONS

1. Which option would you recommend for IPL (including any other you may wish to consider)? Please provide the various item-wise financial implications, including scenarios as relevant, for the options.
 - (i) All the vehicles would be plied on a no return load (NRL) basis in an attempt to overcome the shortage in delivery with the existing fleet.
 - (ii) Existing fleet continues the pattern of its transportation, and to overcome the shortage in delivery, new vehicles would be purchased which would be run on NRL basis.
 - (iii) Existing fleet continues the pattern of its transportation, and to overcome the shortage in delivery, new vehicles would be purchased which would be run on RL basis.
 - (iv) The entire existing fleet would be plied on an RL basis, and to overcome the shortage in delivery new vehicles would be purchased which would also be run on RL basis.
2. Are there assumptions made by IPL that you would like to question?
3. What are the risks and long term considerations while examining the options?
4. Are there specific changes in the clauses of the contract that you would like to propose for the future?

EXHIBIT 1**Contract between IPL and SSL**

The 'Operational Terms and Conditions' and 'Commercial Terms and Conditions' of this Contract have been accepted as set forth hereunder as Part A and Part B.

Scope of Work

This contract is valid from August 01, 2013 to July 31, 2015, for the transportation of Steel by road from our Jamshedpur Works and Jamshedpur/Adityapur based External Processing Agents (EPAs) to destinations Delhi, Ghaziabad, Faridabad, Gurgaon & Kushkhera in North region and Nagpur in West region. IPL service will to transport Steel material for Solid Steel from their Jamshedpur Works to customers located at Delhi, Ghaziabad, Faridabad, Gurgaon & Kushkhera in North and Nagpur in West. IPL will manage all aspects of transport service, including supply of trailers, provide MIS reports, scheduling, day-to-day logistics and supervisory function. IPL will restrain and secure load to the standards required and will conduct all loading within the legal limits.

Validity

The new contract shall be valid for a period of 24 months from the date of August 1, 2013 until July 31, 2015 with a provision of extension for three years at mutually agreed terms and conditions subject to satisfactory performance by IPL as per details mentioned in clause no. VI in Part A of this agreement.

Minimum Requirement of the Contract

- (i) IPL will ramp up to achieve required volume within three months from the date of the receipt order.
- (ii) IPL will submit a Demand Draft of ₹10 lakhs in favour of Solid Steel Limited before commencement of the contract which may be forfeited in case of failure to fulfil vehicle commitment within three months from the date of receipt of the order. If reasons of failure to fulfil the commitment are beyond control of IPL, the same will be considered on case to case basis.

Transportation Rates

The transportation rates in ₹ per ton payable shall be as per the rates given below. The rates shall be fixed and firm for entire period of contract except the revisions under clause nos. VI and X in Part A below. All payment will be made in Indian rupees and will be payable in India from our Jamshedpur Office. The rate table is as follows:

Jamshedpur to Delhi/Ghaziabad/Faridabad/Gurgaon/Kushkhera:

- Volume upto 8,500 tpm – ₹3,795 per ton (from August 1, 2013 till October, 2013)
- Volume 8,501 to 11,700 tpm – ₹4,230 per ton (from August 1, 2013 till October, 2013)
- Single rate effective post ramp up or three months (whichever is later) – ₹3,934 per ton

Jamshedpur to Nagpur:

- Volume upto 1,500 tpm – ₹2,723 per ton (from August 1, 2013 till October, 2013)
- Volume 1,501 to 2,300 tpm – ₹3,687 per ton (from August 1, 2013 till October, 2013)
- Single rate effective post ramp up or three months (whichever is later) – ₹3,134 per ton

The base freight rate as mentioned in Sl.No. 3 (₹3,934 per ton for Delhi and ₹3,134 per ton for Nagpur) are subject to revision as per the Price Variation Clause (PVC) as mentioned in Clause X below after ramp up period.

Freight rate (₹per ton) is based on the distance i.e., 1,375 Km for Delhi and 1000 km for Nagpur from Jamshedpur to destination cities as mutually agreed by both parties.

IPL is free to operate with/without backhaul for the specialised vehicles deployed for Solid Steel's transportation job subject to fulfilment of service level requirement of Solid Steel.

In the event that a new destination, other than the destinations mentioned above, is requested by Marketing & Sales team of Solid Steel, IPL will arrange the movement maximum within one month time after completion of all necessary formalities/establishments.

PART A – OPERATIONAL TERMS AND CONDITIONS

I. Despatch Units

The Steel materials shall be transported direct to customers/stock-points/EPAs from Jamshedpur Works & Jamshedpur based EPAs. It may be noted that new EPAs/stock-points may be added and existing ones may be deleted depending upon company's arrangements. Similarly, other destinations may be added to the list of customers as and when required by Solid Steel.

II. Tonnage to be Despatched

Expected average volume to be dispatched will be 12,500 tons per month (tpm) for Delhi/Ghaziabad/Faridabad/Gurgaon/Kushkhhera (North) and 2,500 tons per month for Nagpur (West) respectively. The volume mentioned above is indicative volume and does not amount any commitment from Solid Steel.

III. Fleet Requirement

Fleet requirement and load building for individual trip will be the responsibility of IPL to facilitate an average payload of 28.5 ton. IPL will provide vehicles of different carrying capacities (Model 4923: 33-34 tons, Model 4018: 27-28 tons & Model 3516: 22-23 tons) to arrive at the desired average payload of 28.5 tons. IPL will start deploying vehicles after receiving the order and will ramp up fully with additional vehicles which will be adequate to dispatch minimum 15,000 tpm [12,500 tpm for North (Delhi NCR & Kushkhhera) and 2,500 tpm West (Nagpur)] from date of receiving the order by three months. Till such time that the ramping up of vehicle is not complete i.e., within 3 months of getting the order, IPL will forego the KPI review and any amount payable to them by Solid Steel on account of KPI movement. The actual ramp up is to be initiated after receiving due clearance from CSD-SSL.

IV. Transit Time

The allowed transit time from Jamshedpur to Delhi/Ghaziabad/Faridabad/Gurgaon/Kushkhhera will be 4 days and for Nagpur will be 3 days, which is sacrosanct and will not be considered as a negotiable factor. However, performance of IPL in transit compliance would be reviewed against stipulated 3 days (refer Clause VI). Transit times are arrived at by subtracting GRN date & time from the invoice date & time. The lorry arrival date and the GRN date & time should be noted in IPL copy of lorry receipt by consignee representative. Penalty for non-adherence to the transit time will be as per clause no. XI 1.

V. Service Level Requirements

1. 100% materials must be delivered within the specified transit time i.e., 4 days for Delhi/Ghaziabad/Faridabad/Gurgaon/Kushkhhera and 3 days for Nagpur.
2. IPL has to place the vehicles for loading within 24 hrs of issue of stock transfer order (STO)/delivery order (DO).

(Contd.)

3. 100% materials must be transported in Prairie Wagons type trailer approved by Solid Steel and should be fully covered during transit. Transporter shall follow the loading norms of Solid Steel and shall maintain the load restrain as given in the SOP issued by CSD.
4. All vehicles will be equipped with GPS from Solid Steel approved service provider for online consignment tracking.
5. Quality of service delivered should be such that the material delivered to Solid Steel's customers/stockyard should be in the same condition as it was loaded at Jamshedpur.
6. IPL should ensure that materials are packed and covered as per norms defined by Solid Steel before leaving the Works/EPAs until it reaches the consignee. Any deviation in product packaging during loading at the loading points at Jamshedpur shall be brought to the notice of Head (Surface Transport) Customer Service Division (hereinafter referred to as "Head (ST)") immediately.
7. IPL shall comply with all statutory compliance including the loading of the vehicles in accordance with the prescribed statutory limit or as notified from time to time under the Indian Motor Vehicles Act and the rules made there under or any other applicable provision. IPL will be solely responsible for any violation of the same.
8. Trans-shipment of any material enroute would not be allowed, unless a specific prior written approval from Head (ST) is obtained.
9. IPL should ensure that their adequate numbers of representatives are available for co-ordination with Solid Steel round the clock. Their representatives should be adequately trained and competent to carry out the duties and perform the function in relation to the provision of the services in an efficient, safe and environmentally conscious manner. Representative should collect the revised/latest Code of Conduct, safety norms, loading norms, etc., from Head (ST) and ensure compliance to the same.
10. IPL will provide uniform and safety items to their drivers as per the safety norms of Solid Steel.
11. Unless specifically asked by Solid Steel, all coils have to be transported in eye-horizontal condition to prevent edge damage during transit. Coils can be loaded eye-perpendicular to the trailer axles with prior approval of Head (ST).
12. IPL shall inform Head (ST), as well as the consignee within 12 hrs in the event of enroute breakdown about the nature of breakdown and likely number of hours of delay for further delivery of the consignment. In case delay is expected to be more than 24 hrs, IPL shall arrange alternative vehicles at their own cost for despatching the materials, subject to all service level requirements as per clause V.
13. Vehicles loaded with Solid Steel material shall not carry any other material/third party's materials.
14. IPL shall provide information to Head (ST) about the incoming vehicle in next 48 hrs in advance.
15. IPL should comply with all Solid Steel's operating requirements such as entry of vehicle details in VTS, advance information of vehicles, delivery report, etc., as per the advice of Head (ST) from time to time.
16. In case of product damage enroute, information should be given to Head (ST) immediately, and as per his advice should be delivered to nearest stockyard. In no case damaged material should reach directly to the customers.
17. All documents meant for customers should be carried properly in plastic folder.
18. Names, addresses, e-mail ID and contact phone numbers of the authorized representatives duly attested by IPL shall be submitted to the Head (ST) & Head, Logistics & EPA-Commercial, Procurement Division (hereinafter referred to as "Head (LEPAC)").

VI. Key Performance Indicators & Performance Review

Performance of IPL will be reviewed jointly on a six monthly basis, based on the following *Key Performance Indicators* (KPIs), which are segregated into two separate sets:

- ❑ Monetary KPIs – Performance variation from agreed target level for these KPIs will have monetary impact on either IPL or Solid Steel.
- ❑ Non-Monetary KPIs – Performance variation from agreed target level for these KPIs will have no monetary impact on either IPL or Solid Steel, but will be reviewed for the further course of action.

Till such time that the vehicle ramp up is not complete (six months from the date of receipt of the order), KPI based performance review will be foregone by IPL.

1. Monetary KPIs

The parameters which will be considered as monetary KPIs, base target levels for those parameters, monetary impact for performance variation & other details are given below:

- (a) Daily lifting capacity: 500 tons (North – 415 tons & West – 85 tons)
 - ❑ Daily lifting capacity for IPL would be 500 tons which will be applicable after three months from the date of work order/LOI given to IPL or when IPL reaches full capacity as per ramp up plan provided, whichever is later.
 - ❑ If the material is not lifted within 24 hours after issue of STO/DO (within daily lifting capacity, as per ramp up plan) would be penalized @ ₹40/ton/day for each incidence.
 - ❑ Penalization for daily lifting capacity on the basis of 500 tons/day would start after 3 months from the date of order/LOI or volume ramp up to 15000 tpm.
 - ❑ Example: IPL lifts only 320 tons in a day after 6 months of starting the operation against issued volume of 360 tons for the day. Balance 15 tons (= 335 - 320) has been lifted by IPL after 3 days. So total amount to be deducted from freight bill of IPL for this incident = $15 \times 40 \times 3 = ₹1800$. Additional volume issued to IPL for the day, i.e., 25 tons (= 360 - 335), would be carried over to next day's issued volume.
- (b) Transit time (3 days)
 - ❑ Though performance of IPL in transit compliance would be reviewed against stipulated 3 days (for all destinations mentioned earlier), however IPL would be penalized @ ₹40/ton/day per incidence for late delivery beyond 4 days of transit period (through SAP system).
 - ❑ Penalization for this KPI will start volume ramp up of 14000 tpm or 3 months from IPL receive order for the contract.
 - ❑ Example: For any incidence when material is delivered after 6 days, where stipulated transit time is 4 days (without any specially assignable reasons beyond control), then total amount to be deducted from freight bill of IPL = $₹40/\text{tons}/\text{day} \times 31.87 \text{ tons} \times (6 - 4) \text{ days} = ₹2,550$, where payload for that specific shipment is 31.87 tons.
- (c) Average loading time (9 hours - base)
 - ❑ The average loading time at various loading points inside Solid Steel works/EPAs under the proposed contract will be 9 hours.
 - ❑ This KPI will be monitored on a six monthly basis.
 - ❑ Variation in freight rate due to variation in average loading time will be ₹9/ton/hr. Loading time will be calculated from the time vehicle reported at the transport park/EPAs for loading to vehicle exit from the gate after completing all formalities. The loading data may be verified from GPS system.
 - ❑ Compensation/penalization for this KPI will be start after vehicle ramp up period, i.e., after three months of IPL receiving the work order/LOI.

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- If average loading time for the past 6 months is found to be greater than 9 hours in the half yearly review, then Solid Steel will compensate IPL by credit note. However, if average loading time is less than 9 hours, then IPL would give rebate to Solid Steel and Solid Steel will raise a debit note on IPL for the same. The debit/credit note would be based on new rate and actual volume transported for the period. The compensation/rebate mechanism is explained below with examples.
- Example: If IPL starts operation from August 1, 2013, then first six-monthly performance review will be held in February 2014 for the six month period, August 2013 to January 2014.

Case I: If average loading time for the review period is found to be 9.5 hours against base average loading time of 9 hours, then IPL would be compensated back by issuing credit note as per the calculations given below:

Increase in average loading time over base loading time = $(9.5 - 9) = 0.5$ hours.

Adjustment in base freight rate for all destinations except Kushkhera for the next six months = $0.5 \times 9 = ₹4.5/\text{ton}$.

Thus freight rate for review period (6 months) for Delhi NCR will change from ₹3934/ton to ₹3939.5/ton.

Finally, Solid Steel to issue a credit note to IPL for the amount = 4.5 (₹/ton) \times Actual volume dispatched (ton) in the review period.

Case II: However, if during review it was found that average loading time for the past 6 months is 8.2 hours, then IPL would give rebate to Solid Steel for lower average loading time and a debit note will be issued on IPL as per the following calculations:

Reduction in average loading time over base average loading time = $(9 - 8.2) = 0.8$ hours.

Adjustment in base freight rate for Delhi NCR for the next six months = $0.8 \times 9 = ₹7.2/\text{ton}$.

Thus base freight rate for next 6 months will reduce from ₹3934/ton to ₹3926.8/ton.

Finally, Solid Steel to issue a debit note to IPL for the amount = 7.2 (₹/ton) \times Actual volume dispatched (ton) in the review period.

(d) Average Payload (26 ton to 28.5 ton)

- Base average payload will be 26 ton.
- There will be a dead band between quarterly average payload of ≥ 26 tons to ≤ 28.5 tons for which no bonus-penalty provision will be applicable.
- Average payload will be reviewed on a six-monthly basis and if average payload is less than 26 tons, then IPL would be compensated back or if average payload is more than 28.5 tons, then IPL will pay back to SSL through a mechanism of issuing debit/credit note based on the following formula:
 - For increase/decrease in average payload by 1 ton from base payload of 26 tons/28.5 tons, the transportation rate will increase/decrease by 4% of base rate or part thereof.
 - Compensation/penalization for this KPI will start after vehicle ramp up period, i.e., after three months of IPL receiving the work order/LOI or volume ramp up whichever is later. The following equation can be used for calculating impact of variation from base level for avg. loading time and avg. payload:

$$R_1 = R_0 + [(L_1 - L_0) \times 9] + [(W_0 - W_1) \times 4\% \times R_0],$$

where,

R_0 = Base transportation rate (i.e., 3795 ₹/ton),

R_1 = Revised transportation rate for the review period,

L_0 = Base loading time (i.e., 9 hours),

L_1 = Average loading time for the review period,

W_0 = Base average payload (i.e., 26 tons if $W_1 < 26$ tons and 28.5 tons if $W_1 > 28.5$ tons),

W_1 = Average payload for the review period.

2. Non Monetary KPIs

The parameter(s) which will be considered as non monetary KPIs, base target levels for those parameters & other details are given below:

- Average unloading time – 6 hours (base)
- Base average unloading time at stock points/customer premises would be 6 hours.
- Unloading time would be reviewed on a six-monthly basis.
- If average unloading time increases beyond 6 hours, then next course of action would be mutually decided between Solid Steel & IPL.

VII. Basis of Freight

- Unit for freight rates will be ₹/ton and would be inclusive of all applicable duties, taxes and levies/tolls, insurance, permits, etc., except service tax. Service tax will be applicable as per law and Solid Steel shall avail the cenvat credit. Freight rates have been derived on the basis of the KPIs detailed in clause VI above which will be reviewed on a half yearly basis except transit time.
- Loading and unloading of Steel material would be done by the consignor & consignee respectively. In specific cases where IPL required undertaking the unloading of material at the stock yard or consignee, payment of the unloading charges, if any, will be done by the office of Head (Sales & EPA Accounts) of Solid Steel based on the certification of expenses by the respective Customer Account Manager (CAM)/Hub Manager of Solid Steel/EPA Manager. IPL needs to submit all supporting documents while claiming such expenses.
- Any octroi payable for inward material to a hub/customer's premises/EPAs shall be paid for by the customer and shall be to the customer's account. Wherever IPL is required to make payment for octroi, the same shall be claimed by IPL from Solid Steel based on invoices raised by them enclosing the original receipt issued by the octroi authorities (to be certified by the respective Hub managers/CAMs/RFMs).
- All transit risks shall be to the account of IPL.

VIII. Rates and Transit Times for New/Add on Destinations

Rates and transit times will remain same for the destination falling within a radius of 50 Km from the destinations mentioned in this contract subject to location of the new destination within the same state. The rates finalised shall be converted to ₹ per ton per Km and shall be used for calculation of rates for destinations beyond 50 Kms within same state. For destinations which are not in the same state, rate shall be finalized mutually.

IX. Diversion/Change in Destination as Mentioned in Invoice

Due to changed market conditions and/or any other unavoidable reasons, it might become necessary for Solid Steel to divert a consignment moving towards any destination to an alternate destination. IPL shall accordingly ensure delivery to the revised destination. Based on the change of destination indicated, IPL shall intimate Head (ST)/Regional Hub Manager regarding the revised destination and claim additional charges for the revision in destination, which shall be settled in contract administration process. If at all, there are any handling charges in such change over in destination, the same shall also be indicated by IPL duly supported

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by documentary evidence, for consideration. The concerned CAM has to certify the diversion as well as any handling charges paid by IPL.

X. Revision of Freight Rates due to Price Variation Clauses (PVCs)

The negotiated base transportation rate (mentioned above) will be reviewed once in a quarter to adjust for the variation of the price of High Speed Diesel (HSD). Transportation rate will also be reviewed once in a year based on the variation of Wholesale Price Index (WPI). The details of both of these price variation clauses are given in the subsequent sections. Revised transportation rate based on PVCs will be determined as per the following formula: Revised Transportation Rate = Base Transportation Rate + Adjustment for diesel price variation (quarterly) + Adjustment for WPI variation (annually).

1. Price variation clause for diesel

It has been agreed between Solid Steel & IPL that average diesel consumption factor for the vehicles in the proposed contract will be 3.25 km/litre, considering both onward and return journeys. Base average diesel price has been agreed to be ₹51.38/litre for Delhi & NCR and ₹54.05/litre for Nagpur, which is simple average of the available high speed diesel (non-branded) prices at locations listed below as on June 1, 2013 (Source: IOCL website, www.iocl.com as on June 1, 2013).

Base Diesel Price for North (Delhi & NCR and Kushkhhera)

Ranchi	- 52.50 ₹/litre
Lucknow	- 54.42 ₹/litre
Delhi	- 50.25 ₹/litre
Raipur	- 55.59 ₹/litre

The mechanism for transportation rate adjustment based on diesel price variation has been explained below:

- Transportation rates shall be reviewed every quarter and shall be made effective from the first of the following months (April, July, October & January) for suitable adjustment based on the actual price (increase/decrease) of diesel and diesel consumption at the end of the quarter. The new rates would be rounded-up to the nearest whole number in ₹/ton and shall be made effective from the first day of the month for the following three month period (i.e., for the quarter). The new rates so finalized shall remain effective for a period of 3 months.
- In case there is no change in the actual diesel price for period under review, the rate review will be done at the end of next quarter.
- For a distance of 1375 km, diesel consumption for onward and return journey with average diesel consumption of 3.25 km/litre = $1375 \times 2/3.25 = 846.15$ litres.
- At ₹51.38/litre base diesel price, diesel cost for one round trip = $51.38 \times 846.15 = ₹43,575$.
- Diesel component in transportation rate considering average payload of 26 ton and base diesel price of ₹51.38 /litre = $43,575 / 26 = ₹1672$ /ton.
- For Kushkhhera, ₹135 /ton will be added to the freight rate obtained after adjusting for diesel price variation to base freight rate.
- Example:
 - Simple average of non-branded high speed diesel prices for Ranchi, Lucknow & Delhi as on October 1, 2013 (sourced from IOCL website) is ₹ 55.05/litre (assumption).
 - Thus diesel cost for one round trip for the quarter July–September 2010 will be = $55.05 \times 846.15 = ₹ 46,581$.
 - Considering average payload of 26 ton, diesel component in freight rate will be = $46,581/26 = ₹1791.5$ /ton, which is greater by $(1791.5 - 1672) = ₹ 119$ /ton from the base diesel cost component. So the freight rate for Delhi will be ₹ 4053 /ton (₹ 3934/ton + ₹119/ton)

— For Kushkhera, effective transportation rate for the same period after adjusting for diesel price increase will be $(4053 + 135) = ₹ 4188/\text{ton}$. These rates will be effective from November 1, 2013.

2. Price Indexation with WPI

The following cost drivers would get an annual increase/decrease based on the variation of Wholesale Price Index (WPI) from a base WPI level:

- (a) Tyre cost,
- (b) Driver salary,
- (c) Establishment & administrative expenses.

The above mentioned components constitute approximately 15% of the base freight rate i.e., ₹3934/ton which would be subject to adjustment due to variation of WPI. Other details of this price variation clause are given below:

- WPI in consideration is monthly WPI for “All Commodities”, published by the Office of the Economic Adviser, Ministry of Commerce, Govt. of India (Website: <http://eaindstry.nic.in/>).
- WPI for the month of April 2013 will be considered as base WPI, which is 171.5 and this will be considered as base reference figure during the entire tenure of the contract.
- Adjustment for WPI variation in transportation rate will always be done separately from the adjustment for diesel price variation.
- It is to be noted here that for WPI adjustment, which will be done once in a year, calculation will always be done considering ₹ 3934/ton as the base transportation rate for all destinations during the tenure of the contract.
- Most recently published WPI that is available one month prior to the anniversary date of contract will be considered for determining movement of WPI from the base WPI of 171.5 (WPI of April 2013).
- Example:
 - First anniversary of the contract started on August 1, 2013 would be on August 1, 2014.
 - WPI for July 2014 is 180.41 (assumed).
 - Percentage increase in WPI from base level = $(180.41 - 171.5)/171.5 = 5.19\%$.
 - Adjustment factor for variation in WPI from base in this case = $15\% \times 5.19\% = 0.779\%$.
 - Adjustment in transportation rate for WPI variation (over base transportation rate) = $0.779\% \times 3934 = ₹ 30.65/\text{ton}$.
 - The revised transportation rate for all destinations (except Kushkhera) from August 2014 will be $(3934 + 30.65) = ₹ 3965/\text{ton}$.
 - Revised transportation rate for Kushkhera from August 2014 = $(3965 + 135) = ₹ 4100/\text{ton}$.

XI. Penalty Provisions

The following penalty provisions will be in force during the tenure of the transportation contract.

1. Late delivery: For delay in delivery compared to the stipulated Transit time, unless the delay in delivery arises from an event of force majeure or any other cause beyond the reasonable control of IPL, there shall be a provision of penalty as mentioned in the table below:
 Delay (in days) Late Delivery Penalty from the date of invoice
 Beyond 4 days ₹40/- per ton per day for Delhi & NCR
 Beyond 3 days ₹40/- per ton per day for Nagpur
2. Indemnification: IPL will be solely liable and responsible for any violation of any statutory provision including that mentioned in the above clause V-8 as well as breach of any terms and condition of this Agreement and shall indemnify Solid Steel against all claims, demand made and/or any penalty/

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interest imposed by any authority or claimed by any third party/customer on Solid Steel including all expenses incurred or to be incurred or loss suffered by Solid Steel.

3. Solid Steel reserves the right to collect/gather information in any manner, which it may, deems fit and monitor on a periodic basis towards the compliance of the above by IPL. In case of non-compliance by IPL, Solid Steel may take appropriate action against any such breach/violation of the terms and conditions of this Agreement, against IPL after serving due written notice in this regard.
4. Damage to consignment: In case of damage to all or part of the consignment, IPL shall compensate Solid Steel for that damage up to a maximum of the invoice value of the consignment.
5. Lost consignments: Subject to clause 8 in relation to weigh scale variations, where part or all of a consignment is lost between the time of loading and unloading IPL shall compensate Solid Steel for that damage @ 1.5 times of invoice value of the consignment.
6. Loss/wrong delivery of documents: There would be penalty of ₹2000/- for any instance of loss of documents, wrong delivery of document (e.g., wrong vehicle no. in way bill and TC copy of other party etc.). In addition, the excise value as appearing in the invoice would be recovered from the bills of IPL till the revised documentation enables the consignee to credit to its account the relevant CEN-VAT amount. Adequate care shall be taken by IPL to ensure cautious carriage of documents in transit since these would be ownership documents along with excise documents, which are very important for subsequent transactions.
7. Unauthorized trans-shipment: Unauthorized trans-shipment of material will attract a penalty of ₹20000/- per incident.
8. Weigh scale variation: Permissible weigh scale variation shall be limited to a maximum 0.2%. For shortages beyond permissible limits, the value of shortfall in tonnage at 1.5 times the rate mentioned in the invoice document (CAI) plus the applicable taxes & duties and proportionate freight amount shall be recovered from IPL's freight bill.
9. Violation of safety COC and security norms: In case of violation of any safety/COC/security norms, the penalties will be applicable as per the Solid Steel rules circulated from time to time and all subsequent updating.
10. Risk purchase: In the event of failure to place the vehicles for lifting the material issued to IPL as per advance information, Solid Steel shall be at liberty to engage any other agency to transport the material by any mode of transportation and recover the differential amount from IPL's bill.
11. Third party's material: In case vehicle loaded with Solid Steel material carry any other material/third party's material, in addition to the penalty for damage caused to the product, the freight bill for that consignment will not be payable to the transporter.
12. Non use of GPS: In case of vehicle running without GPS, a penalty of ₹100/- per day shall be levied. In case of break-down or non functioning of GPS, no complaint with regards to higher unloading time and detention shall be entertained.
13. Improper/inadequate covering: Covering/collapsible hood should be in proper condition at all times. Violation on this account will attract a penalty of ₹5000/- per incident.

PART B – COMMERCIAL TERMS AND CONDITIONS

I. Certification of Receipt of Material

In case of direct dispatches to customers, the receipts will have to be certified by the customers and scanned copy of LR will have to be sent to Customer Account Manager (CAM) through mail for approval. The Goods Receipt Note (GRN) will be raised by the office of Head (Sales & EPA Accounts) based on the certification

of receipts by the customer. In case of stock transfer to the stockyards/EPAs, the transportation bills would require to be certified on the bill format by the Hub Manager/authorized signatory of Solid Steel, who will also raise the GRN.

II. Submission of Bills

Freight bills will be computed on the net weight of the consignment as mentioned in the CAI (Combined Advice-cum-Invoice) except for Cold Rolled (CR) sheets/packets which would be paid on gross weight (i.e., inclusive of weight of packing material). The bills should be submitted to Head (Sales & EPA Accounts) through Solid Steel web site along with scanned copy of the LRs and hard copy in the format finalized by them or as directed by them.

III. Terms of Payment

Payments would be made within 15 days from the date of receipt of bills, duly supported by consignment receipt note, to the office of Head (Sales & EPA accounts), Jamshedpur.

IV. Security Deposit

IPL will arrange to furnish a bank guarantee (BG) of ₹ 25 lakhs or 1% of yearly order value whichever is higher from any of the Nationalized bank/Scheduled banks (approved by RBI) in favor of Solid Steel Limited in the format to be provided by Solid Steel, directly from their banker to be sent to Head (Sales & EPA accounts), Solid Steel, General Office Building, Commercial Centre, Jamshedpur which should be valid till the validity of contract plus six month claim period. In case of failure in respect to any of the terms & conditions, BG will be forfeited in full or in part depending on the severity of failure as per Solid Steel's discretion.

V. Contract Administration

Grievances for genuine claims pertaining to various operational issues such as waiver of penalty, deduction on account of shortage, accidents, etc., shall be resolved on half yearly basis through a contract administration committee defined as under:

1. SSL representatives – Chief Procurement, Chief CSD, Chief (MRO & SS), Head (LEPAC), Head (ST), Head (SS)
2. IPL representatives – Director, Proprietor, Senior Executives of IPL must put their grievance in writing to Head (ST), who would be the convener of the above committee, within one month from the date of delivery otherwise their request will not be entertained. Decision of the committee shall be binding on both IPL and SSL.

VI. Compliance to Safety, Security & Statutory Norms

1. IPL must comply with the Solid Steel's Safety, Security, and Statutory norms and abide by the same.
2. All representatives of IPL who enter Solid Steel premises should undertake appropriate induction and training programs in respect of the relevant safety and Security and Statutory standards as may be required from time to time.
3. All vehicles should comply with the safety and environmental standards as per statutory norms and as defined by Solid Steel. Order Continuation Sheet

VII. Code of Conduct

IPL will sign the "Code of Conduct" formulated by Solid Steel. In case of violation, the penalties (including suspension/blacklisting) will be applicable as per the Solid Steel rules and any subsequent updation for performing contractual obligations under this contract.

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VIII. Termination of Contract

1. Termination for cause: Solid Steel will monitor the performance of IPL against the Key Performance Indicators (KPI's) which shall be agreed by the parties from time to time. Where IPL fails materially to meet the KPIs in any quarter (having regard to the frequency, impact and nature of the failures) the parties agree to meet to discuss the reasons for the failures and the steps that can be taken to improve compliance with the KPI's. In the event that, subsequent to these discussions and implementation of any agreed remedial steps, IPL fails to implement a performance improvement plan Solid Steel may give IPL notice of termination for cause. Solid Steel will monitor the compliance to fundamental service level requirement. On failure to adhere to fundamental service level requirement for two consecutive reviews Solid Steel may give notice of termination for cause.
2. Termination for convenience: Solid Steel acknowledges that IPL will make a significant capital investment in order to provide services to Solid Steel pursuant to this contract. Where the scope of work contemplated by this contract is affected by changes to the operations of Solid Steel such as the closure or relocation of any plants or termination of contracts with Solid Steel customers, the parties will meet and Solid Steel must provide alternate vehicle utilization within its business so that there is no detriment to IPL.
3. Termination in case of bankruptcy/insolvency/winding up: If transporter becomes insolvent and bankrupt, faces with winding up proceedings by appointment of official liquidator; Solid Steel is at liberty to terminate the contract forthwith without assigning any reason. In such cases, Solid Steel shall have the right to receive damage/compensation from IPL.

IX. Arbitration

1. All disputes and/or differences that might at any time arise by and between the parties hereto or in relation to or touching upon any aspect of this agreement shall first be settled mutually by negotiations between themselves.
2. In case no settlement can be arrived at within the period of 30 days from the date of raising the dispute in writing by any party, the dispute or difference shall be referred to a Sole Arbitrator, if both the parties agree upon the same. In case it is not agreed to, the dispute or differences will be referred to three arbitrators, each party appointing one on its behalf and the two arbitrators so appointed by the parties shall, before entering upon the reference, appoint the third arbitrator who shall act as the presiding arbitrator. The provisions of Arbitration and Conciliation Act, 1996 and the amendments made from time to time and the rules prescribed there under shall be applied. The venue of arbitration shall be at Jamshedpur, Jharkhand, India.

X. Jurisdiction

Solid Steel and IPL hereby agree that any dispute or difference of any nature in this agreement, whether implied or explicit, shall be adjudicated upon by a competent Court at Jamshedpur, in the State of Jharkhand. The applicable laws of India shall be binding between parties.

XI. Force Majeure

The failure or delay to perform any obligations under this agreement by either party solely by reason of Act of God, acts of government, riots, wars, revolts, fire, flood, sabotage, strike (including Bandh), lockout, closure of plant (part or full) for economic or other reasons or other causes beyond its reasonable control (Force Majeure) shall not be deemed to be a breach of this agreement. Either party failing to perform its obligation due to the reason of Force Majeure shall serve notice in writing to other party of such Force Majeure as soon as possible

within 3 (three) days after its concurrence. Party failing because of Force Majeure to perform its obligation will, upon the cessation of Force Majeure, take all reasonable steps within its power to resume, with the least possible delay and comply with its obligations. If the Force Majeure continues for more than 180 days then both the parties shall decide in writing to short close the contract settling their respective dues in terms of the agreement.

XII. Non Assignment and Non Subcontracting

IPL shall not assign or sublet or subcontract this agreement or any part thereof or any of their obligations to any other party without prior written approval obtained from Solid Steel. However the agreement between IPL and Solid Steel is non exclusive and Solid Steel may assign its obligation under this contract or part thereof to any other party due to financial reasons or unsatisfactory performance of IPL.

XIII. Consequential Loss

Neither party shall be responsible to other party towards any consequential, indirect loss or loss of profit under this Agreement.

Contract Item Service Conditions:

Unit Price/Tons INR

Item Charges

Delivery Terms: For each unloading point you need to give separate challans.

Payment Term: 100% within 15 days of submission of Challan & Invoice to department head

Order Ceiling Value: 593,500,000.00 INR

Collection Centre :

To bring about improvements in the logistics system inside Works, and strengthening the road safety standards, following safety measures are implemented for any work inside the steel works, with effect from September 1, 2008:

1. All 4 wheelers must have seat belts on the rear seat, and persons sitting on the rear seats must fasten the seat belts.
2. The speed limit on main roads reduced to 35 kmph. Accordingly, the speed monitoring camera shall be set at 35 kmph. The existing speed limit of 16 kmph on the other roads shall remain unchanged.

Plant: 9000 Miscellaneous Plant

General Instructions: Sales tax in no case will be borne by the Steel Company.

SA8000 (Social Accountability) Norms: It is mandatory for you as Contractor/Transporter/Supplier/any other kind of service provider to Solid Steel to comply with SA8000 norms as per the check list submitted by you to us. Non-compliance of the same, detected at any point of time may lead to cancellation of order or any other action or both as deemed fit by Solid Steel.

For Solid Steel Limited

Mr X; Authorised Signatory

Print Date: August 21, 2013

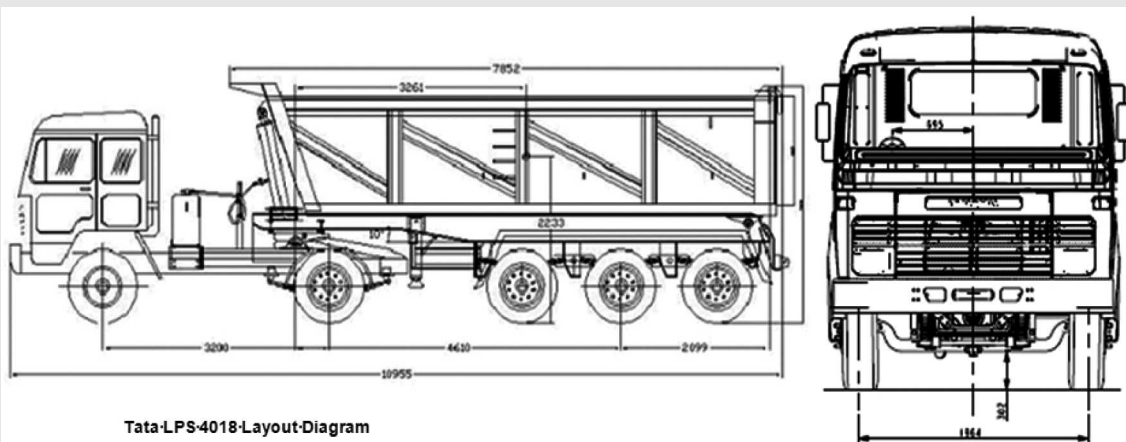
Source: Company data

EXHIBIT 2

Tata LPS 4018

Engine	
Model	Tata Cummins B 5.9 BSIII
Max. Engine Output	179 HP @ 2500 rpm
Max. Torque	675 Nm @ 1400-1600 rpm
Clutch	
Type	Single plate Dry friction Push type
Size	380 mm Diameter
Gear Box	
Model	Tata G - 750 with Twin Synchro cone
No. of Gears	6 Forward, 1 Reverse
Rear Axle	
Model	Heavy Duty Single reduction Axle
Front Axle	
Type	Heavy Duty Forged I Beam, Reverse Elliot Type
Steering	
Type	Hydraulic assisted Power Steering
Ratio	20.2:1
Brakes	
Service Brakes	Full Air S Cam Brake System
Chassis Frame	
Type	Best-in-class ladder type Heavy Duty Frame with riveted/bolted cross members
Size	Frame 285 mm x 65 mm x 7 mm
Suspension	
Front	Semi Elliptical Leaf Spring
Rear	Semi Elliptical Leaf Spring
Tyres	
Size	10.00 R 20 - 16 PR Radial Tyres - Primover
Fuel Tank	
Capacity	400 ltrs Single Rectangular Tank
Cabin/Cowl	
Cabin	All Steel Full Forward Control Sleeper Cabin

Electrical System	
System Voltage	24 Volts
Alternator Capacity	45 Amps
Performance	
Max. climbing ability	19.69%
Max. speed in top gear	70 kmph
Weight	
Max. permissible GVW	40200 Kgs
Vehicle Kerb Weight	14150 Kgs (Appox.): 24 Cum 15620 Kgs (Appox.): 28 Cum
Cost	₹34,00,000



Tata-LPS4018-Layout-Diagram

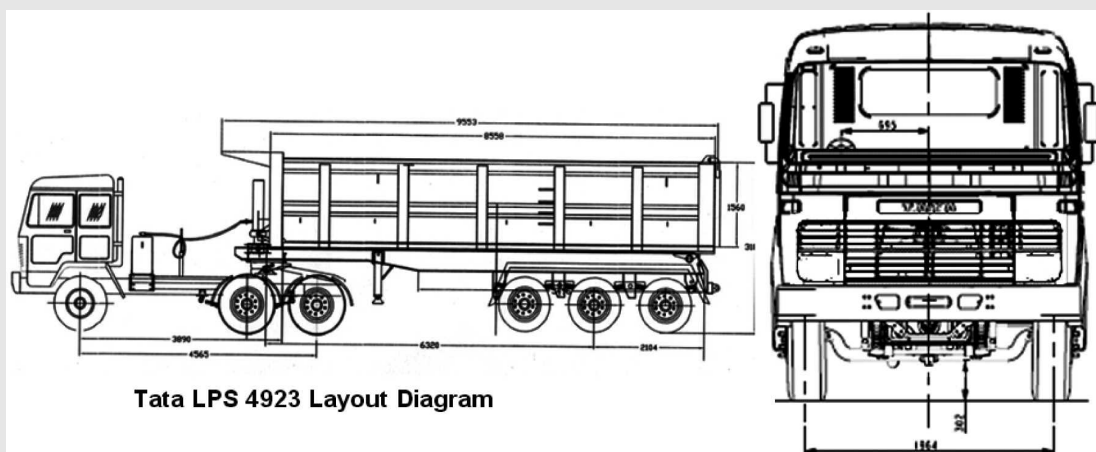
Source: Retrieved from <http://www.construck.tatamotors.com/tip-trailers/lps-4018.aspx> on November 04, 2014

EXHIBIT 3

Tata LPS 4923

Engine	
Model	Tata Cummins B 5.9 BSIII
Max. Engine Output	215 Hp @ 2400 rpm
Max. Torque	835 Nm @ 1300 -1500 rpm
Clutch	
Type	Single plate Dry friction Push type
Size	380 mm Diameter
Gear Box	
Model	Tata G - 1150 9 Speed Gearbox with CRAWLER gear
No. of Gears	9 Forward, 1 Reverse
Rear Axle	
Model	Heavy Duty Single Reduction Axle
Front Axle	
Type	Heavy Duty Forged I Beam, Reverse Elliot Type
Steering	
Type	Hydraulic assisted Power Steering
Ratio	20.2:1
Brakes	
Service Brakes	Full Air S Cam Brake System
Chassis Frame	
Type	Best-in-class ladder type Heavy Duty Frame with riveted/bolted cross members
Size	Frame 285 mm x 65 mm x 7 mm
Suspension	
Front	Semi Elliptical Leaf Spring
Rear	Bogie Suspension
Tyres	
Size	10.00 R 20 - 16 PR Radial Tyres - Primover
Fuel Tank	
Capacity	600 Ltrs (2 x 300)
Cabin/Cowl	
Cabin	All Steel Full Forward Control Sleeper Cabin

Electrical System	
System Voltage	24 Volts
Alternator Capacity	45 Amps
Performance	
Max. climbing ability	23.00%
Max speed in top gear	82.6 kmph
Weight	
Max. permissible GVW	49000 Kgs
Vehicle Kerb Weight	17900 Kgs (Approx.): 28 Cum, 18320 Kgs (Approx.): 32 Cum
Price	₹43,20,000



Source: Retrieved from <http://www.construck.tatamotors.com/tip-trailers/lps-4923.aspx> on November 04, 2014

EXHIBIT 4

Proposal to the Board of IPL

(i) Approval note in connection with purchase of 45 new special vehicles to support return load from Delhi NCR to maximize the profitability

(Source: Annexure forming part of the Board agenda for the meeting dated September 5, 2014, IPL)

“Background: On May 1, 2010, we were awarded by Solid Steel to lift 10,000 ton through special vehicles. This contract was valid upto July 31, 2013. This contract was renewed further upto July 31, 2015 for lifting of 15,000 ton per month. On past performance and with mutual understanding, it is agreed for further extension of this contract for three more years with increased rate and quantity.

We had to lift 15000 ton per month but with existing 174 special vehicles we could only manage to lift 12800 ton (based on average from April 2014 to July 2014). To cope up with shortage of 2200 ton (15000 ton – 12800 ton) we need more special vehicles. Presently we plan to go for 45 new vehicles and we may proceed further with more buying considering the performance and handling pressure from Solid Steel.

An investment of ₹19.44 Crore is required to execute the project. To describe further, ₹18.90 Crore is needed for purchase of vehicles and ₹54 lakh will be paid for Insurance & Registration of these vehicles.”

(ii) Proposal for purchase of 45 number of 4923 special vehicles with investment of ₹18 crores for deployment with SSL to ensure maximum return load

(Source: Minutes of Board Meeting dated September 5, 2014, IPL)

“The Company Secretary apprised that the projection sheet has been deliberated to the Capital Expenditure (Capex) Committee as well as to the Board Members. Capex proposal is the Reserved Board matter wherein approval of Private Equity (PE) partner is required. The Board was apprised that the query has been raised by Shri AB as to the past performance under the contract as compared to the projection, Project IRR, Payback period, ROCE, Cash flow analysis, Debt Equity ratio post approval of the Capex. The Chairman desired that there is the Work order term in the Work order issued by SSL wherein Company has to carry load of 15,000 tpm. However, due to inadequate fleet strength full load was not being carried resulting which Company has to pay penalty on monthly basis.

The Company Secretary apprised that Capex Committee and the Board had already approved Capex in last FY. However the same was not incurred due to recessionary trend and thereafter there was the discussion in the Fleet Committee, Capex Committee and the Board to take decisions for new Capex post review of the Fleet performance. The Chairman desired that apart from PE members, other members should share their views to which Shri CD desired that the fleet data based on the project including consignment margin and profit through hired vehicles as part of the work order should be shared. All Independent Directors shared their views in favour of the proposal keeping in view the work order requirement; however desired that the financial viability as sought by PE should also be evaluated. The Company Secretary was advised to share the financial viability with the Capex Committee as well to the Board.

It was decided that the proposal of Capex will be put up in the next Board Meeting.”

After the aforementioned meeting on September 5, 2014, one of the Independent Directors asked the following questions (questions in bold and answers received in italics):

1. Basis for current fleet deployment of 174 vehicles, with planned time for each circuit. What is the actual time for each circuit, with reasons for variation?

Reply: All these 174 vehicles are deployed on Jamshedpur to Delhi-NCR & Nagpur route. Month wise brief description of vehicle's deployment on these routes has been displayed in below chart. Scheduled time for each route is fixed for 4 days. Based on above chart average Timely Delivery percentage for JMS - Delhi NCR route is 84% & for JMS-NGP route is 68%.

Jamshedpur (JMS) to Delhi NCR				
Month	Timely Delivery	Not Timely Delivered	Total Consignments	Timely Delivery (%)
April 2014	322	51	373	86
May 2014	271	38	309	88
June 2014	311	52	363	86
July 2014	291	68	359	81
August 2014	298	88	386	77

JMS to Nagpur (NGP)				
Month	Timely Delivery	Not Timely Delivered	Total Consignments	Timely Delivery (%)
April 2014	100	20	120	83
May 2014	66	34	100	66
June 2014	60	28	88	68
July 2014	62	32	104	60
August 2014	60	34	94	64

2. Price we get from SSL, our operating cost on fleet and investment cost for the current fleet.

Reply: We are operating at two routes; detail for both the routes is as follows:

(i) JMS to Delhi NCR

— Price @ ₹ 4,110, Operating cost: @ ₹ 39,150 for 4018 & @ ₹ 44,550 for 4923

(ii) JMS to NGP

— Price @ ₹ 3,238, Operating cost @ ₹ 34,550 for 4018 & @ ₹ 39,550 for 4923

3. Do we need more fleet to meet our commitment, even if we return empty?

Reply: SSL's work order is manageable with 174 vehicles but we will have to compromise with empty return resulting loss of ₹ 1.57 Crore.

4. If return load is an opportunity, what is the additional time for the circuits? Hence, additional fleet required? Additional income, costs and investment?

Reply:

(i) Opportunities at Gurgaon, Panipat, Haridwar and Rudrapur.

(ii) As far as additional time is concerned, Panipat and Gurgaon will be managed on same day while Haridwar and Rudrapur may take one day extra time.

(Contd.)

- (iii) *Presently we are managing 174 vehicles doing 474 trips per month, of which 160 trips had a return load. After addition of new fleet of 45 vehicles 4923), total vehicles will be 219. We plan to retain the 174 vehicle's schedule unchanged and 100% return load for 45 new vehicles.*
- (iv) *Revenue generation, additional income, cost and investment for current and next FY (already circulated and discussed in earlier meetings.*

5. What are the risks on the return load assumption? Feasibility of guarantees?

Reply: Opportunities at Gurgaon, Panipat, Haridwar and Rudrapur was widely discussed in fleet meeting and it is resolved that there is plenty of opportunity of getting full load every time.

6. Are there long term issues which will affect the vehicle productivity?

Reply: The prospects are positive:

- (i) *RTO issue might be sorted out soon.*

RTOs will be scrapped soon, says Gadkari¹

Posted on August 19, 2014 by TNN

PUNE: Union minister of road transport and highways Nitin Gadkari on Monday said the central government was in the process of bringing in a law to scrap regional transport offices (RTO) and replacing them with an efficient alternative system in the next few months. Gadkari, who was delivering the J. S. Karandikar memorial lecture organized by the Pune Union of Working Journalists (PUWJ) here, said, "There are some outdated laws and systems which need to be scrapped. Systems like RTOs will soon be abolished; there is no need for RTOs. We have prepared a law which will be introduced soon to replace RTOs." Alleging harassment of citizens at the RTOs, Gadkari said, "Tithe Laxmi darshan acha khel chalto (money rules there)."

- (ii) *GST implementation would ease operations.*

India makes progress on GST implementation²

Posted on August 22, 2014 by India Briefing

DELHI: India moved closer towards implementing a Goods and Services Tax (GST) with the conclusion of the latest meeting by the Empowered Committee of State Finance Ministers this Wednesday. While numerous hurdles remain, central and state Finance Ministers agreed on several important items that are expected to speed up the implementation process. The proposed GST will replace several existing taxes, including the central level excise tax and service tax, and state level VAT, entertainment tax, lottery tax and electricity duty, with one single tax, thus facilitating the consolidation of a single market across the country and allowing for greater supply chain efficiency and economies of scale. Full implementation of GST could raise India's GDP growth by 0.9 to 1.7 percent, according to the National Council of Applied Economic Research (NCAER).

¹ *Source:* Excerpted from an article dated August 19, 2014 on the *Times of India* website -<http://timesofindia.indiatimes.com/india/RTOs-will-be-scrapped-soon-says-Gadkari/articleshow/40383360.cms> - Retrieved on November 6, 2014

² *Source:* Excerpted from an article dated August 22, 2014 on the India Briefing website - <http://www.india-briefing.com/news/indian-gst-deal-paves-tax-reforms-8938.html/> - Retrieved on November 6, 2014

EXHIBIT 5**Load Transported by IPL**

April to July 2014					
Destination	Vehicle	No. of vehicles	Weight carried (per tripper vehicle) from Jamshedpur (tons)	No. of trips per vehicle per month	Total weight carried per month (tons)
RL					
North	4018	10	24	2	480
North	4923	38	30	2	2,280
West	4018	31	24	2	1,488
West	4923	1	30	2	60
NRL					
North	4018	35	24	3.4	2,856
North	4923	46	30	3.4	4,692
West	4018	13	24	3	936
Total		174			12,792

Hurdles to increasing the number of round trips in a month

(Source: Observations by IPL from daily tracking)

- On the trip up north, vehicle held and delayed by RTO at Uttar Pradesh.
- The route to the west passes through a hilly area, for around 250 km in Chhattisgarh, traversing which causes delay.
- Night driving is avoided in Chhattisgarh because of Naxal threat.
- Drivers' personal issues.

Source: Company data

EXHIBIT 6

Route Details

Jamshedpur to Faridabad to Rudrapur to Jamshedpur			
From	To	Load per vehicle (tons)	Distance (km)
JMS	FBD	30	1350
FBD	RDR		280
RDR	JMS	30	1250
			Total distance - 2880
Jamshedpur to Faridabad to Rudrapur to Kolkata to Jamshedpur			
From	To	Load per vehicle (tons)	Distance (km)
JMS	FBD	30	1350
FBD	RDR		280
RDR	KLK	30	1375
KLK	JMS		250
			Total distance - 3255
Jamshedpur to Faridabad to Panipat to Kolkata to Jamshedpur			
From	To	Load per vehicle (tons)	Distance (km)
JMS	FBD	30	1350
FBD	PNP		150
PNP	KLK	30	1600
KLK	JMS		250
			Total distance - 3350
Jamshedpur to Faridabad to Gurgaon to Kolkata to Jamshedpur			
From	To	Load per vehicle (tons)	Distance (km)
JMS	FBD	30	1350
FBD	GGN		80
GGN	KLK	30	1550
KLK	JMS		250
			Total distance - 3230

Source: Annexure forming part of the Board agenda for the meeting dated November 5, 2014, IPL

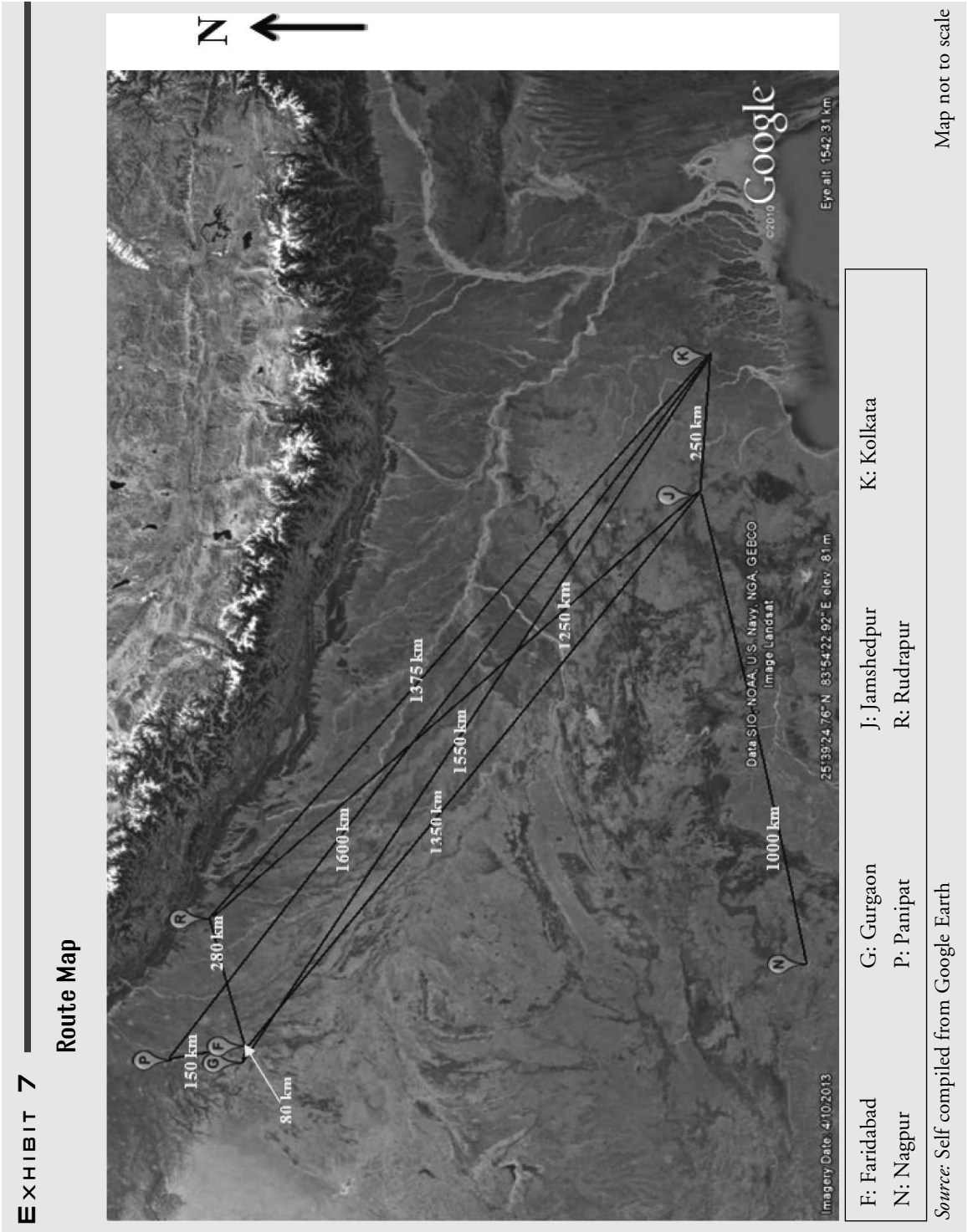


EXHIBIT B

Routewise Monthly Gross Margins

1	2	3	4	5	6	7	8	9	10	11
From	To	Load carried per trip (tons)	Distance (km)	Freight rate per ton (₹)	Total freight per trip (₹) (col 3 x col 5)	Variable cost ¹ per km (₹)	Total variable cost (₹) (col 4 x col 7)	Gross margin per trip (₹) (col 6- col 8)	No. of trips per month	Monthly gross margin per vehicle (₹) (col 9 x col 10)
Jamshedpur-Faridabad-Rudrapur-Jamshedpur										
JMS	FBD	30	1,350	4,110	1,23,300	33.0	44,550			
FBD	RDR		280			21.5	6,020			
RDR	JMS	30	1,250	2,600	78,000	33.0	41,250			
Total					2,01,300		91,820	1,09,480	2	2,18,960
Jamshedpur-Faridabad-Rudrapur-Kolkata-Jamshedpur										
JMS	FBD	30	1,350	4,110	1,23,300	33.0	44,550			
FBD	RDR		280			21.5	6,020			
RDR	KLK	30	1,375	2,600	78,000	33.0	45,375			
KLK	JMS		250			21.5	5,375			
Total					2,01,300		1,01,320	99,980	2	1,99,960
Jamshedpur-Faridabad-Panipat-Kolkata-Jamshedpur										
JMS	FBD	30	1,350	4,110	1,23,300	33.0	44,550			
FBD	PNP		150			21.5	3,225			
PNP	KLK	30	1,600	2,600	78,000	33.0	52,800			
KLK	JMS		250			21.5	5,375			
Total					2,01,300		1,05,950	95,350	2	1,90,700
Jamshedpur-Faridabad-Gurgaon-Kolkata-Jamshedpur										
JMS	FBD	30	1,350	4,110	1,21,500	33.0	44,550			
FBD	GGN		80			21.5	1,720			
GGN	KLK	30	1,550	2,600	78,000	33.0	51,150			
KLK	JMS		250			21.5	5,375			
Total					2,01,300		1,02,795	98,505	2	1,97,010

¹ Variable Cost includes fuel and expenses for driver.

Source: Annexure forming part of the Board agenda for the meeting dated November 5, 2014, IPL

EXHIBIT 9**Other Costs of Operation**

Monthly route characteristic based semi variable cost per vehicle (₹)						
Vehicle	Carrying	Destination	No. of trips per vehicle	General expenses	Tyre cost	Total
4923	RL	North	2	15,000	27,000	42,000
		West	2	12,000	18,000	30,000
	NRL	North	3.4	15,000	30,900	45,900
		West	—	12,000	20,200	32,200
4018	RL	North	2	15,000	20,000	35,000
		West	2	12,000	15,000	27,000
	NRL	North	3.4	15,000	24,700	39,700
		West	3	12,000	16,200	28,200

Monthly fixed costs per vehicle (₹)							
Vehicle	Driver salary	Maintenance cost	Insurance	Tax	Interest	Depreciation	Total
4923	20,000	15,000	5,600	4,200	22,750	42,000	1,09,550
4018	20,000	11,800	4,400	3,300	17,900	33,000	90,400

Source: Company data

SUGGESTED QUESTIONS

1. Which option of investment would you recommend for Ispaat Parivahan Limited (IPL)? Please provide the various item-wise financial implications, including scenarios as relevant, for the options.
2. Are there assumptions made by IPL that you would like to question?
3. What are the risks and long-term considerations while examining the options?
4. Are there specific changes that you would like to propose in the clauses of the contract for the future?

APPROACH FOR ANALYSIS

Optimizing the use of the truck for the return load would be an objective for IPL, while the customer, Solid Steel Limited (SSL), would like to ensure a minimum throughput on a fleet that they are familiar and comfortable with. While the contract penalizes a reduced throughput, it is okay with IPL bringing return loads. In this context, it is important to decide how much additional fleet IPL should acquire and what would be the expected returns.

A possible step-by-step scenario build up could be:

- i. All the vehicles would be plied on a No Return Load (NRL) basis in an attempt to overcome the shortage in delivery with the existing fleet.
- ii. The existing fleet continues the pattern of its transportation, and to overcome the shortage in delivery, new vehicles would be purchased which would be run on an NRL basis.
- iii. The existing fleet continues the pattern of its transportation, and to overcome the shortage in delivery, new vehicles would be purchased which would be run on a Return Load (RL) basis.
- iv. The entire existing fleet would be plied on an RL basis, and to overcome the shortage in delivery, new vehicles would be purchased, which would also be run on RL basis.

As per the above structure, it would help IPL first analyze the implications of plying the current fleet on an NRL basis. This obviously comes at a revenue loss for IPL. On the other hand, with the existing fleet continuing to operate the available return loads, the option of purchasing additional fleet to take care of achieving the guaranteed throughput can be

assessed. This additional fleet could be run with or without a return load. Finally, the option of the entire fleet (current and to be acquired) operating with a return load can be examined.

Apart from the revenues and costs it would be important to examine the risks in each of the scenarios. The analysis gets more involved since (i) there are two destinations to which SSL is sending the goods, (ii) there are two types of trucks, and (iii) the cost structure has fixed, semi-variable and variable costs.

It would help to develop a spreadsheet model that can support the analysis of the scenarios.

Going forward, it is important to recognize that SSL is expanding and hence offers an opportunity for more traffic. At the same time, it may be important to consider what clauses of the contract need to be negotiated better for a win-win situation.

CASE CONTEXT

XYZ Trucking Company is one of India's largest transport and logistics companies with a geographically spread business. The company has branches at various locations including major industrial towns and port cities of India. A case of misappropriation of funds came to light at the Koraput branch. The management quickly followed up with an investigation, both internally and through an external professional auditing company. The matter was reported to the Board. With the help of Board Minutes, the case describes the events that follow this discovery of misappropriation of funds at the Koraput branch. The Board and management were concerned in terms of the actions to be taken, both with specific reference to this misappropriation and to evolve systems that would prevent such occurrences in future.

XYZ Trucking Company: Misappropriation of Company Funds

XYZ Trucking Company was one of India's largest transport and logistics companies. The company had a fleet of 400 owned vehicles and access to over 80,000 trucks through a network of reliable vendors. Its turnover for FY 2011–12 was around ₹1,200 crore. The company head office was located at Manesar in Haryana.

The company was keen to have good corporate governance practices and professionalize its management. Given the nature of a geographically spread business and empowerment at the local level, there had been occasional instances of misappropriation of funds. With a focus on transparency, the company Board was finalising an explanation regarding the misappropriation of funds to be mentioned in the 2011–12 Directors' report to the shareholders. Exhibit 1 gives the minutes of the 177th Board Meeting on this matter.

On 8 May, 2012 another case of misappropriation came to light. An email was sent by the Executive Director (ED) to all the Directors and the top management on Tuesday, 9 May, 2012 as below:

From: TS Radhakrishnan [tsr@xyz.com]

Sent: Tuesday 9 May 2012 7:24 am

To: All the Directors and Top Management

Subject: Koraput fraud, running to several lakh may touch over a crore?

Matter needs to be examined in depth as to our systems and controls. Koraput Branch booking, remittance of funds, systems and procedure. Mr Raj who is on the run, whom was he reportable? What kind of smell test was applied by his reporting authority? Checks on lorry hire and balance hire (from same branch ratio). Do we think that a guy who draws less than ₹10000 pm is the only one? Can there be others involved? What was his behaviour or spending pattern and what kind of mechanism we have to check conduct? An indebted man is target for corruption and malpractice!!!

Internal control mechanism and independent inspection audit and quality cell needs to be in place. A team needs to be put in place from corporate office to control. The Auditing Company (TAC) or others to be contacted for ANTI FRAUD detection. Even a team of 20–25 with process

Compiled by Professor G Raghuram, Indian Institute of Management, Ahmedabad.

Assistance provided by Mr Vijay Magdum is acknowledged. All names, locations and some of the data have been masked to protect sensitivities.

Case material of the author is prepared as a basis for class discussion. It is not designed to present illustrations of either correct or incorrect handling of administrative problems.

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plan to control and mitigate these risks is worthwhile. Initially external independent agency to be hired in the best interest of stakeholders and report of any smell test and system lapses, loose controls should be documented to Chairman and Managing Director (CMD) and AUDIT COMMITTEE. A seamless process is recommended with no interference or overbearing approach by any official regardless of level. Please send your views to CMD directly.

Business Units (BUs) have their limitations beyond a point, and hence endeavour should be to facilitate from CORP/HEAD OFFICE.

Maybe a buy in from BU be required and we need to think beyond the 'know all syndrome'.

Corporate office under directions of CMD will have to deal with this hands-on without fear or favour. Size of company today is too large and you can see the receivables.

This, hopefully, is not the tip of iceberg.

I am aware that more than me the Whole Time Directors (WTDs) would be concerned and would favour their kind and thoughtful advice.

Sincerely yours,

TS Radhakrishnan

EXECUTIVE DIRECTOR, XYZ Company”

On the same day, the CMD appointed an Inquiry Committee headed by Vishnu Vardhan, Vice President (VP) (Operations) to investigate the matter. Accordingly, the agenda for the 177th Board Meeting to be held on 29 June 2012 was sent as below.

177th Board Meeting Agenda, Dated 29/6/2012

“To apprise on fraud at Koraput branch and action taken by the management so far:

Explanation: As apprised the Board members vide mail of CMD and ED dated 09.05.2012, a fraud was noticed at Koraput branch in Orissa with respect to lorry hire payment. Fraud is estimated to be touching over a crore (cr) as per verbal discussion and appraisal of director overseeing. Checking process is continuing as learnt. Earlier, it was hovering around ₹14.8 lakh. FIR got lodged. As per CMD’s directions, matter is getting investigated from various angles and pursued by all concerned for further action as per law in making amends to FIR and on jurisdiction of police station for speedy investigation and nabbing the culprit(s). CMD has also appointed an inquiry committee of senior officials headed by Mr Vishnu Vardhan, VP, to understand to the modus operandi for further internal management controls besides bringing culprit(s) to book.

The investigation is still on and CMD will apprise on the status during the meeting.”

On 17 June, 2012 the Investigation Committee submitted its report to the Management (Exhibit 2). This matter continued to be discussed until the 180th Board Meeting. The extracts of the relevant agenda and minutes of the 177th, 178th, 179th and 180th Board Meetings are presented below.

177th Board Meeting Minutes, Dated 29/6/2012

“Appraisal on fraud at Koraput branch and action taken by the management so far:

Explanation: The Board was apprised that the investigation into the acts of misappropriation, embezzlement of company funds and siphoning out funds from company accounts by putting through fictitious vehicle hiring/deployment vouchers in the system by Mr Raj Kumar during his posting as branch in-charge at Koraput branch has been conducted, and abridged report based on investigation made by the team headed by Mr Vishnu Vardhan, VP, on instruction of CMD was placed on the table. Board took note of the fraud amounting to ₹1.07 cr as summarized below:

No.	Particulars	Amount (₹)
1.	Fake Lorry Hiring	87,45,850
2.	Cash Embezzlement	19,35,791
3.	Manipulation of Expenses/Fixed Assets	31,661
	Total	1,07,13,302

Board was further apprised that Koraput branch is functioning under the control of Vishakhapatnam Regional office and mainly caters to transportation needs of Rayagada Industries Ltd (RIL). Mr Raj Kumar joined the company as loading supervisor on 01.05.2008 at Raipur branch at a monthly CTC of ₹ 4000 but was shifted within 15 days to Koraput branch where he has been working since 16th May 2008. Mr Raj Kumar was promoted as branch in-charge, within less than 2 years wef 1st April 2010. His last drawn net salary was ₹10,000 and he was granted annual increment of ₹1500 wef 1st April 2012. As per the report, Mr Raj Kumar was also handling cash in addition to engaging of vehicles through truck unions and other brokers and supervising loading as well. The feeding of vouchers into the system was done at Rayagada branch but the billing, etc., was being done by Mr Raj in connivance with Mr Sridhar Reddy, SAP Operator. Holding independent charge of the branch without much experience and performing all job single handedly, with no one to supervise his day-to-day activities; he was tempted to commit all these irregularities which went on unchecked for undue long period resulting into substantial loss to the company.

Board was further apprised that besides the involvement of 3 staff members of Koraput/Rayagada branch as per the report, around 10 outsiders were also involved in this fraud, as the amount

has been routed through their accounts, as per the report. CMD observed that FIR has been lodged and efforts are on with the police authorities to trace the culprit.

Board members deliberated on the root cause of such a major fraud requiring immediate steps to review the internal control system in the company. Mr RK Singhal desired that the concerned BU head should take reasonable steps for recovery of the fraud amount and put the persons behind bars. While deliberating the root cause of the fraud, independent directors requested the WTD to ensure the following:

- ❑ Surprise Cash Verification must be done on periodical basis, every quarter. Cheque operation at all branch account should be done on joint operation with signature of 2 persons.
- ❑ Maker-checker concept should be introduced and single cash operation should be avoided.
- ❑ Fidelity insurance should be comprehensively covered so that fraud amount could be recovered from the insurance company.

After deliberation, it was decided that the WTD, namely, Mr RL Mittal and Mr NK Mittal will study the investigation report and will submit the report to the Board in 3 months' time with steps taken to recover the amount.

While discussing the matter, Mr Ganesh Kumar observed that the Board should also be apprised on missing consignment details periodically. Company Secretary was advised to ensure the same."

178th Board Meeting Agenda, Dated 28/9/2012

"Appraisal on fraud at Koraput branch and action taken by the management so far:

Explanation: The Board was apprised on the matter of fraud during its last meeting. The vigilance team has conducted the enquiries. Apart from internal enquiry, forensic team of the third party reviewer (TAC) has been appointed to investigate the fraud. The first cut report from TAC team is expected by 31.12.2012, which will be circulated to the Board."

178th Board Meeting Minutes, Dated 28/9/2012

"Appraisal on fraud at Koraput branch and action taken by the management so far:

Explanation: The Board was apprised that further to the investigation into the acts of misappropriation, embezzlement of company funds and siphoning out funds from company accounts by putting through fictitious vehicle hiring/deployment vouchers in the system by Mr Raj Kumar during his posting as branch in-charge at Koraput branch having been conducted by the in-house team, the forensic team of TAC was also engaged to investigate the fraud, and to determine if there is evidence to confirm the embezzlements identified in internal investigation report. Scope also includes determining the nature and extent of the misconduct and identifying

the modus operandi adopted. Besides, it attempts to identify additional person(s) involved in perpetration of such misconduct, and, identify weakness in the existing control environment and potential areas of improvement with recommendations.

The Board members enquired that the WTD, namely, Mr RL Mittal and Mr NK Mittal were advised to study the investigation report to the Board in 3 months' time with steps taken to recover the amount. In this connection, Mr NK Mittal observed that as TAC has been appointed and they are already investigating the matter, once the report comes from TAC, they will study and submit to the Board. The Board members enquired on the status of FIR lodged by the company to which Mr NK Mittal replied that no accused have been arrested till date. CMD observed that contact details of all accused were provided in the FIR and as the accused are yet to be arrested, the officials of the company have been asked to dedicatedly pursue with the police officials. Mr RL Mittal observed that ED/CS should make continuous follow-up with the WTDs to whom the Board has assigned the responsibility. Mr NK Mittal observed that key decisions being taken at the corporate office should be brought to the notice of WTDs, which was appreciated by CMD and he assured that the same will be ensured.

The Board was further apprised on the first cut report from TAC team based on which their key findings/observations are as under:

- ❑ Cash withdrawal not accounted in the book
- ❑ Cash embezzlement
- ❑ Fake invoices issued on biggest customer 'RIL'
- ❑ The balance confirmation/ledger details for other major customers for Koraput branch is still pending.

The Board was apprised on the potential control weakness as per the initial report of TAC, as under:

- ❑ In December 2011 and January 2012, Koraput branch maintained average cash balance of ₹10 lakh to ₹12 lakh. However, no request was made to branch office for deposit of excess cash in bank account.
- ❑ It was noticed that cheque deposited in bank in the beginning of July 2012 continued to appear as outstanding entries in July 2012 and August 2012 bank reconciliation. Timely bank reconciliation would have helped in identifying such fictitious transactions.
- ❑ Daily cash requirement is given by branch manager and no supporting documents are provided for estimation of expenses (No sales order or confirmation from customer sent to HO for cash requirement).
- ❑ Customer orders are received by branch manager over the phone only, no formal process of receipt of customer orders is in place. No tracking mechanism to identify any potential fictitious sales orders.

- Sourcing of lorry is done by branch manager; rates are though decided by union (Fixed Rates). However, no control over charges paid to driver for lorry hire or unloading.
- Payment to lorry provider is not supported by third-party evidence. Even receipt of money from union was also not enclosed with challans.
- At the time of updation of work order issued by customer to XYZ in SAP, contract value and quantity was not entered into SAP.
- No formal process of account/debtor reconciliation in places.
- Copy consignment notes acknowledged by consignee were available in 30 per cent cases only.

Mr AK Upadhyaya observed that nothing new has come in the present report and once the final report/recommendation comes, the Board should review the same. It was decided to make collaborative exercise and improve the internal control to avoid such incidents in future.”

179th Board Meeting Agenda, Dated 12/12/2012

“Appraisal on fraud at Koraput branch and action taken by the management so far:

Explanation: The ED Mr TS Radhakrishnan visited Koraput on 18.01.2013 on advice of CMD and met Deputy Inspector General (DIG) along with the company officials. The fraud case and remittances by Raj Kumar was explained in detail to the DIG. The DIG was requested to depute a police investigation team from Koraput for arrest of accomplices in close cooperation of Haryana police (Bhiwani) to yield the desired results in unearthing the nexus in such magnitude of massive fraud and cheating and bring culprits to book. The DIG assured that he would refer and lodge complaint with Economic Offence Wing (EOW) Bhubaneswar on this as the crime is an economic offense under their purview beyond one crore and would explore possibility of sending members of Koraput police team. The Chief Vigilance Officer of our company is co-ordinating for the same and will be apprised on the latest status report during the meeting.”

179th Board Meeting Minutes, Dated 12/12/2012

“Appraisal on fraud at Koraput branch and action taken by the management so far:

Explanation: Mr TS Radhakrishnan, ED apprised the board that he visited Koraput on 18.01.2013 on advice of CMD and met DIG along with the company officials and the fraud case and remittances by Raj Kumar were explained in detail to the DIG. The DIG was requested to depute a police investigation team from Koraput for the arrest of accomplices in close cooperation of Haryana Police (Bhiwani) to yield the desired results in unearthing the nexus in such magnitude of massive fraud and cheating and bring culprits to book. The DIG assured that he would refer and lodge complaint with Economic Offense Wing (EOW) Bhubaneswar on this as the crime is an economic offense under their purview beyond one crore and would explore possibility of

sending members of Koraput police team. The Chief Vigilance Officer of our company is co-ordinating for the same.

CMD observed that regular follow ups with the police authorities are required and action plan for the same will be put up in the next board meeting for discussion.”

180th Board Meeting Agenda, Dated 18/03/2013

“Appraisal on fraud at Koraput branch and action taken by the management so far:

Explanation: TAC has submitted its final report. As per the report, they have observed that on scrutiny of documents, records and review of cashbook maintained at branch and bank statement for Koraput Branch, funds amounting to ₹106.80 lakh were fraudulently misappropriated by suspected employee. The break-up of total funds embezzled by the suspected employee is under:

- ❑ Physical cash balance, lying at branch as on 31 July 2012 amounting to ₹7.45 lakh, was embezzled by suspected employee.
- ❑ Suspected employee fraudulently made withdrawals from the bank between 31st July 2012 and 13th August 2012 amounting to ₹11.90 lakh. It appears that these cash withdrawals were intentionally not even recorded in cashbook at branch and were subsequently embezzled by the suspected employee.
- ❑ Suspected employee recorded fictitious revenue for key customer ‘RIL’ and against these sales invoices he recorded fictitious expenses in relation to vehicle hiring, unloading expenses and detention charges in branch books amounting to ₹87.90 lakh. He misappropriated the cash generated against payments for these fictitious expenses.

Final report has been received last week and based on their key findings, discussion with CMD and WTDs will take place on the corrective action to be taken, which the Board will be apprised of.”

Exhibit 3 gives the summary of observations of the TAC report.

180th Board Meeting Minutes, Dated 18/03/2013

“Appraisal on fraud at Koraput branch and action taken by the management so far:

Explanation: Mr TS Radhakrishnan, ED apprised the board that TAC has submitted its final report. As per the report, they have observed that on scrutiny of documents, records and review of cashbook maintained at branch and bank statement for Koraput branch, funds amounting to ₹106.80 lakh were fraudulently misappropriated by suspected employee.

The break-up of total funds embezzled by the suspected employee is as under:

- ❑ Physical cash balance lying at branch as on 31 July 2012 amounting to ₹7.45 lakh was embezzled by suspected employee.

- ❑ Suspected employee fraudulently made withdrawals between 31st July 2012 and 13th August 2012 amounting to ₹11.90 lakh from bank. It appears that these cash withdrawals were intentionally not even recorded in cashbook at branch and were subsequently embezzled by suspected employee.
- ❑ Suspected employee recorded fictitious revenue for key customer 'RIL' and against these sales invoices he recorded fictitious expenses in relation to vehicle hiring, unloading expenses and detention charges in branch books amounting to ₹87.45 lakh. He misappropriated the cash generated against payments for these fictitious expenses.

He further apprised that the matter is being followed up through all concerned. TAC report and earlier advice of audit team are being followed by governance and finance in close coordination with IT for leveraging IT on line. BUs can introspect and finance requires closer scrutiny with checks inbuilt in the system.

Mr RK Singhal raised his serious concern on the fraud that no accurate action has been taken so for ED agreed that there had been control lapses in the system. With effective due diligence, the fraud of such gravity would not have taken places. CMD advised to make best possible efforts to punish the culprits.”

The meeting ended with the Board asking for a report from the management for actions they would take specific to this incident, and to prevent any such occurrences in the future.

Abbreviations

BU	Business Unit
CMD	Chairman and Managing Director
CS	Company Secretary
CTC	Cost to Company
DIG	Deputy Inspector General
ED	Executive Director
ERP	Enterprise Resource Planning
HO	Head Office
RIL	Rayagada Industries Limited
SAP	System Application Products
TAC	The Auditing Company
VP	Vice President
WTD	Whole Time Director

EXHIBIT 1**176th Board Meeting Minutes, Dated 29/5/2012**

“The staff at three branches of XYZ Company has misappropriated funds amounting to ₹7,99,032 during the year under audit. It was decided to mention the following explanation in the Directors’ report to the shareholders.

Explanation: During the year under report, few instances have been noticed to the management pertaining to the theft and embezzlement. As your company has switched over to SAP ERP during the FY 2011–12, some of the validation tool was under testing phase leading to delay in reporting to the management on the fraudulent activity by some of the staff member leading to embezzlement. While action has been taken by terminating the concerned employee and efforts are being made to recover the amount stolen or pertaining to fraud/embezzlement from the concerned employee/insurance agencies, management has taken it very seriously and has been taking the corrective steps in this regard. Internal control system is being strengthened by making strict control through SAP ERP. Validation tools are being monitored by corporate IT team on regular basis through exception reports and required validation is being placed. Branch audit is already in places as a part of internal audit at the major locations and branch auditor has been advised to make periodical audit as deterrent measures. Surprise visit by the management and senior officials at the branches and checking of cash and updation of cash and equivalent transactions.”

EXHIBIT 2**Investigation Committee Report****1. FRAUDS ALLEGEDLY COMMITTED BY MR RAJ KUMAR, BRANCH IN-CHARGE, KORAPUT BRANCH**

The investigation into the acts of misappropriation, embezzlement of company funds and siphoning out funds from company accounts by putting through fictitious vehicle hiring/deployment vouchers in the system by Mr Raj Kumar during his posting as branch in-charge at Koraput branch has been conducted by the undersigned in compliance with the instructions received from Chairman and Managing Director (CMD).

1.1 Focus of the Investigation

- (i) Modus operandi adopted by the employee(s)
- (ii) Crystallizing the amount of fraud
- (iii) System failures resulting in late detection of frauds committed by him over a period of time
- (iv) Identification of loopholes in the system which facilitated and tempted the employee to go ahead with his nefarious acts without being detected
- (v) Identification of the culprits who shared the loot and joined hands with the employee
- (vi) Outlining the suggestions for consideration of the management to plug these loopholes to the extent possible which coupled with preventive vigilance to be exercised by supervisors at all levels to avoid recurrence of such frauds.

(Contd.)

1.1.1

Apart from the above, another aspect of the fraud noticed during investigation has also been looked into to crystalize the amount of loss sustained by the company due to siphoning out of amounts on fictitious consignments where bill payments were shown to have been received in cash at Koraput and/or other places. This amount does not include the interest loss suffered on the amounts temporarily misappropriated out of cash in hand (as the same cannot be detected now).

1.1.2

During the course of investigation, the following reports were generated from the system and physical records available at HO Manesar and Koraput branch were used:

- (i) List of 282 fake consignments
- (ii) List of 148 fake challans
- (iii) List of 26 bills outstanding
- (iv) List of bills where payment advices were fake
- (v) List of bills where cash payments were received from consignees.

1.1.3

In addition to it, the following members of the staff and outsiders are connected with the case who remained in touch with Raj for facilitating the fraud as evident from call details and their banks accounts having cross entries from each other accounts as discussed elsewhere in this report:

- (i) Staff:
 - 1. Mr Ramesh Kumar, Branch In-charge, Rayagada
 - 2. Mr Mukesh Kumar, Loading Staff, Koraput Branch
 - 3. Mr Sridhar Reddy, SAP Operator at Rayagada
- (ii) Outsiders:
 - 1. Mr Amit Soni
 - 2. Mr Sohil Singh
 - 3. Mr Dharmender
 - 4. Mr Ranveer Kumar
 - 5. Mr Raj Kumar
 - 6. Mr Rajesh Kumar
 - 7. Mr Sanjay Mehta
 - 8. Mr Puneet Kumar
 - 9. Mr Pradeep

1.2 Brief History

The Koraput branch is functioning at MG Road, Koraput, District Koraput in Orissa, under the control of Vishakhapatnam Regional office and mainly caters to transportation needs of Rayagada Industries Ltd.

Mr Raj Kumar joined the company as loading supervisor on 01.05.2008 at Raipur branch on the recommendations of Mr Dinesh Kumar and reference of Mr Dharmender Singh (Raj's brother) at a monthly CTC of ₹4000 but was shifted within 15 days to Koraput branch where he has been working since 16th May 2008. His bio-data and joining applications are placed below. Mr Raj Kumar was promoted as Branch

In-charge, within less than 2 years wef 1st January 2010. His last drawn net salary was ₹10,000 and he was granted annual increment of ₹1500 wef 1st January 2012.

Mr Mukesh Kumar was posted to assist him in Feb 2011 and both these employees continued to work together up to December 11. Thereafter, Mukesh proceeded on 2–3 months' leave and reported back in May 2012.

Mr Raj Kumar was also handling cash in addition to engaging of vehicles through truck unions and other brokers and supervising loading as well. The feeding of vouchers into the system was done at Rayagada branch but the billing, etc., was being done by Mr Raj in connivance with Mr Sridhar Reddy, SAP Operator. Holding independent charge of the Branch without much experience and performing all job singlehandedly with no one to supervise his day-to-day activities, he was tempted to commit all these irregularities which went on unchecked for undue long period resulting in substantial loss to the company.

1.3 MODUS OPERANDI

1.3.1 Fake hiring of vehicles

- (i) Mr Raj Kumar prepared fake lorry hire advance vouchers, consignment notes, and challans, and put them through the system as genuine entries.
- (ii) The lorry hire vouchers were entered in cash statements and their amounts pocketed as no vehicles were ever hired.
- (iii) After normal transit period, the receivings were marked off against these CNs and balance payments with unloading and detention charges claimed and pocketed.
- (iv) The payments from the parties were shown to have been received in cash at Koraput from the following clients which is quite unusual in transport sector when the parties were established at centres far away from booking branch:

Date of Receipt of Payment	Amount (₹)	Remarks
05.12.2011	55,000	Tata Nagar
05.12.2011	2,35,848	Bilaspur
12.12.2011	1,43,989	Bilaspur
02.12.2011	4,14,549	Cash Recd. from _____ Bilaspur but Invoices are raised for _____, Bilaspur
08.03.2012	1,88,177	Cash Recd. from _____, Bilaspur but Invoices are raised for _____, Bilaspur
09.03.2012	1,82,106	Cash Recd. From _____, Jabalpur
	12,19,669	

From above transactions, it is clear that amounts were drawn by putting through fake lorry hire advance & balance vouchers and mis-utilised. On due dates of payment of bills raised against these clients, cash amounts were deposited to hide these transactions from the company. It is improbable that the consignees established at Jabalpur, Tata Nagar and Bilaspur came all the way to Koraput to deposit cash.

(Contd.)

- (v) A number of cash/transfer entries in bank accounts of the employee and his associates Mr Ramesh Kumar Singh, Amit Soni and Sohil, as per tables given below, lead ample evidence to prove that cash amounts given to them by him were returned when he needed for showing cash payments of bills.
- (vi) In some of the cases where funds for payment of bills could not be arranged by the employee, fake payment advices were prepared and put through in the system by Raj Kumar. During reconciliation of accounts with Banks, when bank credit entries corresponding to those shown in payment advices were not located, the fraud came to light.
- (vii) Between 21.11.11 and 09.03.12, the employee Raj Kumar prepared 282 CNs included them in 148 challans and generated 62 bills for aggregate amount of ₹87,10,387 out of which fake payment advices were fed for ₹40,98,171 and remaining were shown as outstanding.
- (viii) Amount of loss due to fake lorry hiring
In the process of issuing fake lorry hire advance/balance payment vouchers, Mr Raj pocketed a total amount of ₹87,45,850 as per break up given below. Cash discount amount of ₹87,550 has been subtracted from total hiring charges.

No.	Particulars	Amount (₹)
1	Lorry hire advance	49,18,820
2	Other advance	31,71,400
3	Balance payments	5,89,980
4	Unloading charges	1,33,200
5	Detention charges	20,000
	Total	88,33,400
	Cash discount to be deducted	87,550
	Net Loss	87,45,850

1.3.2 Mis-appropriation of company's cash

- (i) The company's cash came into the custody of Mr Raj Kumar:
 - a. by obtaining payments of cheques drawn on bank account
 - b. on some occasions by credit into his personal accounts (an irregular practice adopted for the sake of convenience) by Vishakhapatnam and other branches.
 - c. by putting through fake lorry hire advance and balance payment voucher in the system.
- (ii) He transferred heavy amounts aggregate ₹45,70,525 into his 4 bank accounts over a period of 1.5.11 to 2.5.12.
- (iii) He remitted funds by ATM funds transfers to persons not connected with the company in any manner. In these accounts heavy cash deposits were also noticed which are believed to have been remitted by Mr Raj by other modes.
- (iv) Out of total credits aggregating ₹45, 70,525 in the above accounts, ATM transfers from the account Mr Amit Soni (A/c No _____) account for ₹2,91,000 and cash deposit at Rohtak, Dadri and Jhajjar add up to ₹5,72,000 which clearly define his mala fide intentions as no business dealings with Mr Amit Soni, a resident of Bhiwani or at our branches at the said centres were on record. Mr Sanjay Mehta

holder of _____ Bank A/c No. _____ from which ATM transfer credit of ₹49000 was afforded to Mr Raj Kumar's account on 01.05.12.

(v) The details of the heavy credits in above four accounts of Raj Kumar is as under :

a. Credits for ₹10,000 and above in _____ Bank A/c No. _____ of Raj Kumar (01.05.11 to 31.04.12)

No.	Date	Amount (₹)	Type of credit	No.	Date	Amount (₹)	Type of credit
1	03/05/11	10000	Cash	17	21/11/11	25000	Cash
2	03/05/11	17000	Cash	18	25/11/11	15000	Do
3	08/05/11	25000	Cash	19	05/12/11	25000	Do
4	08/05/11	10000	Cash	20	18/12/11	25000	Do
5	17/05/11	24500	Do	21	22/12/11	20000	Transfer
6	19/05/11	100000	Clg	22	26/01/12	25000	Cash
7	26/05/11	100000	Clg	23	16/02/12	100000	Do
8	20/06/11	25000	Cash	24	16/03/12	10000	Do
9	21/06/11	25000	Cash	25	19/03/12	25000	Do
10	23/06/11	25000	Cash	26	20/03/12	25000	Do
11	07/07/11	15000	Cash	27	01/04/12	20000	Do
12	07/07/11	25000	Cash	28	02/04/12	19700	Do
13	15/08/11	25000	Cash	29	10/04/12	25000	Do
14	10/09/11	25000				359700	
15	15/09/11	15000				491500	
16	29/09/11	25000			Total	851200	
		491500					

b. Credits in _____ Bank A/c No. _____ of Raj Kumar (27.06.11 to 12.04.12)

No.	Date	Amount (₹)	Type of credit	No.	Date	Amount (₹)	Type of credit
1	27/06/11	30000	Cash, Koraput	18	11/11/11	49900	Cash, Rayagada
2	08/07/11	49500	Cash, Rohtak	19	21/11/11	10000	Cash, Koraput
3	05/08/11	49900	Cash, Visakhapatnam	20	22/11/11	35000	Do
4	14/08/11	25000	Cash, Dadri	21	05/12/11	60000	Do
5	21/08/11	20000	Cash, Rohtak	22	07/12/11	50000	Do
6	26/08/11	49000	Cash, Dadri	23	12/12/11	75000	Do

(Contd.)

No.	Date	Amount (₹)	Type of credit	No.	Date	Amount (₹)	Type of credit
7	28/08/11	48000	Do	24	17/12/11	68000	Do
8	28/08/11	49000	Cash, Rohtak	25	21/12/11	50000	Do
9	30/08/11	49000	Cash, Dadri	26	11/02/12	97500	TR Manesar
10	01/09/11	45000	Do	27	12/04/12	19500	Rakesh Kumar
11	03/09/11	45000	Do				
12	28/09/11	49000	Cash, Jhajjar				
13	29/09/11	49000	Cash, Dadri		Total	1197300	
14	31/10/11	15000	Cash, Rohtak				
15	03/11/11	40000	Do				
16	06/11/11	40000	Do				
17	8/11/11	30000	Cash, Rayagada				

c. _____ Bank A/c No. _____ Mr Raj Kumar

No.	Date	Amount (₹)	Type of credit	No.	Date	Amount (₹)	Type of credit
1	1/12/11	20000	ATM Transfer. _____	18	16/01/12	100000	Cash
2	3/12/11	100000	Cash	19	19/01/12	65000	Do
3	5/12/11	17000	ATM Transfer. _____	20	20/01/12	53000	Do
4	5/12/11	60000	Cash	21	21/01/12	100000	Do
5	7/12/11	50000	Do	22	23/01/12	49000	Do
6	8/12/11	25000	ATM Transfer. _____	23	19/02/12	10000	Do
7	12/12/11	100000	Cash	24	19/03/12	49900	Do
8	16/12/11	23000	Do	25	03/04/12	47800	Do
9	19/12/11	150000	Cash	26	06/04/12	49000	Do
10	19/12/11	50000	ATM Transfer. _____	27	10/04/12	49900	Do
11	21/12/11	250000	Cash	28	16/04/12	49500	Do
12	21/12/11	50000	ATM Transfer _____	29	25/04/12	20000	Do
13	23/12/11	50000	Do	30	30/04/12	49000	Do
14	26/12/11	200000	Cash	31	01/05/12	49000	ATM Transfer _____

No.	Date	Amount (₹)	Type of credit	No.	Date	Amount (₹)	Type of credit
15	031/12/11	30000	ATM Transfer	32	02/05/12	49000	ATM Transfer.
16	05/01/12	100200	Cash		Total	2265300	
17	09/01/12	200000	Cash				

d. _____ Bank A/c No. _____ of Raj Kumar

No.	Date	Amount (₹)	Type of Credit
1	02/05/12	49000	Cash
2	30/04/12	48725	Cash, 49000 minus charges 275
3	25/04/12	50000	Cash, Koraput
4	03/04/12	49000	Cash
5	06/03/12	20000	Cash, Koraput
6	23/02/12	40000	Cash
	Total	256725	

e. Summary of credits

1		8,51,200	01.08.11 TO 31.07.12
2		11,97,300	27.09.11 TO 12.07.12
3		22,65,300	01.03.12 TO 02.08.12
4		2,56,725	23.05.12 TO 02.08.12
	Total	45,70,525	

(vi) Mr Ramesh Kumar Singh, Branch Manager, XYZ, Rayagada. _____ Bank A/c No. _____, Period 01.12.11 to 21.05.12.

The employee was involved in cash transactions with Mr Raj Kumar as he (Raj) had transferred ₹50000 each into his (Ramesh) account on 29.11.11 and 16.04.12 and cash deposits aggregating ₹79,900 from Rayagada were credited into Raj's account No. _____ with _____ Bank:

1	22/06/11	150000	Cash	10	16/12/11	11000	Cash
2	22/07/11	34000	Do	11	25/02/12	10000	Cash
3	26/08/11	35000	Do	12	16/04/12	50000	ATM Transfer from A/c of Raj Kumar
4	30/08/11	10000	“	13	20/04/12	50000	Do
5	09/09/11	25000	“	14	24/04/12	40000	Cash

(Contd.)

6	13/09/11	25000	“	15	13/05/12	40000	Cash
7	25/10/11	27500	“	16	17/05/12	25000	Cash
8	27/11/11	49900	“		Total	632400	
9	29/11/11	50000	Tr.from Raj Kumar A/c				

- (vii) Mr Amit Soni _____ Bank A/c No. _____

During the period from 01.06.11 to 21.05.12, Amit Soni, a resident of Bhiwani whose profession is not known, had been regularly transacting with Mr Raj Kumar in as much as aggregate amount of ₹9,33,000 was transferred into his account by Mr Raj on different dates. Mr Soni appears to have been deeply involved in such transactions as ATM fund transfers from the account of the following persons were also observed in his account which appears to be mala fide transactions:

- a. Mr Ranveer Kumar, Citi Koraput, Orissa - _____ Bank A/c No. _____

₹49,000 was transferred from his account through ATM on 31.04.12 into Amit Soni's A/c and reversed on 01.05.12, the next day.

- b. Mr Raj Kumar, _____ Bank A/c No. _____

₹20000 was transferred from his A/c though ATM on 01.05.12 into Amit Soni's A/c out of which ₹9000 was returned on 10.05.12 by ATM transfer.

- c. Two ATM debit transfers for ₹30,000 each into _____ Bank A/c No. _____ of Puneet Kumar and _____ of Rajesh Kumar on 26.01.12 and 02.02.12 have also been observed. Their addresses are being ascertained to find out their connection with the fraud or if they are our company's employee(s) at any other branch(es).

Additionally, cash deposits into his (Soni's) account during statement period add up to ₹10,02,900 covering 28 credit transactions.

- (viii) Mr Dharmender Singh, _____ Bank A/c No. _____ (01.12.11 to 21.05.12)

Two credits of ₹5000 each dated 23.12.11 and 29.12.11 by ATM transfer from the account of Mr Raj in the above account were observed. These remittances by Raj do not appear to be business transactions.

- (ix) Mr Sanjay, _____ Bank A/c No. _____ (01.12.11 to 21.05.12)

Like Amit Soni and Dharmender, Mr Sanjay is another person with whom Mr Raj was transacting and transferred from his _____ Bank account total amount of ₹3,95,000 in 7 transactions. Apart from it, 25 cash deposits for ₹10,64,300 were also seen in Sanjay's account in December–January 2011. All ATM payments from his account took place at Rohtak and Bhiwani for far away from Koraput. As no business connection has been reported with Sanjay, the transactions speak of nexus among these persons to siphon company cash with connivance of Mr Raj.

1.3.3 Embezzlement of cash

At the time of surprise checking of cash at the above branch on 14.05.12, a cash shortage of ₹14,85,791 was detected by Mr Anand Kumar Mallampalli, Vigilance Officer at Visakhapatnam branch of the company as under:

- | | |
|--|-------------------|
| (i) Cash balance as on 31.04.12 | ₹7,45,791 |
| (ii) Cash withdrawn from Bank on 31.04.12 | |
| but not accounted for in cash statement | ₹7,40,000 |
| (3 cheques for ₹2 lac each and 816616 for ₹1.40 lac) | |
| Total | ₹14,85,791 |

While FIR No 113 dated 19.05.12 was lodged against the accused at Koraput town police station for misappropriating the above amount, it subsequently transpired that a total amount of ₹4,50,000 was withdrawn in May, 2012, as under, and not accounted for in cash statement. Thus the total misappropriated amount comes to ₹19,35,791. The company's account at Koraput was operated under the joint signatures of Raj Kumar, Ranjit Kumar and Mukesh Kumar (any two).

No	Cheque No.	Date of cheque	Amount (₹)
1		04.05.12	1,00,000
2		07.05.12	50,000
3		10.05.12	1,00,000
4		13.05.12	2,00,000
	Total		4,50,000

1.3.4 Manipulation in expenses account and missing fixed assets

The employee is also alleged to have mis-utilised his official position as Branch in-charge and misappropriated the following amount by putting through fake vouchers in expenses account. Additionally, 10 fixed assets items under his charge were also found missing.

a. Office rent vouchers for the period from Jan 12 to Apr 12	₹16,400
b. Sweeper/tea/photocopy bills.	₹1,537
c. Fixed assets items (10) valued at	₹13,724
Total	₹31,661

The landlord of office premises at Koraput branch has denied having received the rent amount.

1.4 Summary of Likely Loss

No	Particulars	Amount (₹)
1.	Hiring of Fake Lorry Hiring	87,45,850
2.	Cash Embezzlement	19,35,791
3.	Manipulation of Expenses/Fixed Assets	31,661
	Total	107,13,302

1.5 MOBILE CALL DETAILS OF MR RAJ KUMAR (OFFICIAL MOBILE)

- On scrutiny of phone bills for the months of January 2012 to May, 2012 in respect of company's mobile no. _____ provided to Mr Raj Kumar, the following instance of repeated telephone calls to some particular numbers for long durations have been observed, which are made only under special circumstances. Considering the employees involvement in fraudulent activities, the list assumes greater importance to identify the persons with whom he was in regular touch with, to establish any nexus between them. This information should be supplied to police when second FIR is registered against Mr Raj Kumar and others.

(Contd.)

	Number of calls made by Mr Raj Kumar				
Mob No.	Jan, 12	Feb, 12	Mar, 12	Apr, 12	May, 12
	56	69	103	185	89
	141	154	105	79	20
	3	59	153	157	58
	106	63	50	44	3
	12	56	64	97	31
	84	45	30	69	20
	98	100	9		
	84	27	24	39	26
	132	64			
	10	19	43	86	28
			18	102	8
	11	40	23	25	21
		7	1	72	20
	29	31	12	14	3
	20	11	25	13	13
	Maximum duration of calls in mins				
Mob No.	Jan, 12	Feb, 12	Mar, 12	Apr, 12	May, 12
	209.32	211.06	61.34		
			75.44	315.86	62.93
	42.53	65.03	73.80	192.80	62.72
	1.99	53.14	133.25	127.55	31.71
	78.16	112.75	62.25	51.04	10.15
	39.10	99.39	55.62	58.03	44.47
	3.40	52.77	169.11	17.02	15.49
	129.03	35.02	25.68	37.22	16.39
	64.17	36.61	22.30	22.97	12.23
	19.56	24.10	48.83	30.45	31.54
	148.08		6.13		
	6.82	26.36	27.55	61.52	19.81
		16.4	3.57	81.19	20.05
	19.63	14.39	67.19	3.15	
	18.09	29.05	43.44	12.83	

	Maximum no. of units consumed as per mobile bill				
Mob No.	Jan, 12	Feb, 12	Mar, 12	Apr, 12	May, 12
	13614	13882	3734		
	2977	4743	5381	13452	4641
			4744	20147	3893
	159	3834	9647	9355	2451
	6026	8359	4865	3874	815
	2470	6385	3602	3803	2967
	8623	2382	1808	2722	1319
	220	3402	10631	1065	949
	4703	2652	1631	1801	905
	522	2076	2235	4632	1461
	1397	1610	3243	1966	2034
	9168		373		
		1111	237	5565	1407
	405	1175	1743	2687	1158
	2423	1944	1356	1182	91

- (ii) The employee has made repeated calls at _____, a mobile number at Bhiwani in the name of Mr Mahesh Kumar, who owns a truck engaged with VITA plant for lifting milk. He has stated that their common friend named Pradeep, who belongs to an adjoining village to Garetpur, called Veerpur, and whose father runs a shop in auto market at Bhiwani had been making calls to Raj over his phone. The truth of his statement is yet to be confirmed.

1.6 LOOPHOLES

1.6.1 System failures

- No laid-down system in the company to conduct surprise cash verification.
- Routing of company's cash through the personal accounts of employees for any purpose.
- Receipt of payments against bills in cash instead of cheques/RTGS, etc.
- Beside single custody of company's cash without any prescribed limit by Cashier, the branch in-charge himself handles cash transactions at many branches as happened at Koraput Branch.
- No system for independent tracking of vehicles, which remained a big casualty in the above case. Independent tracking if done could have brought the fraud to light on the very first day itself.
- No system of sending SMS to truck owners whenever their vehicles are engaged. This may also be introduced to check any fictitious hiring entries in their names.
- No systems of reconciliation of vehicles engaged with the consignor or of sending daily vehicle engagement reports (perforated copy of booking register) existing in the company.

(Contd.)

- (viii) Dereliction of duties by SAP Operators while feeding the documents which facilitated the fraud unchecked.
- (ix) Non-checking of genuineness of documents received at HO Manesar before consigning these to record.

1.6.2 Human failures

- (i) The immediate controller of the Branch, Mr Ranjit Kumar, to whom the Branch was directly reporting, never checked cash balance held by Branch in-charge, books and documents relating to dispatch of vehicles even on sample basis to ensure that basic compliances were being made to safeguard company interests.
- (ii) Mr Sridhar Reddy, SAP operator at Rayagada Branch while feeding the challans, CNs and balance payment advices did not act with circumspection to detect any abnormal feature. The following unusual features in the present case could have raised suspicion if the documents being fed had been viewed with careful scrutiny and checks:
 - a. In many cases the truck engagement forms were not obtained.
 - b. Where such forms were taken, the engine and chassis numbers of vehicles were not engraved with pencil.
 - c. Engagement of direct vehicles from Koraput to Cochin was also very rare.
 - d. Cash payments of bills by the parties established at other centres, far away from Koraput, an unusual feature was also left unnoticed and unreported.
- (iii) Mr Ramesh Kumar, Branch Manager at Rayagada also failed in his duty to scrutinize the documents being received and fed at his branch.
- (iv) The above documents after feeding were submitted to HO Manesar where these were received and kept as records. It is evident that no scrutiny of these papers was being conducted at HO otherwise vital discrepancies could not have escaped attention and fraud detected at the initial stage.
- (v) Cash payments from the consignor parties located away did not raise any suspicion. No system of customer calls was prevalent in the company to keep close liaison with customers.
- (vi) It is surprising that Mr Raj Kumar did not avail any leave from January 2011 to May 2012 despite his father's illness in June 11. He went missing only when the fraud came to light in May 12. It did not arouse any suspicion of the controllers of the Branch. Similar cases of employees not proceeding on leave for long time require careful scrutiny.
- (vii) Mr Raj Kumar spent a total amount of ₹1,88,633 on medical treatment of his father in June 2011 onwards without seeking any personal loan through the company and taking any leave. The payment of eligible amount of ₹97500 was released by insurance company vide cheque no_____ dated 30.10.11. The amount, even after sanction by the insurance company, was not claimed by Mr Raj till December 2011. The fact remained un-noticed and did not raise any suspicion at any level in the company.

1.7 Remedial Actions Required

- (i) At regular intervals an official from a nearby Branch/Regional Office should be deputed to conduct surprise cash verification and submit a report.
- (ii) Internal Audit of the Branches should be conducted at fixed periodicity of 6 months covering maximum operational areas. A proposal with revised format to implement, which was submitted to corporate office, is pending for discussion and decision.

- (iii) A list of employees with previous record of doubtful integrity should not be given independent or single-handed charge/responsibilities in the company. To adopt system and keep them under constant watch, a list of employees with such doubtful integrity should be maintained and reviewed periodically by HRD.
- (iv) To monitor assets creation beyond his known sources of income of an employee, a system to obtain assets & liabilities statements annually on 31st March every year should be put in place in respect of Branch In-charges and above (on prescribed format).
- (v) There is no system of control and checks by the Regional Managers and other controllers of their branches to create a sense of control for the operating units. They should be provided with a prescribed format to fill up and email immediately to next higher authority regarding the observations made and steps taken to implement systems and procedures of the company. They should be made accountable for any such activity under their control for lack of control, etc.
- (vi) All new/old branches should have minimum two members of staff also acting as joint custodians of cash and cheque leaves whether pre-signed or not, as per circular instructions issued.
- (vii) To avoid fake lorry placement as in this case, system of tracking of vehicles should be extended to destination branch through SMS/email.
- (viii) System of sending SMS to truck owners whenever their vehicles are engaged may also be introduced to check any fictitious hiring entries in their names.
- (ix) Regular reconciliation of vehicles engaged with the consignors or daily vehicle engagement reports (perforated copy of booking register) if sent to the party could have prevented the fraud. The system needs to be introduced. Even if it is assumed that the customer shall not pay any attention to such daily report forms submitted to them, even then it would act as deterrent for the employee attempting to put through fictitious vehicles into the system.
- (x) The practice of crediting company's cash into personal accounts of employee for any reason, may be for business purposes, should immediately be stopped. For example, at Koraput Branch, personal account of Mr Mukesh Kumar, Loading Staff (_____ Bank A/c No. _____), company's cash was frequently credited into personal account of the employee which he had withdrawn through ATM on different dates as under:

1	14/02/11	49500	Cash
2	17/02/11	45000	Do
3	27/02/11	49500	Do
4	28/02/11	49000	Do
5	14/03/11	49000	Do
6	21/03/11	40000	Do
7	15/04/11	49000	Do
8	04/05/11	22000	Do
9	06/05/11	25000	Do
10	19/05/11	49500	Do
11	25/05/11	49500	Do
	TOTAL	477000	

(Contd.)

- (xi) All payment advices being fed into the system must accompany either photocopy of cheque or party mail advising RTGS sent for credit into the company's account to prevent fictitious entries.
- (xii) All balance payment vouchers where detention and unloading have been paid, must accompany a copy of mail authorizing unloading/detention charges by the competent authority to prevent arbitrary concessions.
- (xiii) "Whatever is not checked is not done" principle is not being followed at all. Being single custodian of cash, CN and challan forms, and attending to loading jobs, the employee was successful in defrauding the company for such a long time. Maker/Checker principle must be observed in all documents being put through in the system. In the present case, the SAP operator has also been involved and remained unchecked which helped Raj in perpetration of fraud in connivance with SAP Operator Mr Reddy at Rayagada Branch. After feeding of challans, CNs and balance payment advices in SAP by the SAP Operators, there is no system of immediate checking by any supervisor. Checks and control for such checking should be provided in SAP to detect any of the following abnormal features which in the present case could have aroused suspicion if the documents being fed had been viewed with circumspection:
 - a. In many cases the truck engagement forms were not obtained.
 - b. Where such forms were taken, the engine and chassis numbers of vehicles were not engraved with pencil.
 - c. Engagement of direct vehicles from Koraput to Ernakulam was also very rare.
 - d. Cash payments of bills by the parties established at other centres far away from Koraput, seems to be an unusual feature.
- (xiv) The practices of providing pre-signed and blank cheques to the operating staff are fraught with risk as the employee is free to fill up any amount and withdraw from the bank. To minimize the risk involved, the cheques can be stamped as "Not above ₹....." considering the branch daily requirements.
- (xv) As preventive vigilance, the employees not proceeding on leave even for a short period permitting other employees to work in their place should have also raised an eye of suspicion. Mr Raj Kumar did not avail of any leave since January, 2011 till May, 2012 when the fraud was detected. Similar cases should immediately be examined and reviewed by HRD. It should be made essential for employees at operation level to avail leave for some minimum specific period at a stretch.
 - a. The STD call details appearing in the telephone bills should be scrutinized in order to check misuse of mobile facility as well as to identify the numbers, whether personal or official, to which repeated telephone calls were made to know the purpose for making such calls. The employee had been making repeated calls on a particular number during day and night time. A system should be devised to occasionally check whether such frequent calls were made for company business while making payments of the official mobile phones.
 - b. Transfer and promotion policy for staff at branches and administrative offices may be formulated keeping in view the important aspects of efficient functioning, overall development and interests of the staff and company. It shall prevent and ensure timely detection of any malpractices being committed by staff staying at their branches for unduly long periods for vested interests.

- (xvi) Job rotation should be done within the branch every six months to prevent creation of any vested interest and to provide all the members of the staff opportunities to enrich their knowledge and develop themselves to handle different situations.
- (xvii) A centralized Vigilance and Disciplinary Action Department armed with trained staff under direct control of CMD/ED is required to be created to deal with such cases independently and take stern action against employees involved in harming company's image and causing financial losses.
- (xviii) Delay in bank reconciliation with long delay is also an area of concern which is required to be looked into.

2. CONCLUSIONS

- (i) Mr Raj Kumar had been able to defraud the company as no systems to check his malpractices were in place and no preventive vigilance was ever exercised by other members of staff through whom his work was passing through and his controlling office.
- (ii) He defrauded the company by putting through fake hiring of vehicles in the system and put the company to a loss of ₹87,45,850 in connivance with outsiders namely:
 1. Mr Amit Soni
 2. Mr Sohil Singh
 3. Mr Dharmender
 4. Mr Ranveer Kumar
 5. Mr Raj Kumar
 6. Mr Rajesh Kumar
 7. Mr Sanjay Mehta
 8. Mr Puneet Kumar
 9. Mr Pradeep

and staff members, namely, Mr Ramesh Kumar, Branch In-charge and Sridhar Reddy, SAP Operator, both at Rayagada Branch.

The involvement of other staff and/or outsiders cannot be over-ruled which can be explored with the help of mobile numbers (as given above) which if provided to the police authorities along with further FIR to help investigation and nab the accomplices of Raj Kumar.

In some cases, the bill payments of fake truck hiring entries were shown to have been received in cash from the parties established far away from Koraput by Mr Raj Kumar and managed to feed into the system with the help of SAP Operator.

- (iii) He embezzled company cash amounting to ₹14,85,791, which came into his hands as Branch In-charge Koraput branch. This remained un-noticed and un-reconciled for quite long time.
- (iv) He manipulated expenses account vouchers under head office rent and other sub heads and pocketed a total amount of ₹17,937 in a fraudulent manner.
- (v) Ten fixed assets items costing ₹13,724 were found missing from his charge as Branch In-charge, Koraput Branch.
- (vi) The fraud under vehicle hiring would have remained undetected and loss amount further increased, had he not put through fake payment advices and arranged genuine RTGS remittance by raising funds from further posting of fake lorry hire vouchers.

(Contd.)

3. RECOMMENDATIONS

- (i) The FIR for embezzlement of cash amounting to ₹14,85,791 has already been lodged against Mr Raj Kumar at Koraput Police station on 19.05.12 and the matter is under police investigation. After discovering additional amount of ₹4,50,000 withdrawn by Mr Raj Kumar in May, 2012 and not accounted for in cash statement, a supplementary application with available evidence should immediately be submitted at Koraput police station for necessary action, if not already done so.
- (ii) Further FIRs against Mr Raj Kumar and all others outsiders, as mentioned above, including Mr Ramesh Kumar, Branch In-charge Rayagada Branch and Sridhar Reddy, SAP Operator at Rayagada for putting through fictitious documents in the system and siphoning off company cash amounting to ₹87,45,850 and against Mr Raj Kumar alone for putting the company to a loss of ₹31,661 by manipulating vouchers in expenses account and for missing fixed assets under his control while working as Branch In-charge at Koraput. All evidence in the form of lorry hire advance/balance payment vouchers CNs, Challans, books and registers connected therewith, bank account statements for company accounts and accounts of Mr Raj Kumar and others should be carefully preserved for making these available during police investigation.

4. GENERAL OBSERVATIONS

- (i) Of late, a large number of instances have come to notice where the operating staff has displayed gross negligence in the discharge of their duties resulting in substantial financial losses to the company. In addition to financial losses by way of various penalties due to negligence of staff, cases of misuse and embezzlement of company's funds the company are also on increase. Cases of employee's lack of integrity resulting in diversion of company funds for personal use have also been observed.
- (ii) This is a cause of concern for the company which is also tarnishing the company's image and reputation. Despite repeated training sessions, meetings, seminars and circular letters, the magnitude of such non compliances is increasing day by day and so as the cases of such incidents. The above case of fraud committed by Mr Raj Kumar along with outsiders and our own staff, where company's huge funds have been siphoned off by fictitious booking of vehicles exposing our systems and procedures, and showing laxity in ensuring internal control mechanism by all controllers supposed to be directly or indirectly responsible, i.e. whom the branch was directly reporting, is the latest example.
- (iii) With the too large and still growing size of the company today, surprisingly, there is no practice or prescribed system for independent investigation in the internal control mechanism leading to fraud and subsequently reprimanding employees who fail to abide by the company's performance standards, policies or rules. There is also no promotion or transfer policy in the company and employees manipulate to stay at one place for long years for their vested interests which leads to such frauds. This is the high time the company should look into this aspect.
- (iv) Further, it is also noted that the fraud/other cases involving our staff are neither properly dealt with nor brought to logical end apparently leaving erring staff scot free giving room to encourage others to adopt such activities. There is, therefore, an urgent need to standardize process to deal with all fraud/vigilance cases and employees who breach the terms of employment and/or indulge in various fraudulent activities leading to financial losses to the company. Continuation of existing systems and practices in the company without any change is fraught with great risk as existence of more such instances at other branches cannot be ruled out.

- (v) Re-employment of tainted staff with past history of doubtful integrity and removed from the company, should immediately be stopped. HRD should make direct reference to the previous employers of the new staff before taking final decision. All appointments should be centralized with no deviations based on personal recommendations only.
- (vi) Periodical strong branch internal audit system with deeper look in operational areas and compliances is another area which requires immediate attention to avoid recurrence of such incidents.
- (vii) Controllers of the branches should spend time during their visits to branches and make independent enquiries and collect information from other resources about the branch functioning and peruse the accounting/books. They should visit a branch at least once in a quarter for this specific purpose and record all observations in branch visit book.

Submitted for information and necessary action

(Vishnu Vardhan)

(MN Sharma)

(Divesh Gupta)

Vice President (Operations)

Manager (HR and Adm)

Sr Manager, Manesar

(Madan Bansal)

Accountant (Manesar)

17th June, 2012.

EXHIBIT 3

Summary of Observations in the TAC Report

1. EMBEZZLEMENT OF CASH FROM KORAPUT BRANCH

- (i) Absence of defined process to monitor the cash requirements at branch and inadequate controls to monitor the utilization of idle cash balances at branch
- (ii) Inadequate controls to monitor illegitimate/unauthorized utilization of cheques to misappropriate funds
- (iii) Absence of Maker/Checker controls at the branch leading to non-recording of cash withdrawals in cashbook/recording of fictitious expenses
- (iv) Absence of a defined process to verify the physical cash at branch vs. the balance as per cashbook/bank book at branch
- (v) Weak controls over collection from customers and collections deposited in the branch bank account instead of HO account

2. FICTITIOUS REVENUE AND EXPENSES LEADING TO EMBEZZLEMENT OF FUNDS FROM KORAPUT BRANCH

- (i) Absence of detective and preventive controls to avoid recording of fictitious sales by branch. Sales order received by branch are based on verbal communication with customers and not documented/ received over email.
- (ii) Absence of a defined process to confirm legitimacy of the sales order confirmation by head office directly with the customer to detect any potential fictitious sales order processed by 1919 branch.

(Contd.)

- (iii) Absence of a defined process to obtain customer balance confirmations. Any fictitious sales order processed by branch would be detected only at year end when debtors are overdue and provisioning for such doubtful debts is required to be done.
- (iv) Absence of maker/checker control at the branch office. There is no segregation of duty between the person who receives sales order, generates sales invoices, hires vehicle for transportation, records and approves expenses at branch and withdraws cash from bank for cash expenses and conducts bank reconciliation.
- (v) Absence of a defined process to conduct monthly bank reconciliation for all branch bank accounts on a timely basis. Delays of 3–4 months of conducting bank reconciliation have been observed. Further, due to absence of maker/checker controls any potential fictitious/incorrect reconciliation items highlighted in bank reconciliation statement will remain unnoticed for a long period of time.
- (vi) Absence of a defined process to conduct periodic branch audits or review of revenue/expenses recorded at branch by head office. Branch managers are assigned conflicting roles and responsibilities to create, approve and pay expenses, withdraw cash from bank, etc., which led to embezzlement of funds at Koraput branch.

SUGGESTED QUESTIONS

1. Comment on the stances of (i) Top Management, (ii) Whole Time Directors, and (iii) Independent Directors.
2. Categorize and critique the suggestions made by the Investigation Committee and The Auditing Company (TAC).
3. What specific systems (both IT based and non IT based) would you put in place to prevent future similar occurrences?

APPROACH FOR ANALYSIS

Funds Management is a major challenge for any geographically spread business. Given the nature of the problem instances of misappropriation of funds must be viewed with care and caution. In such a situation, there is need for a proactive approach. Realizing the inadequacy of controls in their organization when faced with the problem of embezzlement of funds, the Directors and top management of XYZ Trucking Company are keen to take necessary action.

Based on the Investigation Committee report and that of TAC, it is important to reflect on what messages need to be sent down the line, that such instances will not be tolerated. It would be useful to analyze the stances taken by various stakeholders and what implications they have on dealing with this incident.

An analysis and categorization of the causes between human and systemic issues would help. The observations made by TAC highlight the need to have company specific anti-fraud measures like periodical audits, a well-defined authority-responsibility structure, bank reconciliations and external confirmations. Based on this, an action oriented response by the management needs to be evolved.

Such corrective actions need to be both for the short term and the long term. Wherever possible, information technology should be leveraged. Professional values need to be reinforced. A risk identification and management framework needs to be put in place for monitoring at the Board level.

CASE CONTEXT

FarmAid Tractors Limited (FTL) was a tractor company with a 20 per cent market share and aimed to be the market leader within five years. The Indian tractor industry had become very competitive, with the growth in capacity outstripping the growth in demand. Customer preferences and demands had changed in the context of the competitive environment. FTL realized that the role of the dealer and how he was serviced by the company were key to its success. An important concern was how to develop a partnership with dealers by bringing in a service focus through improvements in supply chain management and outbound logistics. Trucking played a critical role in the transportation of tractors.

Two major areas that warrant analysis are (i) order processing and inventory planning and (ii) the distribution structure including stockyard location. This case addresses the issue of determining the optimal stockyard location for states in India, specifically in the state of Gujarat.

FarmAid Tractors Limited

The tractor industry in India had become very competitive, with growth in capacity outstripping growth in demand. The increased capacity was in response to a healthy growth in demand during the 90s. (A brief description of the Indian tractor industry is given in Exhibit 1.) There were seven major players targeting both domestic and international markets (Exhibit 2). FarmAid Tractors Limited (FTL), situated near Thane in Mumbai, was the third largest player in FY99 with a 20 per cent market share. FTL was aiming to be the market leader within five years.

FTL had one factory, 15 models (4 accounting for 90 per cent sales), 18 regional offices (each with a stockyard, one in a given state), and 300 dealers, and sold 60,000 tractors in a year for the past two years (Exhibit 3). FTL was relatively a new entrant in the industry, having started in the early 90s. The promoters were familiar with the automobile industry, and had competency in the auto components business.

Customer preferences and demands had changed in a competitive environment. The role of the dealer and servicing the dealer by the company were recognized by FTL as key success variables. The key issue was to develop a partnership with dealers by bringing in service focus, through improvements in supply chain management and outbound logistics.

In summer 1999, as part of a major effort in organizational restructuring and business process reengineering, FTL decided to engage the services of Prof. Prashanth from a reputed institute of management in western India. The assignment was on supply chain management, focused on outbound logistics. After an in-depth study of FTL (manufacturing, production planning, visiting and despatch processes), and, some of the regional offices, stockyards, and dealers, various issues and decision areas were identified by Prof. Prashanth. Exhibit 4 gives a list of the issues and decision and action areas which were planned to be analysed and for which data were sought from FTL. An in-company logistics team of four young executives, coordinated by Mr Rajesh Bhatt, supported Prof. Prashanth in this exercise.

Two critical areas for analysis were taken up first: 1. Order processing and inventory planning, and 2. Distribution structure, including stockyard location.

Prepared by Professor G. Raghuram, Indian Institute of Management, Ahmedabad.

Assistance provided by Ms Sushma Choudhary is acknowledged. Names and some of the data have been modified.

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1. ORDER PROCESSING AND INVENTORY PLANNING

Orders were placed by regional offices for delivery to stockyards, model-wise on a monthly basis. Orders had to be consolidated, based on dealers' requirements by the twentieth for receipts during the following month. Over the next five days, there could be discussion between the plant (production planning) and regional offices to modify the order, keeping in view any possible production constraints. Even though production (and despatches) were planned and scheduled for a whole month, there were always end of month pressures for modifications and additions. Marketing executives and top management of FTL were sensitive to the monthly market shares that industry analysts watched and reported.

Inventory planning at the stockyards to enable high service levels to dealers and at the plant to respond to seasonality were key concerns. The forecasts that would drive this planning also needed to be examined. Exhibit 5 gives the framework proposed by Prof. Prashanth to address these concerns.

2. DISTRIBUTION STRUCTURE AND STOCKYARD LOCATION

There were two concerns: the need for a central despatch yard and location (and number) of stockyards. Exhibit 6 gives relevant issues as part of the consultant's framework of addressing these concerns.

Currently, all despatches were made from the factory to stockyards through a daily allocation process which took into account the unmet demand at stockyards, ready for despatch inventory, and availability of trucks based on transporters' inputs. Once assigned to a transporter, tractors were moved by transporters to their godowns, since there was no space in the factory for holding finished stocks. It was often noticed that transporters actually moved tractors out of their godowns after an average of two days, primarily because of non-availability of intended trucks for despatch. FTL was concerned about this since the period of "lack of control" over tractors was enhanced because of this. A central despatch yard at a suitable highway location, 20 km away from the plant, was being considered. (There was no space nearer or adjacent to the existing plant for such expansion.)

For better servicing of dealers, location of stockyards was crucial. The primary transportation mode was decided as road, using long platform trucks that could carry up to five tractors. Secondary transportation from stockyards to dealers would use trucks that could carry two tractors rather than move tractors on own power. This was expected to reduce transit damages and also offer tractors in a mint condition to the dealer. One of the issues was whether a stockyard should be close to the entry point in a state or close to the marketing office, which was usually in a large commercial centre near the centre of the state. For an in-depth analysis, Exhibit 7 gives potential

stockyard locations for Gujarat, with monthly operating costs and distances. The current stockyard location was Ahmedabad. Exhibit 8 gives the location of 19 FTL dealers in Gujarat, along with expected monthly demand and distances. The total demand for tractors in Gujarat was expected to be 500 tractors a month. Exhibit 9 gives a map of Gujarat showing all locations.

The primary transportation cost was expected to vary from ₹2.5 to ₹3.0 /tractor/km, depending on the truck technology. The secondary transportation cost was expected to vary from ₹3.0 to ₹3.5 /tractor/km depending on the service level offered. It was also a matter of concern that a dealer should not have to be more than 500 km from a stockyard. Some of the more aggressive marketing executives felt that this should not exceed even 350 km, which would be a one day transportation lead time. Another issue was a possible minimum on what a stockyard should handle in a month, especially if stockyard management was to be outsourced. The company executives felt that 200 tractors a month was a reasonable figure to enable it to be attractive to the outsourcee.

Exhibit 10 gives the results (optimal stockyard locations with total costs) of the analysis based on a programming model for various scenarios of parameters affecting stockyard location. Top management was interested in the actual allocation of dealers to stockyards for these scenarios and their implications. The recommendations for stockyard locations in major states are given in Exhibit 11.

Supply Chain Organization

To ensure better supply chain coordination for higher service levels to dealers and customers, the distribution unit right up to stockyards would be under a new supply chain organization which would include the production units (Exhibit 12).

The overall spirit of the service orientation sought to be achieved by better supply chain management was communicated in a letter (Exhibit 13) to the logistics team members in response to certain queries.

EXHIBIT 1**The Indian Tractor Industry**

In 1999, the Indian economy was still highly dependent on agricultural growth and not surprisingly it was the largest tractor market in the world. However, in terms of total tractors in use in the country, it was eighth in the world. The country had a tractor density of 10.5 tractors per thousand hectares of gross cropped area (GCA) compared to the international average of about 28 tractors per thousand GCA.

Demand and Supply

The tractor industry was segmented based on the power of the tractor engine expressed in terms of horse power (HP). Among the segments, the 31-40 HP segment led with 54.7 per cent of total tractors sales in FY2000. Among the regions, North India constituting UP, Punjab and Haryana led with a contribution of 44 per cent of tractor sales for FY99. The demand for tractors increased from 121,106 tractors in FY90 to 260,762 tractors in FY2000 at a CAGR of 8 per cent, but the annual growth in demand varied substantially. For example, in FY99 and FY2000, the rise in sales was reducing with growth rates of 3 per cent and 2.9 per cent respectively.

During the last 20 years from FY78 to FY98, the tractor industry had performed substantially better in comparison to the growth in Indian agriculture production and GDP. As given in Table 1, CAGR of tractor sales was almost four times the growth in agriculture production.

TABLE 1 Tractor Sales v/s GDP Growth

	CAGR (FY78 to FY98)
Agriculture production	2.2 %
GDP	5.15 %
Tractor sales	8.31 %

The major factors influencing demand of tractors were monsoon, land holding pattern, availability of credit, growth in income of farmers, and implementation of scientific farming practices. The industry was not cyclical, as many would presume about the automotive industry in general. Demand contraction occurred in 1982 and again in 1993, the two years of severe credit squeeze.

The optimal land holding required for different HP tractors was approximately 8 to 10 hectares for 1800 cc or 25 HP tractors, 25 to 30 hectares for 35 HP tractors and beyond that, it was higher HP tractors. But the actual relationship between different land holdings and the power of tractors was dependent on earning stability, type of soil, type of operation, and affordability by farmers.

As per FY91 data, nearly 78.2 per cent of India's agriculture land was held by small and marginal farmers having less than the prescribed land holding. This had gone up from 76.2 per cent in FY86. The all-India average land holding figure stood at 1.55 hectares in FY91, down from 1.69 hectares in FY86. For these small and marginal farmers, there was very little potential for economic use of tractors by outright purchase.

Industry Structure

The HP-wise composition of tractor industry sales, as shown in Table 2, reveals that 31-40 HP tractors constituted the largest segment with 54.7 per cent of sales in FY2000. It can also be seen that demand for the less than 30 HP segment, which was a close second in FY94, had been pushed back by the 31-40 HP segment.

TABLE 2 Segment-wise Market Shares

	FY94	FY99	FY2000
< 30 HP	36%	22.5%	26.1%
31-40 HP	46%	57.8%	54.7%
41-50 HP	15%	15.9%	14.7%
> 51 HP	3%	3.8%	4.4%

This graduation to a higher HP segment can be explained if one considers the fact that region wise share of tractor sales had also shifted from the northern states to other parts of the country. Initially, the population of tractors was concentrated in states like Punjab and Haryana which received the benefits of the Green Revolution. Soil in these states was alluvial and thus required a low powered tractor for tilling. However, over the years, with an increase in irrigated cropped area, the population of tractors began to increase in other states as well. These included states in the western and southern parts of the country where the soil – laterite soil, black soil, etc. – was harder and needed higher powered tractors.

From the table above, we see that in FY2000 the share of the less than 30 HP segment improved by around 3.5 per cent while that of the next higher segment fell by 3 per cent. This could be attributed to the fact that in the 1999-2000 budget, the excise duty for the plus 1800cc tractors (above 30 HP) was increased from 13 per cent to 16 per cent while that of the less than 1800cc segment remained at 8 per cent.

Region-wise Share of Tractor Sales

North India constituting UP, Punjab, and Haryana led among the regions, by contributing 44 per cent of tractor sales in FY99, the data for which are presently available. But its contribution had come down in the last five years from a peak level of 53.5 per cent in FY94. Among the states, UP stood first with a contribution of 23 per cent of the country's tractor sales. MP and Punjab stood next with around 12-13 per cent contribution each.

State-wise sales figures over the years show some important changes (Table 3). Sales in agriculturally developed states like Punjab, Haryana and Uttar Pradesh as part of total tractor sales had come down from 53.5 per cent in FY94 to 44 per cent in FY99. This contrasts with the increase in share for the central and western regions of the country (Rajasthan, Madhya Pradesh, Maharashtra and Gujarat). This region's share rose from 20.4 per cent to 27.8 per cent in the same period. Sales in the northern regions had been below the all India CAGR of 8.6 per cent in the last ten years. On the other hand, the central and western regions of the country had recorded double-digit growth rates.

(Contd.)

TABLE 3 State-wise Market Shares

	FY90	FY94	FY98	FY99	CAGR (FY90 to FY99)
Punjab	22,026	26,636	31,644	31,047	3.9%
Haryana	15,307	16,579	22,711	21,877	4.0%
UP	31,233	30,656	50,433	59,211	7.4%
Bihar	4,891	2,900	10,282	12,875	11.4%
Rajasthan	9,315	11,129	25,152	24,054	11.1%
MP	10,018	11,418	32,250	32,711	14.1%
Andhra Pradesh	5,395	5,881	11,171	9,862	6.9%
Gujarat	6,508	10,033	21,501	22,208	14.6%
Maharashtra	5,737	6,730	15,059	16,011	12.1%
Karnataka	3,665	5,179	10,176	6,501	6.6%
Tamil Nadu	3,864	7,030	10,392	7,369	7.4%
Others	3,147	3,887	9,608	11,145	15.1%
All-India	121,106	138,058	250,379	254,871	8.6%

The increased growth from central and south Indian states had led to growth in the medium and high powered tractor sales, as these states had harder soil compared to the alluvial soil in the northern states. In the future, new tractor sales were expected to take place mainly in the western and southern regions while the mature markets of the north would see higher replacement sales.

TABLE 4 Major Markets for Tractors

	Major markets
Less than 30 HP	UP, MP, Rajasthan, Haryana, and Bihar
31-40 HP	MP, Rajasthan, Punjab, UP, Haryana, Gujarat, and Bihar
41-50 HP	Punjab, MP, and Rajasthan
More than 51 HP	Punjab and some volumes in Kerala and Maharashtra

Source: SIAM/TMA

EXHIBIT 2**Key Market Players**

As of 1999, the industry was controlled by seven major players – Mahindra & Mahindra (M&M), Escorts, FarmAid Tractors Limited (FTL), Punjab Tractors Limited (PTL), TAFE, Eicher, and HMT. All except FTL had been in the tractor market for more than 20 years. M&M continued its leadership position for the sixteenth successive year with a market share of 25 per cent in FY2000. Escorts had taken the second position from PTL with a market share of around 20 per cent. Escorts was followed by FTL (20 per cent), PTL (15 per cent), and TAFE (12 per cent). While M&M had a balanced presence in all HP segments except that less than 20 HP, others like PTL were stronger in the low and medium powered segments.

In recent years, the tractor industry had seen some new entrants introducing their products in the higher HP range. These included Ford New Holland and L&T John Deere. This had added around 65,000 units to existing capacities. In FY99, capacity stood at approximately 350,000 units. This meant a capacity utilization of around 72 per cent, down from around 87 per cent in FY98. This pointed to a growing problem of overcapacity in the industry.

Many of the players had strong linkages with the automobile industry. Recently, one of the largest and oldest players in the tractor industry, Escorts Limited, merged itself with Escorts Tractors Ltd after buying out the stake of its foreign collaborator Ford New Holland.

Mahindra and Mahindra Limited (M&M)

M&M was the world's largest tractor manufacturer. It was the largest jeep and tractor manufacturer in India with a tractor market share of 27 per cent. Achieved economies of scale because of these associated operations in LCV and utility vehicles. Strong distribution network and brand equity. Recently embarked on a business process reengineering program to achieve reduction in the production time, costs, and improvements in product quality. One of the core competencies of M&M lay in engineering skills and R&D which had helped the company develop a diversified product range. M&M had acquired a majority stake in Gujarat Tractors Limited.

Escorts

With the recent merger, Escorts had emerged as the second largest player in the Indian tractor market with a market share of 20 per cent. (Escorts may not have substantial economies of scale because of differences in the products of the two companies.) It was also poised to takeover the tractors division of public sector HMT Ltd. Engaged in a restructuring exercise, resulting in the integration of the entire tractor business in one company and the other businesses like two-wheeler, auto components, telecom, etc. in separate companies. The distribution network, though widespread in the north, was weak in the emerging markets of south and west. The highly successful brand name Ford had been withdrawn with the divestment of the stake of Ford New Holland in favour of Escorts. Now, tractors were being marketed in the name FARMTRAC and the change had been well advertised among the customers. Escorts had seen declining sales, had lower margins than the industry, and had a very high debt/equity ratio.

(Contd.)

FarmAid Tractors Limited (FTL)

Had a presence in all market segments. Also had a 20 per cent market share and was aiming to be the number one player in another five years, achieving a market share of 30 per cent, either by expansion or by acquisition.

Punjab Tractors Limited (PTL)

Strong distribution network and brand equity. Had adapted its tractors to suit specific state/crop conditions. Had been growing at a faster rate than the industry. Had one of the highest operating margins in the industry. Sales were against advances. It had a working capital surplus. Well positioned in the > 40 HP segment to exploit future growth opportunities.

TAFE

Closely held company of the Amalgamation Group. It had the strongest presence in the 30-40 HP market segment, but had no presence in either < 30 HP or > 40 HP segments. The company had substantial presence in all the major markets, though, its earlier focus was southern India where the competition was weak. Setting up new facilities to manufacture 13,000 tractors per year. Most of the vendors were well known automobile ancillary group companies such as Bimetal Bearings, India Pistons, etc.

Eicher

Sales were limited to < 30 HP category which had seen declining market share, though absolute sales may be increasing. Distribution was limited to Haryana, Punjab, and western UP. There was a proposed merger with Royal Enfield, which could provide access to Enfield's network in the south. Had one of the lowest net profit margins in the industry.

HMT

Had a presence in all market segments. Despite very good product quality, had not been a very strong marketing company. Had been experiencing a declining market share, although volumes were increasing. Had not been strong in the Green Revolution states of Punjab, Haryana, and western UP. It had not been competitive on prices. Proposed takeover by Escorts Ltd though final approval was pending with CCEA.

As seen in the table below, production capacities in the tractor industry had increased with the coming in of John Deere and Ford New Holland. However, this increase had not kept pace with a corresponding increase in production. Capacity utilization in FY99 stood around 72 per cent, clearly indicating a growing problem of overcapacity in the industry. In FY2000, the utilization was expected to drop to 64 per cent. In FY01, additional 17,000 units were likely to be added to New Holland's capacity while another 20,000 units were expected to be added to John Deere's capacity in the next two years. FTL was also planning to expand either by adding capacity or through acquisition.

Production Capacities

Company	FY99	FY2000 (Expected)
Bajaj Tempo	6,000	6,000
Eicher	45,500	45,500
Escorts	56,250	56,250

Company	FY99	FY2000 (Expected)
<i>FTL</i>	60,000	65,000
HMT	18,000	18,000
M & M	77,000	89,500
Punjab Tractors	50,000	72,000
TAFE	37,800	37,800
L & T John Deere	0	10,000
Ford New Holland	0	18,000
<i>Total</i>	350,550	418,050
Total production	253,904	267,356

Source: TMA/Annual reports

EXHIBIT 3

FTL Tractor Production

FY	Numbers
1996	45000
1997	53000
1998	60000
1999	60000
2000	65000 (Expected)

Source: Company records

EXHIBIT 4

Logistics Issues and Decision Areas

1. Objectives of FTL's logistics: To maximize market share and profitability in a competitive environment by enabling availability of the right model in best quality at the right place at the right time.
2. Symptoms/issues
 - (a) Stockouts
 - Inability to supply specific models indented by dealers (end user impact: lost sale/forced conversion to another model)
 - Delayed supply of specific models indented by dealers (end user impact: loss of goodwill)
 - Stockout cost considered anywhere from 50 to 200 per cent of contribution.
 - (b) Excess stocks
 - Inventory carrying cost: working capital cost of ₹100/tractor/ day (at 0.05 per cent a day on a tractor worth ₹200,000)
 - Scope for damages
 - An average of 20 days stock before sale to dealer costs ₹2000/tractor (₹12 crore/year)
 - An average of 20 days stock and a further 15 days credit by the dealer costs the dealer ₹3500/tractor (₹21 crore/year) (a dealer typically earns ₹8000/tractor as commission, and possibly ₹1500 as 15 days credit, apart from margins on accessories)
 - (c) Inter-stockyard transfers
 - Extent during 1997/98
 - Reasons, costs
 - (d) Losses: transit/storage resulting in repair/replacement/replenishment (70 per cent of tractors received a 'yellow' card on receipt at dealers – implying not ready for sale. 75 per cent of these were set right in the first week. The remaining sometimes got complicated in investigations, resulting in non-settlement of claims/dues even up to four years)
 - Losses chargeable to transporter
 - Losses chargeable to insurance
 - Other losses, including opportunity cost of sale
 - Model-wise losses
 - (e) End of month pressures
 - Inventory carrying cost associated with skewed sales to dealers
 - Cost of communication
 - (f) Need to revise production schedules
 - Extent during 1997/98
 - Scope for improvement through better forecasting and planning
 - (g) Transportation costs
 - Average primary (₹2500/ tractor, ₹15 crore a year)
 - Average secondary (₹1500/ tractor, ₹9 crore a year)

3. Decision and action areas

(a) Central despatch yard

Allocation based on truck availability: savings in inventory

Increased flexibility because of later allocation across destinations: savings in inventory

Loading and storage under supervision: reduced losses

Infrastructure cost

Availability of trucks/movement to railsiding

(b) Stockyard locations

Stockyard in every state owing to tax savings

Since secondary transportation cost is not significantly higher than primary transportation cost, entry point in the state is often the best

Multiple stockyards will be justified based on total transportation cost (primary and secondary), limitations on secondary movements (if on own power), and stockyard infrastructure and management cost (each stockyard costs about ₹25,000/ month)

Stockyard to have minimum throughput volume (say 200 tractors/month)

Stockyards to be managed by C&F agents

(c) Mode choice

Transportation cost

Inventory cost at unloading end

Inventory cost at loading end

Inventory cost because of pipeline

Cost because of losses

Buffer inventory cost at unloading end due to reliability in transit

Availability of transport/lead time for availability

(d) Inventory norms

(e) Forecasting and planning systems

Current system

Revised system with rolling horizon

(f) MIS for stockyard management

Selection of C&F agents

Experience/familiarity with tractor business

Professional outlook of management and employees

Understanding of transport business

Skills for inspection and documentation on receipt and before delivery

Security infrastructure, preparedness for contingency

Infrastructural support: land for ordered storage and retrieval, fax, telephone, loading/unloading ramp

Professional charges

Time frame for contract

(Contd.)

- Monitoring of C&F agents
 - Proper record keeping
 - Proper execution of instructions
 - Orderly storage and retrieval (in full communication with area office)
 - Damages during unloading/storage/despatch
- (g) MIS for transporter assessment
 - Selection of transporter
 - Quality in delivery (accidents, thefts)
 - Reliability in transit time (average, variance)
 - Price
 - Number of trucks owned
 - Nature of financing
 - Type of drivers employed
 - Permits invested in
 - Monitoring of transporter
 - Date of despatch, date of delivery, variance analysis
 - Transshipments on route
 - Report daily movement
 - Spot contingency owing to accidents (role of central despatch/nearest C&FA/destination C&FA)
 - Stock allocation during contingency by central despatch
 - Despatch wise
 - Transporter-wise
 - Model-wise
- (h) Need for transport development
 - Loading and unloading practices
 - Truck design
 - Financing of transporters
 - Coordination with other tractor manufacturers for return loads
- (i) Inputs for product development
 - Avoid protruding parts for better packing efficiency and reduction of damages
 - Kitting of loose parts

Source: Developed by the author

EXHIBIT 5**Order Processing and Inventory Planning****Regional Office to Factory (Stockyard-wise, Model-wise)**

- ❑ Monthly inventory plan with safety stock for stockyards. Safety stock to provide 98 per cent service level, model wise
- ❑ Order quantity = expected demand during protection interval + safety stock – current stock (including stock in transit)
- ❑ Protection interval = Order interval (monthly) + lead time (0.8–1.3 months)
- ❑ Attempt to reduce end of month skew and move to weekly ordering, with two weeks lead time

Seasonality

- ❑ Annual inventory plan for seasonality (uniform production versus demand driven, if required by using overtime and/or subcontracting).

Month	Demand	Production	Inventory because of uniform production
January	5,000	5,000	1,100
February	4,000	5,000	2,100
March	4,500	5,000	2,600
April	6,000	5,000	1,600
May	5,900	5,000	700
June	5,700	5,000	0
July	4,500	5,000	500
August	4,000	5,000	1,500
September	4,500	5,000	2,000
October	5,500	5,000	1,500
November	5,400	5,000	1,100
December	5,000	5,000	1,100
Total	60,000	60,000	

Forecasting

- ❑ Company level (for aggregate and seasonality planning)
- ❑ Regional office level (consolidation of dealer forecasts and cross-checking, for placing orders from the factory)
- ❑ Dealer level (customer tracking)

Source: Developed by the author

EXHIBIT 6

Distribution Structure

Central Despatch Yard

- ❑ Investment cost: ₹15 million
- ❑ Operating cost: ₹2 million/year
- ❑ Flexibility in allocation after physical verification of truck availability
- ❑ Inventory saving over current practice: 2 days (1,20,000 tractor days/ year) i.e. ₹12 million/ year

Some Drivers for Secondary Logistics

- ❑ Change from own power to truck based-movement
- ❑ Stockyard near dealer
- ❑ B/C category inventory to be held by stockyard only

Stockyard Location Analysis

- ❑ Because of 4 per cent central sales tax, by and large each state had to have at least one stockyard
- ❑ Current policy for stockyard locations was proximity to regional marketing office, which was usually in a major city in the centre of the state
- ❑ Both number and location of stockyards were questioned and relaxed where logistical servicing of dealer gained importance
- ❑ A mathematical programming model could be used for analysis

Source: Developed by the author

EXHIBIT 7

Stockyard Location, Cost, and Distance

Stockyard Location	Operating Cost per Month (₹)	Distance from Thane (Kms)
Valsad	25,000	136
Surat	20,000	263
Vadodara	30,000	448
Ahmedabad	30,000	545
Rajkot	25,000	761

Source: Company records

EXHIBIT 8

Dealer Location, Demand, and Distance

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Dealer Location	Amreli	Anand	Bardoli	Bharuch	Bhavnagar	Dharampur	Dholka	Godhara	Himmatnagar	Jamnagar	Junagadh	Nadiad	Mehsana	Morbi	Palanpur	Patan	Porbandar	Rajpipla	Surendranagar
No. of Tractors/ Month	35	30	25	40	25	20	20	20	35	20	30	45	20	20	20	30	20	25	20
Valsad	633	272	62	163	514	32	385	315	424	616	630	293	419	647	491	456	715	204	431
Surat	566	205	31	96	447	109	318	248	357	549	563	226	352	570	424	389	648	141	364
Vadodara	399	38	125	71	280	266	151	81	190	382	396	59	185	403	257	238	481	82	200
Ahmedabad	258	73	225	182	200	377	40	136	79	313	327	52	74	292	146	125	412	195	116
Rajkot	105	255	492	365	175	560	162	321	304	88	102	234	299	67	371	255	187	255	111

* All distances are in kilometres

Source: Company records

EXHIBIT 9

Stockyard and Dealer Locations



Source: Company records

EXHIBIT 10
Scenario Analysis for Gujarat

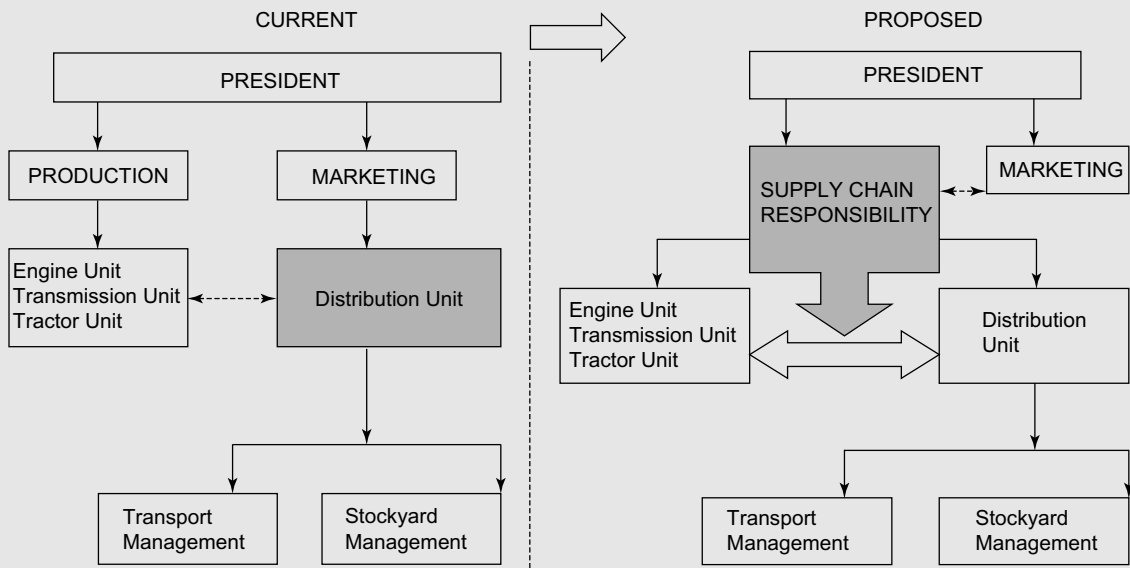
Cost/tractor/ km	Current	Secondary distance limit: None	Secondary distance limit: 350 km	Secondary distance limit: 500 km	Secondary distance limit: None Minimum number of tractors to be serviced by a stockyard: 200/month	(₹) Secondary distance limit: 500 km Min. number of tractors to be serviced by a stockyard: 200/month
Primary: 2.5 Secondary: 3.5	10,28,999 Ahmedabad	8,73,533 Valsad Rajkot	8,78,209 Valsad Ahmedabad Rajkot	8,75,454 Valsad Ahmedabad	8,75,484 Valsad Ahmedabad	875,484 Valsad Ahmedabad
Primary: 3.0 Secondary: 3.0	11,19,855 Ahmedabad	8,22,880 Valsad	9,43,085 Valsad Ahmedabad Rajkot	8,87,380 Valsad Vadodara	8,22,800 Valsad	8,99,080 Valsad Vadodara

Source: Author's analysis

EXHIBIT 11
Recommendations for Stockyard Locations

State	Existing Yard(s)	Optimal Locations
Andhra Pradesh	Hyderabad	Hyderabad Vijayawada
Tamil Nadu	Chennai	Hosur Trichy
Karnataka	Bangalore	Belgaum Davangere
Gujarat	Ahmedabad	Valsad Ahmedabad
Madhya Pradesh	Bhopal	Indore Raipur
Rajasthan	Jaipur Sri Ganganagar	Kota Jodhpur Sri Ganganagar
Punjab	Jalandhar	Patiala
Haryana	Karnal	Gurgaon

Source: Author's analysis

EXHIBIT 12**Organization Structure**

Source: Developed by the author

EXHIBIT 13

November 2, 1999

Mr Rajesh Bhatt

Logistics Team

FarmAid Tractors Limited

Thane, Mumbai

Dear Rajesh,

Regarding the restructuring of the supply chain, I have the following points.

1. The entire supply chain should service the customer requirements in a coordinated way. We aim to be like a "service" organization.
2. We build on the premise that marketing's role is to be aware of the customer requirements, and interface with the customer, both directly as well as through the dealer. Hence, ideally, supply chain's responsibility should be up to servicing dealer requirements. Thus, dealer and dealer customer interface becomes the front office function, while servicing the dealer right from the raw material vendor through a series of transport, storage, and conversion activities is the back office function.

(Contd.)

3. Given the above ideal supply chain structure, we can start examining activities prior to reaching the dealer, one by one, to see if there would be better effectiveness and efficiency if the activity was performed by marketing (front office) or by supply chain (back office). The activities in reverse order would be
 - a) transportation from area stockyard to dealer
 - b) allocation from area yard to dealer
 - c) receipt, storage, inspection at area yard
 - d) transportation from central despatch to area yard
 - e) allocation to area yard
 - f) transportation from finished goods to area yard
 - g) ready for despatch inspection at the plant, and so on
4. If (a) above is better performed by marketing, then it could be part of marketing role. Apart from this activity, it appears that the other activities should be a back office function under supply chain, so that complete responsibility is taken to ensure availability of required tractors. Focus on activities like transportation, storage, and inspection even at geographically dispersed places should reach the same level as a particular manufacturing process in a factory environment.

Thanking you,

Yours sincerely,

Prashanth

Source: Developed by the author

SUGGESTED QUESTIONS

1. What are the factors leading to the perceived 'lack of control' and poor delivery quality?
2. What forecasting technique should be used for inventory planning at the plant and the stockyards?
3. Is there a need for a central dispatch yard? What are the pros and cons of having such a yard?
4. What is a good model for determining the optimal location of stockyards and the associated allocation of dealers to the stockyards in the state of Gujarat?
5. Interpret the implications of the recommended locations versus the existing locations as given in Exhibit 11.

APPROACH FOR ANALYSIS

Quality, as determined by dealers, is an important driving element in the new supply chain. It throws up a number of steps and stages of supply which lead to poor quality. These need to be mapped out.

The demand forecast plays a major role as the next step in the analysis. Forecasts are made at three levels – at the national level, across all models, for overall capacity planning at the factory, regional forecasts across dealers in a region so that regional stockyards can order, and finally, dealer level forecasts. Seasonality needs to be addressed properly for the required service levels. Dealer level forecasts may have their limitations, so, alternatives would have to be considered.

The need for a central dispatch yard can be assessed from the perspective of inventory costs, quality costs and control issues. The visibility of loading on trucks is an important consideration.

The case has a number of scenarios in which to analyze the optimal stockyard location, with truck transportation costs (primary and secondary) and stockyard location costs being the main factors. Constraints like the minimum number of stockyards in a state and the minimum number of tractors to be handled by stockyards have to be taken into account too.

A mathematical program can be formulated for solving this problem using the demand forecasts and cost estimates that are available. This model is usually of the location-allocation

type and would decide the locations of stockyards *together* with the allocations of dealers to these stockyards. Exhibit 10 gives the outcome through a model of this type.

The optimal stockyard locations in the various states, driven primarily by costs, could be different from the existing locations, which are based on their proximity to the marketing offices. The optimal locations may, therefore, need a buy-in. This would need facilitating mechanisms for improved communication and co-ordination.

In the context of the above issues, the supply chain organization may also need re-structuring, to achieve better co-ordination across production, order processing, and dispatching.

CASE CONTEXT

This case focuses on the issue of mode choice for the movement of both raw materials and finished products. The location of the plant has already been decided based on various considerations, such as the availability of natural gas as a fuel and access to new sponge iron plants in western India. However, the market for the final product of Laxmi Transformers, sponge iron (also referred to as Direct Reduced Iron) was a growing one in India and there was scope for focusing on some selected final markets. Logistics costs could be a significant factor in this consideration. Mode choice, across trucking, rail and sea, both for inbound and outbound, needs to be examined. Apart from mode choice, the distribution network design, investments for railway siding, barge rentals and scheduling of ships could be explored for a complete logistics plan.

Laxmi Transformers

Direct reduced iron (DRI), commonly called sponge iron, was to be produced by Laxmi Transformers (LT) at its new ₹500 crore Alibag (Maharashtra) plant starting in February 1991. DRI was an intermediate product in the steel making process and essentially served as a substitute for scrap iron. DRI was used by both mini steel plants and large integrated steel plants. It could also be used by ferrous foundries. Maharashtra and Gujarat were the two most industrialized states in India and had a number of mini-steel plants and ferrous foundries which were potential sponge iron buyers. All the integrated steel plants were located in the eastern part of the country except the SAIL plant which was at Bhadravati in Karnataka.

The advantages of using sponge iron were as follows:

1. It was a substitute for ferrous scrap which was currently imported in large quantities, costing the nation a large amount of foreign currency.
2. Undesirable elements which may be found in scrap such as chromium, tin, nickel, etc. were absent. This gave a more consistent and reliable end product quality.
3. It was easier to handle than scrap.

LOCATION

The two primary reasons for locating the project at Alibag were the availability of natural gas and nearness to sponge iron markets. Natural gas from the Bombay High offshore field was brought to Uran by a pipeline, about 25 km due south of Bombay. Industries located in areas near Uran would get gas at what was called “landfall prices” which were substantially less than what inland customers would pay. The landfall price of gas was about ₹2500 per 1000 cubic metres. About 300 cubic metres of gas were needed per tonne of sponge iron. The project site was on the seashore, with a view to having access to sea transport, both during construction and operations.

There were a number of different processes that could be used for sponge iron production, some being coal based and some being gas based. In consultation with the engineering advisers to

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We also thank McGraw Hill Education (India) Private Limited for permitting us to print this case, which was published in *Supply Chain Management for Competitive Advantage: Concepts and Cases* by Rangaraj, Raghuram and Srinivasan.

the project, Technocrats India Ltd., LT decided to adopt the HyL III process for sponge iron production, under license from the Mexican firm HyLsa which had patented it. This process used reformed natural gas to convert iron ore to sponge iron.

The plant which had a rated capacity of 500,000 tonnes per annum, would require about 1.24 tonnes of pellets per tonne of DRI and 0.31 tonnes of lump ore per tonne of DRI, making for a feed mix proportion of approximately 80 : 20. A problem with the Alibag plant was that the iron ore and pellets required were not available locally.

TRANSPORTATION

LT's newly appointed Manager, Logistics decided that his first task would be to review the proposed transportation strategies of his company for the inward movement of raw materials and the outward movement of his company's product.

Raw Materials

He first met the Manager, Raw Material Procurement (RMP) and then the Manager (Marketing) to get their views. Manager (RMP) was responsible for identifying potential reliable suppliers of the principal raw materials, namely, lump iron ore and iron pellets. He found that the Manager (RMP) had already made a thorough examination of the production situation and entered into contracts with three mines that would supply lump ore. The Manager (RMP) had also entered into a long term contract with Kudremukh Iron Ore Company Limited (KIOCL), Mangalore, for supply of iron pellets which were essentially produced by agglomerating fine particles of iron ore. Even though this was an export-oriented unit whose rupee prices should ordinarily fluctuate according to the value of the rupee with respect to the US dollar, LT was able to negotiate a special arrangement guaranteeing its requirements at the rate of ₹600 per tonne FOB. This rate would be reviewed annually. The Manager (RMP) was able to clinch this deal because he negotiated at a time when KIOCL was going through a very troublesome period financially.

Based on considerations such as quality of ore and possible supply and handling constraints, LT had decided to procure lump ore in the following proportions from the mines mentioned below:

	Percentage	Price (₹/tonne)
Daitari (Orissa)	40	250
Banspani (Orissa)	40	250
Goa	20	330

These sources were not substitutable, since they had been identified according to certain required chemical properties.

Finished Goods

The Manager (Marketing) was in the process of trying to line up customers for LT's DRI. While he had not yet been able to get any firm commitments, he had been able to make some estimates of the size of the market. A major difficulty he faced in this task was that while there were a few sponge iron producers in the country already, none of them could be called major producers because for various reasons they were producing at only a fraction of their capacity. The Manager, Marketing's estimates of the market potential is shown in Exhibit 1.

INBOUND MODE CHOICE

LT was now faced with the problem of deciding the best way of transporting raw materials to the Alibag plant and DRI from the plant to market centres. There were three possible modes that could be used – rail, road, and sea – or combinations of these.

Rail

The nearest railhead to Alibag was at Pen, about 15 km away. The Railway Board in Delhi had categorically stated that there was no prospect of building a line to Alibag, but suggested that LT would be able to get a line constructed at its own expense at an approximate cost of about ₹1 crore per km (including handling and storage infrastructure). If other industries which were coming up in the area (a cement bagging plant, a gas based fertiliser plant, and a few others in the drawing board stage) wanted to use the track, LT would be able to share the construction cost.

In the case of rail transport, freight rates were determined by the Indian Railway Conference Association (IRCA) which published a book of tariffs. Exhibit 2 gives relevant tariffs. While iron ore was classified as Category 110 for purposes of tariff determination, there was some confusion on the classification of DRI. While IRCA stated that sponge iron came under Category 150, Central Railway's commercial staff maintained that DRI was a different product and would be charged under Category 210.

Sea

A jetty capable of handling four barges simultaneously with an unloading rate of 2000 tonnes per hour was to be built at the plant site in Alibag. Giant Western Shipping had said that it would be able to provide two ships, one of 65000 deadweight tonnes (dwt) and the other of 35000 dwt. LT would be expected to pay market rates whichever ship it decided to employ, as the shipping industry was riding on the crest of a wave. Going rates and details of ship operating costs and times are given in Exhibit 3.

High tonnage ocean going ships like the ones being considered could not enter Alibag's minor port due to draft restrictions. Hence cargo had to be loaded/unloaded in deep water into/from barges which could use the jetty. Each barge could be used for one round trip in a day, due to the tidal variations. The current plan was to charter five barges of 1,000 tonnes payload capacity for this task. (The limits for unloading were determined by the operating rate of the cranes on the ship. A total of 10000 tonnes per day was possible, but then 10 barges would be required. Five would be at the ship side when the other five were at the jetty.) The charter rates for these barges were ₹300 per tonne of barge capacity per month (A 1000 tonnes barge hire would cost ₹3 lakh per month, i.e. ₹10000 per day). Deep water operations at Alibag were not possible for 120 days of the year due to the monsoon.

Road

Road transport rates were expected to be 50 paise per tonne kilometre, though due to the new Motor Vehicles Act and consequent strict imposition of no overloading, the rates could possibly go as high as 70 paise per tonne kilometre.

Exhibit 4 gives a distance matrix between the various mines, Pen station, ports, and market centres. Exhibit 5 gives a map of India with relevant locations.

CONSIDERATIONS FOR OUTBOUND MOVEMENT

In examining the options LT had regarding outbound movement, the following were some of the key issues that had to be borne in mind.

1. Since the ships that bring iron ore would be returning empty (being on a time charter), sponge iron to markets in the eastern parts of India could be transported by ship. This would involve additional time due to loading and unloading, but not due to travel time.
2. Scheduling the ships for various trips could become an issue.
3. If LT opened a stockyard for redistribution, it would cost about ₹1 lakh per month to maintain the stockyard.
4. Inventory carrying costs would be significant.
5. If trucks were to be used for outbound movement, two issues would dominate. Would it be possible to get enough 10 tonne trucks to carry the quantities demanded? Would the plant be able to handle such a large number of trucks?
6. If a rail siding were to be laid from Alibag to Pen, inbound rail transport would also be facilitated. Regarding outbound movement, only the major consumers could handle direct rail movement. If a siding was not considered, and rail movement was still planned from/to Pen, then road movement between Pen and Alibag would take place at a cost of ₹30 per tonne, including handling.

7. Each additional handling of DRI resulted in a loss of 1%. The average selling price of DRI was expected to be ₹4000 per tonne.
8. The above considerations could even influence the market choice for LT, since demand was expected to exceed supply.

The Manager (Logistics) was keen on developing a transportation plan keeping all these considerations in mind.

EXHIBIT 1**Market Centre-wise Demand Estimate for Sponge Iron (10,000 tpa)**

No.	Market Centre	1990/91	1995/96	2000/01
1	Delhi	8.8025	17.605	35.21
2	Hissar	1.0375	2.075	4.15
3	Ambala	0.885	1.77	3.54
4	Ludhiana	3.8475	7.695	15.39
5	Jaipur	2.475	4.95	9.9
6	Lucknow	3.4325	6.865	13.73
7	Muzzafarnagar	1.7375	3.475	6.95
8	Tatanagar	2.0275	4.055	8.11
9	Ranchi	1.175	2.35	4.7
10	Barajamda	0.0525	0.105	0.21
11	Calcutta	10.705	21.41	42.82
12	Rajkot	0.0525	0.105	0.21
13	Ahmedabad	0.845	1.69	3.38
14	Baroda	1.3075	2.615	5.23
15	Raipur	1.7775	3.555	7.11
16	Gwalior	0.565	1.13	2.26
17	Indore	1.9125	3.825	7.65
18	Jabalpur	0.1825	0.365	0.73
19	Bombay	9.37	18.74	37.48
20	Nagpur	2.485	4.97	9.94
21	Aurangabad	0.35	0.7	1.4
22	Kolhapur	0.6775	1.355	2.71
23	Waltair	0.8075	1.615	3.23
24	Secunderabad	1.16	2.32	4.64
25	Kothagudam	2.44	4.88	9.76
26	Bangalore	2.65	5.3	10.6
27	Hospet	0.5575	1.115	2.23
28	Bhadravati	1.48	2.96	5.92
29	Calicut	1.275	2.55	5.1
30	Madras	2.1175	4.235	8.47
31	Tiruchirapalli	0.245	0.49	0.98
		68.435	136.87	273.74

No.	Market Centre	1990/91	1995/96	2000/01
32	Bhilai	20	25	30
33	Bokaro	20	30	35
34	Rourkela	9	11	15
35	Durgapur	8	9	11
36	Burnpur	5	5	6
37	TISCO, Jamshedpur	10	15	20
38	VISL, Bhadravati	2.5	3.5	5
	Total	142.935	235.37	395.74

Source: Company Information

EXHIBIT 2

IRCA Tariff (Rupees per Quintal)

Category	110	150	210
Km	₹ Ps	₹ Ps	₹ Ps
1-100	4.25	5.44	7.24
101-105	4.54	5.82	7.77
106-110	4.66	5.99	7.99
111-115	4.79	6.17	8.21
116-120	4.91	6.32	8.45
121-125	5.02	6.48	8.68
126-130	5.14	6.65	8.91
131-135	5.26	6.81	9.14
136-140	5.38	6.98	9.37
141-145	5.49	7.14	9.59
146-150	5.61	7.29	9.84
151-155	5.74	7.47	10.06
156-160	5.86	7.64	10.28
161-165	5.98	7.79	10.52
166-170	6.11	7.97	10.74
171-175	6.22	8.12	10.97
176-180	6.34	8.30	11.20
181-185	6.47	8.45	11.44

Category	110	150	210
Km	₹ Ps	₹ Ps	₹ Ps
186-190	6.59	8.61	11.66
191-195	6.71	8.79	11.90
196-200	6.82	8.94	12.12
201-205	7.15	9.39	12.73
206-210	7.28	9.57	12.98
211-215	7.40	9.73	13.21
216-220	7.53	9.91	13.45
221-225	7.65	10.07	13.68
226-230	7.78	10.24	13.92
231-235	7.91	10.41	14.15
236-240	8.04	10.58	14.40
241-245	8.15	10.74	14.64
246-250	8.28	10.92	14.86
251-260	8.51	11.22	15.30
261-270	8.73	11.54	15.75
271-280	8.97	11.86	16.19
281-290	9.19	12.18	16.63
291-300	9.42	12.48	17.06

(Contd.)

Category	110	150	210
Km	₹ Ps	₹ Ps	₹ Ps
301-310	9.81	12.99	17.79
311-320	10.05	13.32	18.23
321-330	10.27	13.64	18.67
331-340	10.51	13.95	19.12
341-350	10.74	14.27	19.58
351-360	10.98	14.59	20.03
361-370	11.21	14.91	20.46
371-380	11.46	15.23	20.91
381-390	11.67	15.55	21.36
391-400	11.91	15.87	21.80
401-410	12.59	16.78	23.06
411-420	12.84	17.12	23.52
421-430	13.08	17.45	23.99
431-440	13.33	17.78	24.46
441-450	13.55	18.11	24.92
451-460	13.80	18.44	25.38
461-170	14.05	18.77	25.84
471-480	14.30	19.10	26.30
481-490	14.54	19.44	26.76
491-500	14.78	19.77	27.24
501-510	15.66	20.96	28.87
511-120	15.91	21.28	29.33
521-530	16.13	21.59	29.77
531-540	16.38	21.91	30.22
541-550	16.59	22.23	30.67
551-560	16.84	22.53	31.11
561-570	10.07	22.86	31.56
571-580	17.31	23.18	31.99
581-590	17.53	23.50	32.45
591-600	17.77	23.81	32.90
601-610	18.59	24.93	34.44
611-620	18.84	25.26	34.90

Category	110	150	210
Km	₹ Ps	₹ Ps	₹ Ps
621-630	19.07	25.58	35.36
631-640	19.32	25.91	35.82
641-650	19.56	26.25	36.29
651-660	19.81	26.57	36.73
661-670	20.04	26.90	37.20
671-680	20.28	27.23	37.64
681-690	20.52	27.54	38.11
691-700	20.77	27.90	38.57
701-710	21.08	28.34	39.19
711-720	21.34	28.67	39.65
721-730	21.57	28.99	40.12
731-740	21.81	29.32	40.58
741-750	22.05	29.65	41.04
751-760	22.30	29.97	41.50
761-770	22.54	30.31	41.97
771-780	22.78	30.65	42.44
781-790	23.03	30.98	42.89
791-800	23.26	31.31	43.36
801-825	23.98	32.26	44.69
826-850	24.57	33.09	45.85
851-875	25.18	33.92	47.01
876-900	25.80	34.76	48.18
901-925	26.52	35.71	49.53
926-950	27.11	36.55	50.69
951-975	27.72	37.38	51.86
976-1000	28.33	38.22	53.02
1001- 1025	28.96	39.06	54.22
1026- 1050	29.49	39.78	55.21
1051- 1075	29.99	40.46	56.18
1076- 1100	30.51	41.17	57.16
1101-1125	31.13	42.03	58.37
1126-1150	31.66	42.75	59.36

Category	110	150	210
Km	₹ Ps	₹ Ps	₹ Ps
1151-1175	32.17	43.44	60.35
1176-1200	32.69	44.13	61.32
1201-1225	33.83	45.70	63.50
1226-1250	34.38	46.42	64.50
1251-1275	34.89	47.15	65.49
1276-1300	35.40	47.84	66.50
1301-1325	36.06	48.73	67.75
1326-1350	36.59	49.46	68.75
1351-1375	37.12	50.17	69.75
1376-1400	37.64	50.89	70.75
1401-1425	38.64	52.23	72.64
1426-1450	39.17	52.97	73.66
1451-1475	39.71	53.69	74.68
1476-1500	40.23	54.42	75.69
1501-1525	40.88	55.28	76.90
1526-1558	41.30	55.88	77.73
1551-1575	41.73	56.45	78.54
1576-1600	42.13	57.04	79.34
1601-1625	42.75	57.84	80.50
1626-1650	43.18	58.44	81.31
1651-1675	43.60	59.02	82.13
1676-1700	44.04	59.61	82.95
1701-1725	44.65	60.43	84.13
1726-1750	45.10	61.04	84.96
1751-1775	45.52	61.62	85.76
1776-1800	45.95	62.21	86.57
1801-1825	46.35	62.74	87.34
1826-1850	46.77	63.34	88.16
1851-1875	47.21	63.91	88.97
1876-1900	47.65	64.50	89.81

Category	110	150	210
Km	₹ Ps	₹ Ps	₹ Ps
1901-1925	47.95	64.92	90.42
1926-1950	48.38	65.54	91.23
1951-1975	48.81	66.12	92.07
1976-2000	49.24	66.69	92.88
2001-2025	49.38	66.90	93.15
2026-2050	49.52	67.10	93.42
2051-2075	49.91	67.60	94.14
2076-2100	50.28	68.10	94.85
2101-2125	50.64	68.61	95.55
2126-2150	51.01	69.13	96.27
2151-2175	51.39	69.62	96.98
2176-2200	51.75	70.13	97.67
2201-2225	52.12	70.64	98.39
2226-2250	52.50	71.15	99.11
2251-2275	52.88	71.64	99.81
2276-2300	53.24	72.15	100.53
2301-2325	53.61	72.66	101.22
2326-2350	53.98	73.16	101.93
2351-2375	54.35	73.66	102.63
2376-2400	54.72	74.16	103.35
2401-2450	55.45	75.18	104.75
2451-2500	56.21	76.20	106.18
2501-2550	56.84	77.07	107.40
2551-2600	57.49	77.95	108.62
2601-2650	58.14	78.83	109.85
2651-2700	58.77	79.69	111.07
2701-2750	59.41	80.56	112.31
2751-2800	60.04	81.46	113.53
2801-2850	60.69	82.33	114.75
2851-2900	61.32	83.19	115.98

Source: Company Information

EXHIBIT 3

Shipping Charges and Times

Ship size (dwt)	35000	65000
Payload (tonnes)	34000	64000
Standing charges		
(US \$ per day)	9000	15000
(₹ per day)	153000	255000
One way voyage fuel costs to/from Alibag (₹)		
Mormugao		
-Loaded	120000	125000
-Ballast	105000	110000
Mangalore		
-Loaded	180000	187500
-Ballast	157500	165000
Paradip		
-Loaded	840000	875000
-Ballast	735000	770000
Calcutta		
-Loaded	960000	1000000
-Ballast	840000	880000
Fuel costs at anchor (₹ per day)	15000	17000
Port dues (₹ per entry)		
Alibag	300000	412500
Mormugao	336000	462000
Mangalore	330000	453750
Paradip	380000	522500
Calcutta	420000	577500
Unloading/loading charges (₹ per tonne)		
Alibag	15	
Mormugao	50	
Mangalore	FOBT	
Paradip	40	
Calcutta	45	
One way average travel times to/from Alibag (days)		
Mormugao	1.0	1.0
Mangalore	1.5	1.5
Paradip	7.0	7.5
Calcutta	8.0	8.5
Average waiting/loading period at ports (days)		
Alibag (unloading)	8.0	11.0
Mormugao	4.5	5.5
Mangalore	3.0	3.5
Paradip	5.0	6.0
Calcutta	6.0	7.0

Source: Company Information

EXHIBIT 4**Distance Matrix (kilometres)**

Inbound road and rail distances between mines, ports and the plant					
		Goa	Mangalore	Daitari	Banspani
Alibag	(Road)	520	800	1780	1650
Pen	(Rail)	500*	700*	2200	1800
Mormugao	(Rail)	50	-	-	-
Paradip	(Rail)	-	-	170	700 400(post '95)

* After the completion of Konkan Railway (1996)

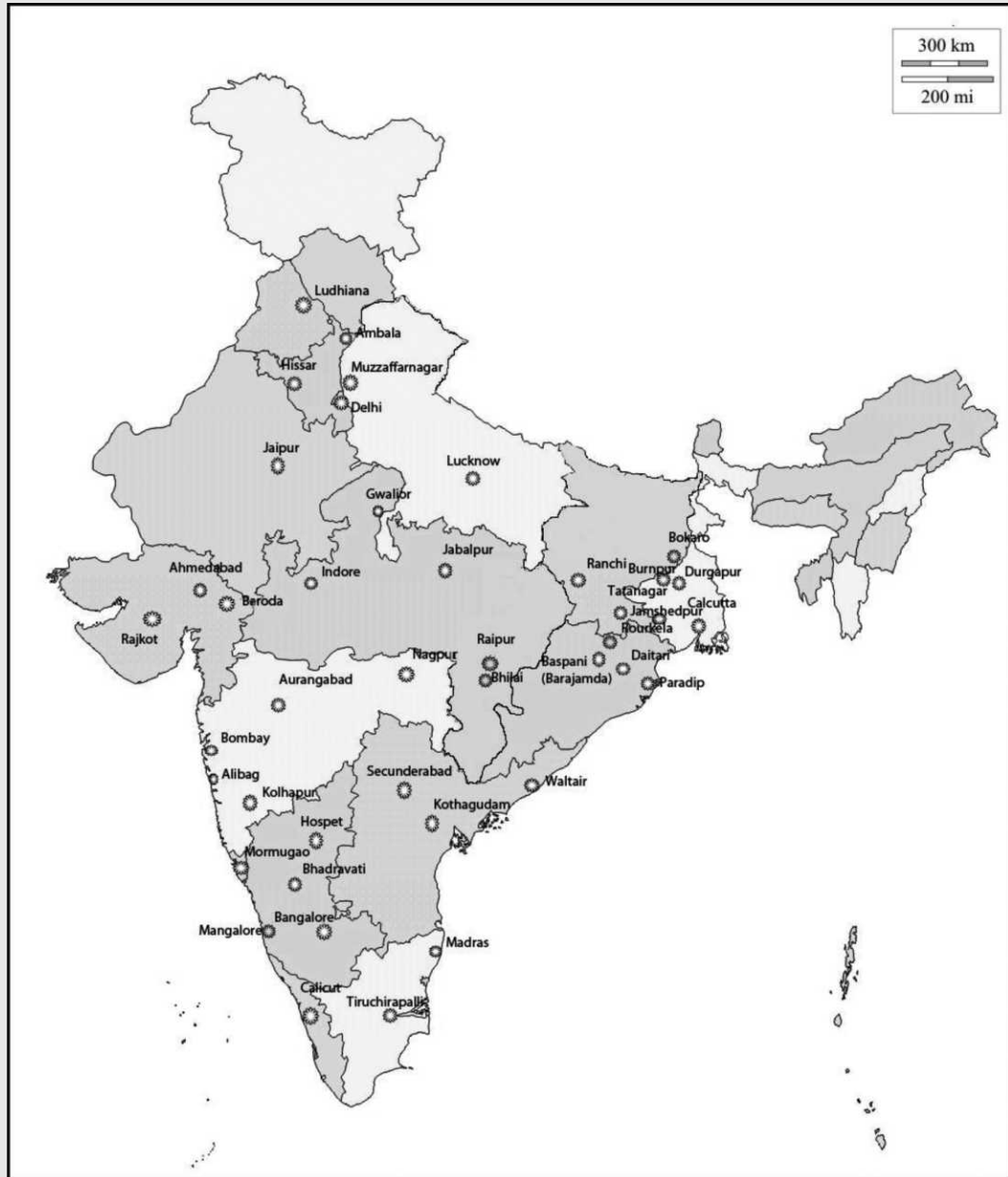
Outbound distances to market centres					
Town	Pen (Rail)	Alibag (Road)	Town	Pen (Rail)	Alibag (Road)
Delhi	1420	1490	Baroda	440	510
Hissar	1520	1590	Raipur	1140	1200
Ambala	1610	1680	Gwalior	1225	1170
Ludhiana	1695	1765	Indore	880	680
Jaipur*	1150	1250	Jabalpur	1000	1130
Lucknow	1400	1450	Bombay	70	85
Muzaffarnagar	1550	1620	Nagpur	830	940
Tatanagar	1700	2040	Aurangabad*	340	350
Bhilai	1280	1450	Kolhapur	540	350
Rourkela	1540	1900	Waltair	1520	1320
Durgapur	2000	2300	Secunderabad	810	680
Burnpur	1850	2250	Kothagudam	1060	980
Bokaro	1820	2200	Bangalore	1140	970
Ranchi	1650	2000	Hospet	870	670
Barajamda	1600	1800	Bhadravati*	1390	780
Calcutta	1970	2160	Calicut	1840	1170
Rajkot	780	850	Madras	1290	1310
Ahmedabad	540	630	Tiruchirapalli	1710	1300

Towns marked * have metre gauge only

Source: Company Information

EXHIBIT 5

Map of India with Relevant Locations



Source: Company Information

SUGGESTED QUESTIONS

1. What is the best mode for the inbound supply of raw material?
2. What final markets should Laxmi Transformers choose to serve based on logistical considerations? What is the best mode for the finished goods dispatch to key markets?
3. Contingent on a particular choice for inbound movement, can the same mode be used for servicing some final markets?
4. Is laying a rail siding from Pen to Alibag worth the investment?
5. If ships are to be used for inbound logistics, how many barges would be required for the lighterage operations from the mother vessel to the jetty at Alibag?
6. Would the scheduling of carriers in any mode affect the economics of the mode choice?

APPROACH FOR ANALYSIS

In such a situation, attention must be paid to the value chain of the product, which could have a significant impact on transportation and inventory related costs. In particular, the inventory costs have to be calculated keeping in mind the stage at which the material is, since raw material and finished goods have quite different values of holding and handling. The main quantities to be considered in inventory calculations for each mode are pipeline (or transit) inventories, batching inventories and buffer stock inventories.

Each mode choice (including trucking, rail and sea) scenario has to be worked out with the relevant details of all the associated costs. The sea mode, in particular, has a number of cost factors, since the volume of movement is high enough that inventory costs while building up the loading quantity and while consuming the unloaded quantities have to be estimated. Also, barge costs have to be accounted for, with a suitable level of detail.

Since the spatial spread of final markets for the firm is still uncertain, the logistics costs due to a mode choice decision may affect the choice of locations for marketing efforts to some extent. In other words, while considering each mode of movement, the 'optimal' choice of market to serve (with appropriate assumptions about market share) can be assumed. For this purpose, a segmentation of the final market can be done either on the basis of the location of the customer, or on the basis of the size of the customer's demand, in order to

decide which markets to focus on. Some markets may be served by road, while others by rail and road using a distribution stockyard, and still others by sea. Do also recall that one of the motivations of locating the plant at Alibag was to serve new mini steel plants and ferrous foundries in western India.