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Last Mile Transportation Challenges And Creative Thinking In Logistics

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ABSTRACT

Last-mile transportation or final mile delivery which refers to the overall process involved in the final leg of a product's journey, including the planning process, resource management, and other aspects. With growing metropolitan development, with the growth of e-commerce, and increasing consumer appetites for faster, more convenient deliveries, logistics firms are experiencing more pressure to improve their last-mile tactics. Key hurdles in this last phase of delivery include traffic congestion, customer expectations, environmental concerns, high costs, and the necessity for real-time tracking and optimize vehicle utilization along with an improved customer centric philosophy.

Divergent thinking and creative approaches are essential for overcoming these obstacles. This statement reviews new explanation such as integration of battery electric vehicles (BEVs), unmanned aerial vehicles (UAVs), last-mile delivery robots, micro fulfilling centre, and crowd shipping platforms. It also emphasizes the importance of business analytics, AI powered route optimization, and the commitment of sustainable delivery practices ability to reduce expenses and boost profitability. By reconsidering conventional models and implementing modern technologies, businesses can transform the last mile into a more sustainable, economical, and customer-focused operation. This essay will bright on how the supply chain industry might overcome such hurdles and develop within an increasingly complex environment.

Keywords: final mile delivery, supply chain, divergent thinking, creative, sustainability, customer centric.

INTRODUCTION

The systematic method for monitoring purchase, storage, and delivery of resources to their ultimate location. This phase is important because it has a direct influence on customer engagement and delivery expenses. It is, however, affected by various challenges such as traffic jams, delayed deliveries, high operating expenses, customer focus and environmental issues. To overcome these challenges, divergent thinking solutions like route optimizing using geographical information systems (GIS), Vehicle routing problem (VRP), drone delivery, smart vault, and crowd-sourced shipping. Through the integration of technology and strategic planning, companies can boost efficiency, lower costs, and improve customer satisfaction in last-mile logistics.

The set of procedures used to move commodities from one buyer to another or internally is known as logistics. In fact, there are a few credentials for logistics managers, who manage and handle all of the issues involved in that process. The achievement needs attention to numerous details: Routes must be chosen based on practicality, legal requirements, and avoiding impediments like road repairs, conflicts, and bad weather. Costs must be carefully evaluated in relation to variables like weight and recyclability when choosing a shipping provider and packaging alternatives. Factors that guarantee customer pleasure and the availability of appropriate warehousing are examples of fully loaded expenses that may involve elements other than transportation.



The logistics team members is responsible if a shipment of dairy goods arrives ruined due to a refrigeration problem. Fortunately, logistics management software assists companies in tracking the flow of goods, minimizing expenses, protecting assets, and making the optimal routing and shipping choices. Processes like selecting shippers based on contracts or rate changes, printing shipping labels, automatically entering transactions in ledgers and the balance sheet, scheduling shipper pickups, recording receipts and receipt signatures, assisting with inventory control, and other tasks can frequently be automated by such software.

REVIEW OF LITERATURE

1. MARLON G BOARNET, EUGENE JAE KIM, EMILY PARKANY 1998 Utilizing information for California freeways from 1976 to 1994, a traffic congestion index was created. The method produces a congestion metric with a number of benefits. The index produced here can be applied to counties, urbanized areas, highway segments, or other components of geographic areas or roadway networks. Cross-sectional and time-series comparisons that were before very infrequently conceivable are now available thanks to the index. The congestion index created here is based on easily accessible data, which is what matters most. Based on data from the Highway Performance Monitoring System, the index is contrasted with others, and the similarities and differences are displayed. There is also discussion of crucial topics for upcoming studies and data gathering initiatives that could lead to more accurate congestion monitoring.

2. RICHARD L OILVER 2010 A theory-based applied approach is used to review the concept of customer satisfaction, drawing from a substantial body of academic work that has just recently made its way into non academic surveys. Despite the existence of alternative conceptualizations, the expectancy disconfirmation with performance model serves as a foundation for this discussion, viewing satisfaction as an end-state with unique antecedents. The definition, conceptual explanation, and potential

applications of each of the focal determinants—expectations, performance, and subjective disconfirmation—in satisfaction research are provided. Throughout the conversation, some problems that satisfaction researchers face are also examined and fixed.

3. PATRICK JAILLET, JIN QI, MELVYN SIM 2016 We examine a class of uncertain route optimization problems where all choices are made prior to the realization of the uncertainty. After the uncertainty is realized, the goal is to find the best routing options that, to the greatest extent feasible, meet a set of predetermined criteria. These issues include delivering numerous capacitated cars to various nodes to satisfy the customers' ambiguous expectations and determining the best routing strategy to satisfy the soft time window requirements at a subset of nodes when the trip time is unclear. We present an exact mathematical approach for identifying and resolving these kinds of routing issues. Specifically, we provide a novel criterion for decision-making, known as the Requirements Violation (RV) Index, which measures the risk of requirements violations by considering the frequency of violations as well as their severity when they do occur. When probability distributions are known, the criterion can handle it; when distributions are only partially described by descriptive statistics like moments, it can handle ambiguity. In order to determine the precise optimal routing solution where the RV Index requirement is minimized, we create realistically effective algorithms using Benders decomposition. We also provide numerical data from many computer tests that demonstrate the solutions' appealing performance.

4. TECHANE BOSONA 2020 The largest and least effective part of the supply chain is last mile logistics (LML). This study's primary goal was to pinpoint the key obstacles to urban freight LML and areas where assistance might be possible. Three more references and forty-two peer-reviewed complete publications published after 2010 were used for this. The results showed a tendency of consistent growth in urban freight traffic. Globalization, urbanization, densification, online and omni-channel (OC) retailing, urban economic development, and population expansion are the primary factors causing this consistent rise. Three primary possible freight LML configurations were mapped and examined using typology analysis. If delivery failure is reduced, freight LML configurations involving light cargo vehicles and cargo bike-based delivery methods may be more appealing. The LML difficulties were generally examined and divided into four categories: logistic cost, LML system and management, infrastructure, and technological. The possible opportunities were also examined from the perspectives of social, economic, and environmental sustainability. Lastly, this paper has identified possible future LML research agendas. The study may serve as a knowledge basis for customers, policymakers, logistical and technical service providers, and academics and practitioners.

5. WASSEN AM MOHAMMAD, YOUSEF NAZIH DIAB 2023 Over the past ten years, e-commerce has been steadily expanding. Online retail has expanded rapidly as a result of the COVID-19 epidemic, especially in sectors like grocery, apparel, and food. Significant logistical issues have been brought about by the expansion of internet retailing, particularly in the final distribution leg, or "Last Mile." For example, in urban areas, traditional truck-based home delivery has hit its limit and is no longer a viable delivery option. Advances in technology have led to the implementation of various different logistical solutions as creative substitutes for package delivery. This covers, among other things, drone delivery, smart parcel stations, robot delivery, and crowdsourcing. In light of this, the purpose of this paper is to present a thorough review and analysis of the most recent developments in last-mile delivery solutions from both industry and academic viewpoints (see for overview). This is accomplished by using a content analysis literature review to examine more than 80 pertinent publications, identify the essential characteristics of the most recent last-mile delivery innovation, highlight its varying degrees of maturity, and highlight the associated theoretical and practical difficulties.

OBJECTIVE OF THE STUDY

The primary objective of this paper is to provide a systematic literature review (SLR) and structured insight into last mile delivery, ultimately identifying gaps in current knowledge and proposing an approach for further studies involving the environment in the area. The study aims to the following objectives:

- Logistics aims to minimize expenses associated with transportation, warehousing, and inventory holding.
- Meeting customer expectations for timely delivery is a primary goal, requiring efficient planning and execution.
- Focuses on managing inventory levels to avoid stockouts while minimizing storage costs and obsolescence.
- By ensuring reliable and timely delivery, logistics plays a crucial role in enhancing customer satisfaction.
- Optimizes the flow of goods and information throughout the supply chain, leading to greater efficiency and responsiveness.
- Strives to streamline processes, reduce waste, and improve overall operational efficiency.
- Involves identifying and mitigating potential risks, such as disruptions to the supply chain or damage to goods in transit.
- It plays a role in ensuring the quality of products throughout the supply chain, from sourcing to delivery.
- Involves the strategic sourcing and acquisition of goods and services needed to support operations.
- Focuses on efficiently fulfilling customer orders, ensuring that the right products are delivered to the right place at the right time.

SCOPE OF THE STUDY

The following describes the scope of the study paper :

- Collecting data from various logistics participants in a variety of work roles.
- Gather and analyse the questioner demographic data such as age, gender, level of education, Job designation and experience.
- Additionally, ask specific questions about last-mile transportation and how traffic congestion affects last-mile delivery.
- To collect information from a wide range of respondents, use a structured questionnaire.
- To assess the data gathered and draw insightful conclusions, apply statistical and thematic analysis approaches.
- Assess people's confidence levels in their comprehension of environmental issues and customer expectations.

This research paper aims to provide important insights into the comprehension of last mile transportation challenges and innovative thinking, including drone delivery, smart vaults, crowd-sourced shipping, vehicle routing problems (VRP), route optimization using geographical information systems (GIS), and drone delivery, by clearly defining its objectives and scope.

RESEARCH METHODOLOGY

This study is a methodological presentation that involves the problem, statement, hypothesis, data collection and outcome that are predicted as recommendations. The primary objective of this research is to know insight of directors, staff, managers and trainees in my company's logistics department think about last mile transportation challenges and creative thinking in logistics is the primary goal of this paper. The data was gathered from primary and secondary sources. A detailed study by interaction with colleagues and gather their response to my questions and opinions regarding last mile transportation challenges and creative thinking in logistics. The samples were gathered from 150 respondents and published. To obtain a genuine, appropriate, and balanced data set for this analysis, the study uses stratified sampling and snowball sampling techniques. The data collected from both the sources is analysed and interpreted in the systematic manner with the help of statistical tool like percentages and diagram for visualization.

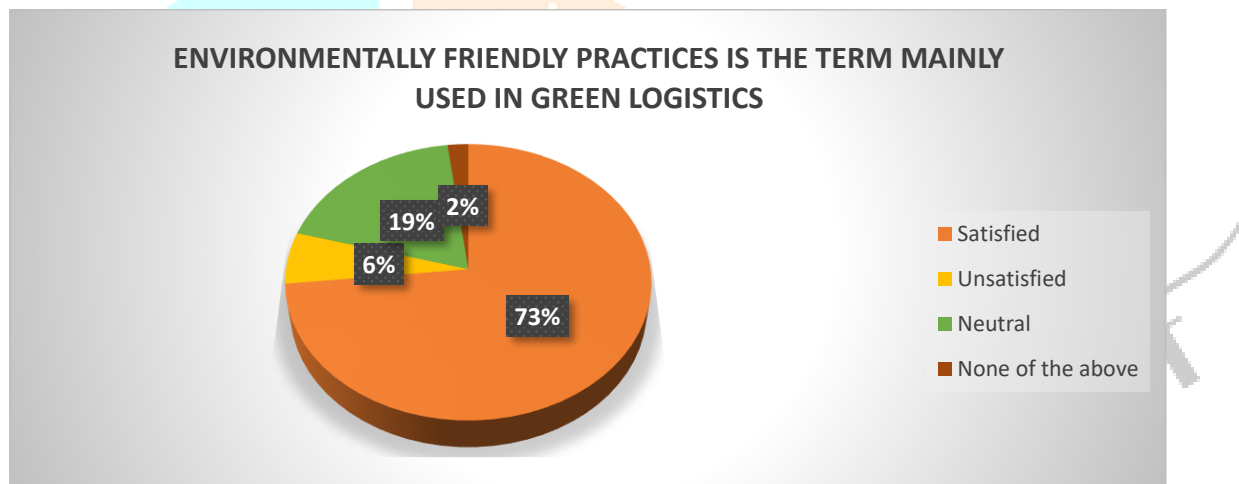
DATA ANALYSIS AND INTERPRETATION

In order to gather information about last mile delivery and transportation challenges that affect logistics, we practiced questionnaires for this study paper. In order to get opinion about the challenges of last mile delivery, the results of this research, and the perceptions of my colleagues, seniors, managers, employees and logistics department trainees, 150 questionnaires were included in the analysis.

ENVIRONMENTALLY FRIENDLY PRACTICES IS THE TERM MAINLY USED IN GREEN LOGISTICS

OPTIONS	FREQUENCY	PERCENTAGE
Satisfied	110	73.33
Unsatisfied	9	6
Neutral	28	18.67
None of the above	3	2
TOTAL	150	100

Source: Primary data



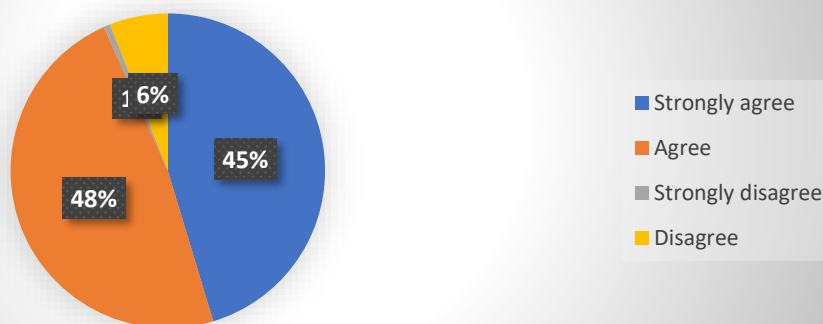
Interpretation: The above table shows that a majority of respondents says environmentally friendly practices will be satisfied when it is used in green logistics, 6 % of respondents having the opinion this will be unsatisfied environmentally friendly practices, 19% of them said it is neutral and only a few 2% went with the option none of the above to green logistics.

TRAFFIC CONGESTION SIGNIFICANTLY DELAYS LAST-MILE DELIVERIES

OPTIONS	FREQUENCY	PERCENTAGE
Strongly agree	68	45.33
Agree	72	48
Strongly disagree	1	0.67
Disagree	9	6
TOTAL	150	100

Source: Primary data

TRAFFIC CONGESTION SIGNIFICANTLY DELAYS LAST MILE DELIVERIES



Interpretation: The above table shows that a huge number of respondents 48% of total 150 respondents Agreed with the statement traffic congestion significantly delays last mile delivery, additionally 45% of them strongly agree this statement. But, 6% of respondents disagreed and additionally, 1% strongly disagree these traffic congestion.

THE PRIMARY CHALLENGE IN LAST MILE TRANSPORTATION

OPTIONS	FREQUENCY	PERCENTAGE
Traffic congestion	36	24
Limited Infrastructure	21	14
High delivery costs	18	12
All of the above	75	50
TOTAL	150	100

Source: Primary data

WHAT IS THE PRIMARY CHALLENGE IN LAST MILE TRANSPORTATION

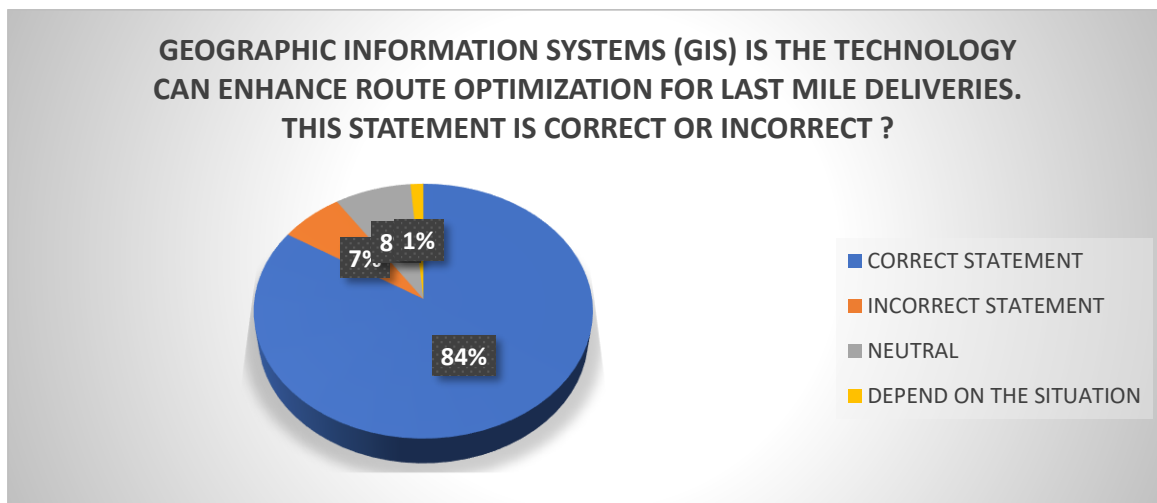


Interpretation: The above table shows that a majority of users 24% says it is a traffic congestion and 14% of the them says it is high delivery costs and 12% of them says it is limited infrastructure and 50% of them thoughts that last mile transportation is the primary challenge

GEOGRAPHIC INFORMATION SYSTEMS IS THE TECHNOLOGY THAT CAN ENHANCE ROUTE OPTIMIZATION FOR LAST MILE DELIVERIES

OPTIONS	FREQUENCY	PERCENTAGE
Correct statement	126	84
Incorrect statement	10	6.666666667
Neutral	12	8
Depend on the situation	2	1.333333333
TOTAL	150	100

Source: Primary data



Interpretation: The above table shows that a huge number of respondents 84% says Geographic information systems is the technology that can enhance route optimization for last mile deliveries of total 150 respondents says it is correct statement, additionally 7% of them says incorrect statement. But, 8% of respondents neutral and additionally, 1% depends on the situation.

FINDINGS

The data is collected from 150 respondents of my colleagues, seniors, managers, employees and logistics department trainees. Most of the respondents in this survey were in the 20 – 25 age range. Their views and concepts about the last mile transportation challenges and creative thinking in logistics have been examined. Both male and female samples gave their opinions on managing consumer expectations and last-mile delivery. Many of them thought they achieved the expectation. It combines divergent thinking techniques that can affect last mile deliveries such as drones, crowd sourcing, and route optimization. The predictions of last-mile delivery challenges and innovative logistics thinking were also examined in this research.

CONCLUSION

Last mile logistics is a dynamic industry with numerous challenges, but it also offers many opportunities for innovation and progress. By using technology, putting sustainable practices into place, and focusing on the customer experience, businesses can become leaders in the ever-evolving field of supply chain management and handle the complexities of the final mile. One of different challenges with last-mile delivery, including traffic congestion, high costs, seasonal fluctuations, and antiquated technology. However, by leveraging innovative solutions like AI-driven route optimization, real-time tracking, and sustainable practices, businesses can remove the obstacles and create a more efficient, customer-centric

delivery process. The key is adopting flexible, technology-driven strategies that streamline operations, reduce costs, and meet rising customer expectations. Addressing last-mile transportation challenges is crucial for enhancing supply chain efficiency and customer satisfaction. The complexities associated with urban congestion, delivery delays, cost inefficiencies, and environmental concerns demand innovative solutions. By integrating creative thinking into logistics strategies, businesses can adopt advanced technologies like route optimization software, autonomous delivery vehicles, and smart lockers to streamline last-mile operations. Additionally, collaboration with local partners, micro fulfilment centres, and sustainable delivery methods can significantly improve service quality.

Embracing innovation and adopting flexible strategies will enable organizations to overcome last-mile delivery hurdles while meeting evolving consumer expectations. By fostering creativity in logistics, businesses can achieve improved cost control, faster deliveries, and enhanced customer experiences, ensuring a competitive edge in the dynamic marketplace.

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