Chapter 8 – Conclusion

After covering the previous chapters and on being able to investigate and reject the various null hypotheses this research document has reached its concluding portion. The usefulness of this document may now be sated as per the points provided below:

8.1 Significant Contribution

As the literature survey suggests to the best of our knowledge there have not been any academic study in India that had focused on the brand related, value perception and delivery aspect of multi-axle trucks. Also unique to the literature on road freight transportation industry, a time series model has been put forward that has been able to correctly predict sales of overall sales of MHCV trucks in the Indian transport industry.

8.2 Limitations of the Study

The study conducted had the following limitations:

- Only 171 transport operators could be covered across 10 cities across India. All respondents had to be reached out through face to face interviews as most of them were not active internet users and could not be reached through various online and social media platforms.
- Transporters from North – Eastern India not represented Adequately.
- Manufacturers did not agree to officially respond to the questionnaires designed for manufacturers, citing requirement of receiving confirmation from country head offices.
- Exact Sales breakup of heavy trucks across tonnage segments (like 25 tonnes, 28 tonnes, 31 tonnes etc.) were not available freely.
- Literature availability for academic research work on marketing/sales of multi-axle trucks in India is very limited.

8.3 Inference

Inference – Chapter 4: The rejection of the null hypotheses provided in this chapter, implies that industrial productivity and the overall performance of the core and basic
production sectors of a growing/developing economy like India, aided with due improvement in road infrastructure boosts the demand for transportation of various finished products, semi-finished products and raw materials which in turn boosts the demand for trucks that would haul these freights. This pushes up the production of trucks. If seen from the perspective of the truck manufacturers, various government initiatives like GST, development of golden quadrilateral, north – south & east – west corridor, average quality of national/state highways and minimization of extortion [$X_1$] and industrial developments have also helped to boost the market size for multi – axle trucks. Whereas on the other hand transport operator preferences [$Z_1$], basic average operator profile and their business performance [$Y_1$] determine the product value that needs to be provided (to the transport operators), which if appropriately catered to, would make the truck (to the truck operator) more relevant to its intended customer. The rejection of the null hypotheses provided above, implies that industrial productivity and the overall performance of the core and basic production sectors of a growing/developing economy like India, aided with due improvement in road infrastructure does boost the demand for transportation of various products at different stages of output for the intermediate customer or the end customer in turn boosts the demand for trucks that would haul these freights. Substantial policy decisions to incentivise industrial activity would ensure availability of freight as demand for various categories of goods across the Indian market would drive the need to transport various category of goods. Also, a healthy growth of infrastructure would ensure availability of suitable mode for the heavy and large multi – axle trucks to run without hindrance. Recent policy actions to introduce GST e – way – bills, mandatory FASTag and vehicle tracking systems in national permit trucks$^{68}$ will also benefit smooth movement of freight.

**Inference – Chapter 5:** The core null hypothesis: ‘Multi Axle Vehicles do not have inherent advantages’ was further divided into three sub null hypotheses. These are:

a) Multi Axle Trucks do not have a Lower cost of operations;

b) Multi Axle Trucks do not take less time; and

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$^{68}$ Ministry of Road Transportation and Highways, notification no. G.S.R. 1081 (E) Rule 2 (3) and (5).
c) Cab comfort does not lead to better productivity & Safety

While rejecting the null hypothesis as mentioned in section 2.6.1.2 (a), ANOVA tests of between-subjects effect were executed and the Eqn. 5.1 derived in chapter 5 effectively pointed out that multi-axle trucks (3 axles and 4/5 axles trucks) have a significant cost advantage over the two axle trucks in terms of total cost incurred for every ‘tonne – km’ hauled (this was calculated in terms of average freight weight available across freight groups studied). It was also observed that the operating cost of 4/5 Axle truck was found to be lower in comparison to the 3-axle trucks. To reject the null hypothesis as mentioned in section 2.6.1.2, further ANOVA tests of between-subjects effect were executed and the Eqn. 5.2 and 5.3 were derived in chapter 5. Although Eqn. 5.2 shows that average speed of multi axle trucks do not vary significantly across terrain and two axle trucks maintain better average speed in hilly terrain. But, considering the given application of the vehicles, instead of measuring speed through simple KM/Hr. a more effective measure of Tonne-KM/Hr. (load speed product) was used. Which clearly demonstrated that the multi-axle trucks had an advantage over two-axle trucks. Null hypothesis as mentioned in section 2.6.1.2 is relevant in terms of the core hypothesis because multi-axle trucks are driven on longer routes and drivers typically spend a continuous period of 2-3 days to even a fortnight in their truck cabins. The rejection of null hypothesis as mentioned in 2.6.1.2, pointed out that factory-built cabins do help drivers to drive for longer hours while exposing the drivers to lower levels of tiredness. On successfully rejecting all three of the sub hypotheses it was established that multi-axle trucks do have inherent advantages over two-axle trucks.

**Inference – Chapter 6:** This chapter dealt with the null hypothesis that when it comes to buying multi-axle trucks ‘Brand Image has no impact on customer perception’ and an extension of this premise that ‘The key buying factors are not different between Tata and Ashok Leyland brands’. Personal attributes/preferences and operating aspects were found to be different between Tata and Ashok Leyland were found to be different. It was also found that the correlation among the Key Buying Factors were also very different between the Tata and Ashok Leyland brands; in fact, there was noticeable difference in the perceptual perspectives of Tata and Ashok Leyland customers. So, it was safe to reject the null hypothesis that ‘Brand Image has no impact on customer perception’. The points of similarity and the points of differences were established, and
a logistic regression was developed using the Key Buying Factors (points of differences) that determine a purchase of a Tata or an Ashok Leyland brand. Thus, the null hypothesis ‘The key buying factors are not different between Tata and Ashok Leyland brands’ was rejected. Additionally, a trucker’s brand equity model on the lines of Keller’s and Kuhn’s CBBE model has been put forward.

**Inference – Chapter 7:** The null hypothesis that when it comes to business models of truck manufacturers in India, the ‘Business models of the top three Truck Manufacturers in India are not different from each other’. Here the business model concept was studied form the value concept – wherein value was determined by quality and price. This approach also led to one further null hypothesis to be adjudged i.e. ‘Customer Value perceptions are not different across Truck Brands in India’. It was determined from primary data that customer perceptions do vary among truck customers in 25T and 31T categories. The main consideration for this present study i.e. value (in terms of quality and price) was observed to be different for separate category of customers. There was one category which appreciated the differential premium for the perceived superior value, another category of customer was also found who was satisfied with the price advantage and associated quality of a given brand of truck. There were also few customers who can be categorized into a post purchase dissonance state where they seem to not appreciate the value derived from the products of the brand which they had primarily purchased. It was also found that the business model for offering value to customers was different as manufacturers were differently focused across tonnage segments of the market.

**8.4 Suggestion:**

The activity of freight transportation through trucks is very important and is critical to the efficient working of an economy. Since India has a huge population and is a developing economy, the potential contribution of trucks and the trucking industry in general towards the economic development of India is tremendous. The researchers after working through the various research objectives from chapter 4 to chapter 7, would suggest the concerned stakeholders (Relevant Governmental Bodies, Manufacturers and Transporters) that:

1. Truck drivers were observed to be driving at an alarmingly high number of hours per day, appropriate and effective regulations are required to limit these
within safe ranges, mandatory air-conditioning of truck cabins (already implemented by the Indian government) would enable drivers to concentrate and drive safely within an ambient work condition.

2. Multi-axle trucks have operational efficiency which can be fully realised through uninterrupted passage through states. This has already been largely actualised through the ushering in of the GST norms. Things could improve further through availability of hub warehouses, widespread implementation of RFID based toll payments on the national highways & freight corridors and ensuring no unauthorized stoppage of trucks by government personnel.

3. The bulk of the transporters have small fleets and effectively represents the SME sector, they have efficient operations, but their strategic aspects often suffer. So, transporters need to focus more on long term aspects of their business and opt for vehicles that would significantly reduce their operational costs and service efficiency in the long term.

**8.5 Future Scope of Work**

This present work has been carried out to meet the objectives that were set out to be met through the course of the research, however at the end of this document some possible areas of further study/research are being put forward:

- Impact of GST on the trucking industry, comparison of behavioural and attitudinal aspects in Pre – GST and Post – GST scenario.
- Product Life Cycle Management aspects of the trucking industry with Indian and International implications.
- Verifying trucker’s CBBE with more respondents and more brands at different value segments
- Studying seasonality factors in purchase of multi-axle trucks, with sale data of multi-axle across certain tonnage segments and brands.
- Revisiting the value concept (as executed in chapter 7) with more key buying factors, and with a greater number of respondents to develop an augmented version of the value perception matrix.
- More focussed study on the manufacturers could be carried out to develop a nine cell GE matrix for the Indian truck market.