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Research Paper

Operation analytics: Logistic optimization

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***Abstract*—** *The primary aim of this paper is to analyze logistic optimization through operation analytics. For this purpose, V- Trans that is India's cargo management and logistics solution provider corporation is taken as a case study and its various functions are studied and compared to implemented project "Goods to Go" and results are derived out. With this paper we aim to comprehend and research on daily operation and logistics optimization of V-Trans, to understand the workings and the shortcomings of firm on whole and provide solutions. To achieve this, we have used various numerical and analytical tools and implementations of operations research.*

***Keywords*—** *V-Trans, Logistics optimalization, Route optimization, Research Operations, online goods transportation system.*

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I. INTRODUCTION

Operational research (OR) is a diagnostic method of troubleshooting and decision-making which is beneficial in managing organizations. Operational Research works by dividing the problems into basic components then solving them using the procedures of mathematical analysis.

Initially founded as Vijay Transport by late Mr. K.K. Shah in 1956 as a transport company, used to delivery of full truckload and provide "store to store" services. As time glided by, with, changes in major Indian economic reforms, growth in business activities and competitive pressure there was increasing need of time-bound, door-to-door cargo services. Previously, several transport providers used to operate on full truckload which was the main revenue source as the primary business, whereas door-to-door transport was only provided as a secondary-service.

In 2002, due to customers' repeated incoming requests for an express cargo service, Vijay Transport started a little unit for this service, sharing the resources of the prevailing establishment. In 2008, the Vijay group transformed to the "V group". This makeover, divided V-group into three independent entities namely V-Trans, V-Logis, V-Xpress.

V-Trans provides surface transportation solutions across India. It deals with full truckload movement in addition to part loads. V-Trans brand was quite 58 years old, and it had 475 branches across India. V-Trans was reported having an annual revenue of over INR 8.3billon in 2020. To fit client's business requirements V-Trans offers specially tailored solutions. It had been equipped with a state-of-the-art infrastructure, IT digitization and a fleet of quite 600 GPS- enabled vehicles. Working alongside with, other business arms of the V-group, V-Xpress, and V-Logis, it provided an entire coordinated logistic services solution to its customers.

'Goods to Go' project is developed to automate goods transport operation like booking vehicles, payment, delivery report, generating transactions receipt etc.

In the prevailing system most of the goods related transportation operations are manually executed. In this system, it is very difficult to find transport service at a giventime or place, booking, get old records, etc.

Since all work is done manually, it takes time to give report to management regarding their query making it an error prone system. Sometimes, it is very difficult to manage all transport delivery or find people to transport goods. So, an automated system is needed to computerize all these activities.

Goods to Go automates all transport office work like billing, tracking payments, creating report etc. The main job is to provide goods transport service to consigner and consignee.[7]

It is a type of transportation management system where a software application is used to maintain day to day transactions in transport office. They can select vehicles to transport the goods. Clients can also trace, track the vehicle assigned for delivery of goods. Customer can also book goods transport order online as well as check their goods delivery status online.

Features needed for a good transportation service provider:

1. Convenient: A couple of simple steps on mobile app and customer can online book and track also as online booking. Having automated branches all networked through differentiated Enterprise Resource Planning program allows clients to retrieve information about booking, deliveries as well as helping them to trace and track their consignments online.

2. Personalized model: For lowering competition, offering personalized solutions and suggestion for required client requests, offering diverse options, thus, selecting the foremost optimal solution supported minimum cost and energy required. Offering various transportation solutions gives a greater number of choices to customer,for example, through airways, railways, road transport, etc. thus, cutting down unnecessary costs.

3. Availability: A prominent logistics service provider should have wide presence throughout the country accessing various locations along with having immense infrastructure fleet of wide range of vehicles.

II. OVERVIEW

The logistics industry in India is split into four main domains. It consists of transportation, warehousing, freight- forwarding along with value-added logistics. In India about 14.4 per cent of its gross domestic product or GDP is spent on logistics and transport in comparison to the 8 per cent that is on average spent by other developing nations in the world.

By the year 2020, the freight transport market in India was expected to be worth of US$307.70bn. Road freight currently hold about 63 per cent of the total transportation, and 0.6 million light-duty trucks and 2 million for heavy- duty trucks.

The logistics industry in India had grown at a compound annual rate of growth (CAGR) of 9.7 per cent during 2010- 2015 and was expected to grow at a CAGR of 8.6 per cent between 2015 and 2020[4]. The Indian logistics companies were growing at a mean rate of 10.1 per cent. Considering India as a low-cost country, things changed when it came to logistics.

The logistic operating costs were higher thanks to various issues like a posh tax structure and its customs policy.

In the end, Roadways are the most utilized mode of goods transportation in contrast to railways, waterways, and airways or any other mode of transportation.

All these were getting to increase the demand for warehousing and logistics within the country.

Logistics industry In India (freight type) is as given as:

TABLE 1: LOGISTICS INDUSTRY IN INDIA(FREIGHT TYPE)

Type	Value in million metric tons	% Of total freight
Road freight	3,152.52	63
Rail freight	1,352.08	27
Sea freight	450.36	9
Air freight	50.04	1

Source: Adapted from "Market Research Report",www.novonous.com/publications/feight-transport-market-india-2015-2020

III. OPERATIONAL RESEARCH

Operations Research is one of the distinctive tactics to quantitatively analyze and make decisions supported by science. It follows a group of structured procedure which starts with the formulation, making assumptions, then the gathering of knowledge takes place, followed by providing optimal resolution to the theme then its analysis and execution. Operational Research is mostly used in cases of limited resources availability to provide the optimal solution. The instruments and scientific outlook and approach of OR are frequently operated in various industries like manufacturing transportation, telecommunication, financial markets, etc.

Operational Research consist of a wide number of approaches, some of the followings are:

1. Objective-oriented approach
2. Scientific approach
3. Decision-making
4. Computerized
5. Inter-disciplinary approach
6. Linear Programming approach, etc.

A. OR in Logistic Industry

In logistic market majorly operations are to allocate and dispatch the given respective fleets corresponding to incoming request from customers that allows them to make concentrated income. research is that the foremost useful approach to curb this problem because it calculates the foremost optimal because of allocate the limited sources, hence the methodology and approach of research are widely applied during this logistic industry. [5]

In today's on-demand economy where there's logistics of medicine, machinery, courier packages etc. happening, the allocation possesses to be exhausted the foremost optimal way.

The route optimization procedure accumulates the records and outputs the route with innumerable pickups and drop-offs interconnected. OR is widely applied in such kind of market of India because it efficiently curbsthe problems of this industry in our country.[6]

IV. LITERATURE REVIEW

Route optimization is finding the shortest total riding time, given a fleet of cars and several other orders with their constraints.[5] This is often likewise mentioned as Vehicle Routing Problem. Each picture in time could also be considered a routing trouble that we solve for, the results of which become the updated commands for the fleet.[5] It considers all the statistics and may provide us with routes for drivers that contains quite one pickup and drop-offs intertwined. More importantly, it allows the whole fleet to perform together centralized system. Because the routing problem is understood to emerge as exponentially harder with size, the additional passengers, the additional automobiles, the additional complicated actual-world scenario is, the clearer it becomes those simple heuristics arenot considered good enough.[1]

Case study are to know business-to-business (B2B) marketing during a logistics organization; apply go-to-market (GTM) strategy within the logistics industry; design B2B distribution strategy to reinforce geographic penetration; and develop digital marketing strategies within the logistics industry.[2]

This paper proposes an improved control system by having dynamic deadlines at the traffic light intersections. The proposed system uses sensors to seek out the traffic conditions to dynamically control the traffic.[3]

This paper summarizes the change in consumer behavior and outlook on online transportation network performance in Indonesia, this study aims to empirically examine the impact of electronic customer relationship management and e-service quality on client satisfaction and reliability. Research design, data, and methodology -

A quantitative approach was applied, then we determined the respondents who met the predetermined criterion by using purposive sampling method.[4] In total, 167 online transportation customers in Indonesia participated during this electronic questionnaire survey.

V. METHODOLOGY

This research implements active/dynamic performance management framework with a simulation-based procedure for obtaining a dynamic case understanding of detailed business density.

A. Purpose

The aim of this paper is to explore and improve the present business dynamics of a goods transportation industry implementing online automated goods transportation system and foster understanding of hypothetical feedback effects within the broader system.

B. Finding

Scenario analysis shows that changes within the various marketing schemes, alongside improvement in existing system of customer service, cutting prices for customer and offering more varied transportation options for heavy/ medium and light weight deliveries may have significant impact on this industry.

Current statistics of V-trans Cooperation

Table 2: V-Trans internal assessment

Basis	Details
Launch	1956
Annual Revenue	Over 500 Cr
Tech Platform	Application
Presence in number of cities in India	15000+
Number of vehicles on the platform in India	600+
Number of employees in India	3000+

With the detailed review and knowledge of the prevailing logistic enterprise, contemporary situation, and troubles, listed below are few of the recommendations which will beconsidered for implementation:

1. Apart from time-bound delivery, it had been obvious that customers wanted safety for their shipments. Mishandling of commodities is a known problem among logistics service providers. albeit V-Xpress conducted a 247 monitoring of all the hubs, the in-transit safety of products was always a risk.
2. V-Xpress an arm branch of V-Trans Cooperation, had conducted marketing research to spot the attributes that drive the customer's choice of a logistics partner. These were found to be reach, i.e., how widespread, and deep the geographic network is; unique selling proposition (USP); and SLAs. These were the key criteria that customers searched for in their logistics partner.
3. However, the top priority are security and trust.
4. The low-budget marketing operation includes marketing through e-mail, social media, database, etc. where the rate per business-to-business customer gain is less as compared to customer acquisition using conventional channels.
5. No one would really like to possess a shortage or pilferage to occur with their shipments. A logistics partner must build an elevated level of credibility in order that the customer can place trust in it and make it its preferred partner.

C. Secondary Data Analysis

This research is predicted based on previous data provided, sources from web, newspaper articles, online journals, internet, etc.

The data collected presents the info on the integral logistics working of V-Trans.

D. Derived Data Analysis

In this logistic industry, the principal areas are concerns are security, time-bound service, warehousing, availability ofrequired transportation medium and pricing.

VI. RESULT

Based on research conducted, the results are as follow:

1. V-trans is logistic service provider having its own warehousing units and transport system whereas Goods to Go comes more under logistic aggregator service.
2. Goods to Go aggregates number of logistics service providers thus giving more options to customers and providing considerable number access routes combining various local vendors therefore reaching more clients.
3. Goods to Go entirely online automated system has more user interaction and customer trust as compared to base level service provider V-Trans.
4. Goods To Go online outreach is more as it is readily available on Mobile and offers in time online goods delivery options be it light/heavy weighted goods.
5. Goods To Go does not need any additional infrastructural as its only job is to find logistic service providers for person asking for a transport system totransport his/her goods.

VII. CONCLUSION

Online goods Transportation services have a greater potential of customer acquisition in India since the past few years due to many reasons like inadequate transport system of the country, the ambiguous law of our country and non- centralized and multiplayer market of goods transportation services in India.

Majority of the operations of such firms include allocation and dispatching of respective fleets with regards to the incoming request from customers that permits them gain andcollect maximum income.

However, improvement is needed on consumer response, more of direct customer booking through online automated system building brand and customer loyalty.

Research is that the most useful approach to curb this problem because it calculates the foremost optimal thanks to allocate the limited sources, hence the methodology and approach of research is extensively utilized in this industry. (“V3I10-1149 | Taxicab | Operations Research - Scribd”) [5] Surge price optimization may be a crucial factor that affects the demand and price of this logistics industry.

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