Chapter 10
Role of Operations Strategy and Big Data: A Study of Transport Company

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ABSTRACT

It has been observed that the less than truck load (LTL) industry is going through significant transformation. After the last few years of decline in revenue, due to weak economy, the profitability of the LTL is on the rise. A strategy based on improving freight flow and density, and tightening terminal capacity is finally producing results for many LTL's, at the same time other LTL's are investing on expanding terminal network's while making bigger gains in the revenue. The availability of big data has revolutionised the way the LTL industry operates. The data assists in planning, efficient routing, safety control, fuel conservation, driving habits, etc. Analysts believe that big data still has a bigger role to play and it will have significant impact on the LTL industry in the coming days. This chapter discusses the challenges and opportunities for LTL carriers as it arises due to the emergence of big data.

INTRODUCTION

This chapter presents a discussion on LTL and impact IT in general and big data in particular is making in LTL sector. This chapter starts off with discussing operations strategy for LTL load and then role of IT in LTL is discussed, which if followed by overview of impact of big data on LTL and issues associated with incorporating big data into daily operations and decision making. This chapter covers few

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problems linked with typical large scale logistics LTL carrier (Zhang, 2010) and suggesting the possible approaches to handle these problems.

This part addresses the following topics:

- OR Tools
- Strategic Issues
- Integration
- Practicalities
- LTL and big data

In the operation research (OR) Tools, authors discussed some of the famous models prevalent in the market. Math behind the models has not been discussed but authors have tried to understand the logic behind the models and their applicability in the context of a large LTL service provider. In strategic issues, authors discuss the need and requirements of a large LTL service provider from the strategic, tactical and operational point of view. We also introduce the concept of positioning for the large LTL service provider so that the company can understand where it wants to go in the future and adapt the strategy for that goal. Integration discusses how the models can be integrated in the company. Authors discuss the investment, infrastructure and culture integration for the implementation of new system / model. Practicalities summarise and deal with some investment and emerging issues for a large LTL company. Role of big data in LTL is the main focus in last part, which also covers some issues linked with big data in LTL.

BACKGROUND

A load plan specifies how the freight is routed through a line haul terminal network operated by a less than truck load (LTL) carrier. A typical LTL shipment usually travels from an original (O) terminal to a destination (D) terminal, and pass thorough usually one or two intermediate break bulk terminals en-route. The main problems are large line haul problem, daily P&D operation (vehicle routing problem), balance problem. Currently, the given Omega corp (a hypothetical company) in case is using constraint programming as well as classical math programming based approach to solve vehicle routing problem. For the large line-haul problem, company uses MIP based approached and simulator. For balance problem, company uses revenue management model. For solving the LTL load plan, there were many methods suggested by scholars. Powell-Sheffi (1989) proposed a heuristics approach using add-drop local search method. This method is quite simple and easy to implement in small level organization but in medium and large scale organizations, the calculation and math gets more complicated, hence difficult to implement. Powell- Koskosidis (1992) uses a gradient-based local search method and the lagrangian heuristic approach with a relaxation of minimum service level constraints. It provides a good quick solution with tight lower bound. However, the solution is not very precise since for the precise solution it takes longer execution times. Powell (2001) introduced a new approach to solve the load plan designing problem for LTL. The strength of his approach lies in the fact that it explicitly recognizes the structure of most LTL networks and uses it to improve the efficiency of the algorithms as well as to sequence the research. The most important modelling assumption in his research is handling of level of service, which is each load planning link is a certain minimum frequency which must be maintained if direct service is offered.