APPLICATION OF ARTIFICIAL INTELLIGENCE (AI) SOLUTIONS IN LOGISTICS CUSTOMER SERVICE

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Abstract

Customer service is one of the essential services in logistics. In order to provide high quality, cost friendly and seamless logistic processes, businesses leverage various information technology systems. Continued innovations and solutions in logistics may improve logistics customer service, culminating in improved business results. In recent years, digital technologies like Artificial Intelligence (AI) have become game changers, introducing aspects such as voice assistants, natural language processing (NLP), predictive analytics, and chatbots. In logistics customer service, AI may support data collection management, promote accuracy in scheduling delivery time and tracking shipments in real time, promote cost-effectiveness, offer instant customer support, and support decision making processes. Although AI has substantial benefits in businesses, implementation of AI is associated with potential difficulties such as integration with other systems, infrastructure compatibility and data privacy. To this end, this article explores the benefits and challenges of application of AI solutions in logistics customer service.

Keywords: Artificial Intelligence (AI), Logistics customer service, innovations and solutions, logistics industry

Introduction

The growing impact of Artificial Intelligence in various industries is now evident on the logistics industry. The amount of data in this sector is huge and complex, as it involves both flow of goods and services, including passing of relevant information from the beginning of the supply chain to the point of consumption. This calls for processes that are comparatively leaner. Hu et al. (2020) suggests that transportation systems leverage AI technology at different levels for route optimization. The continued use of AI in addressing emerging issues in logistics has led to increased reassessment of various innovations and solutions. Both scholarly and professional input in logistics industry on the use of AI will be reviewed in this paper.

According to Ghiani et al. (2022), recent applications have birthed transformation of dynamic systems currently in use, as a result of an evolution and embrace of emerging technologies. Modgil et al (2022) observes that more accurate prediction using AI has resulted in improved management of inventories and significant reduction in costs. Other examples include route optimization algorithms powered by AI, which leads to more efficient consumption of fuel and reduced delivery times. The revolution of AI in customer care has led to the introduction of virtual assistants and chatbots, where inquiries are responded to, information conveyed or transactions performed automatically using a natural language (Huseynov et al., 2023).

Consequently, application of AI solutions in collecting predictive consumer data (Gkikas et al., 2022), forecasting future consumer behaviour (Pascucci, et al., 2023), problem resolution and improvement of customer service (Ahmed and, Hussain 2023) and interaction with customers, timely scheduling and provision of quick responses, go a long way in impacting the overall customer loyalty and levels of satisfaction.

Research aim: to examine the application of Artificial Intelligence (AI) Solutions in logistics customer service.

The following **objectives** have been set to achieve the aim:

1. To assess the use cases of artificial intelligence solutions trends in logistics customer service;
2. To highlight the importance of artificial intelligence solutions in logistics customer service;
3. To identify the challenges of implementing artificial intelligence solutions in logistics customer service;

Research object and methods

Research object: artificial intelligence in logistics customer service

In order to assess and highlight the use and benefits of artificial intelligence solutions in logistics customer service, the article employs literature analysis, synthesis of existing data, and analysis of relevant scholarly works. This research method allows gathering of applicable information from online databases, reports and academic journals. This review will be useful in providing a comprehensive understanding of artificial intelligence solutions in logistics customer service, including the challenges of implementing artificial intelligence solutions, and identifying the gaps in the literature. To this end, data was obtained by reviewing literature findings in various scientific peer reviewed papers, published between 2018 and 2024.

Research results and discussion

Use cases of artificial intelligence solutions trends in logistics customer service

The key artificial intelligence technologies in logistics customer service include Natural Language Processing (NLP), Machine Learning (ML), Robotic Process Automation (RPA), Predictive Analytics (PA), Speech Recognition and Synthesis (SRS), and Real-Time Shipment Tracking (RTST) (Niazi, Kapp & Wang, 2021).

AI-powered systems are enabled by NLP to understand and process inquiries by customers using Natural Language (NL). Examples include virtual assistants and chatbots, used to respond to queries about order status, delivery time and shipment tracking. Therefore, they enhance customer communication by providing instant and accurate responses. On the other hand, ML enables analysis of historical data, prediction of future trends and delays in delivery, route optimization and responses that are personalized based on preferences of individual customers. On the other hand, RPA effectively and efficiently automates various tasks like management of inventory levels and invoice generation to ensure customers get updated in real-time. Additionally, SRS implores voice commands, allowing customer to access interactions more conveniently, by using speech recognition and voice synthesis to understand spoken language and provide verbal responses. RTST is also responsible for real-time updates, ensuring that throughout the logistics process, customers receive timely and accurate communication, thus enhancing transparency (Niazi, Kapp & Wang, 2021).

Several companies have adopted the use of AI solutions to serve their customers. One such case is the Amazon's Alexa, which allows customers to easily establish information about the status of their parcels, with customers asking Alexa about the arrival time of their parcels (Capgemini, 2022).
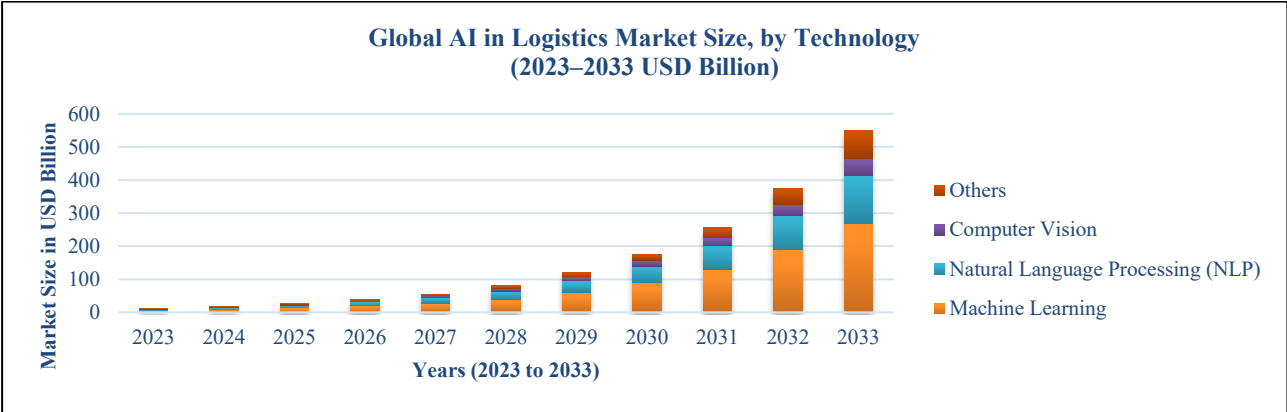

Source: according to DHL (2018)

Fig. 1. Ask Alexa! Shipment tracking via voice

The AI solution has conversational capabilities, which provide customers with other needs and further relevant information to help them act accordingly. This way, customer relationships are proactively managed in an intelligent way. According to the Capgemini report, an undisclosed company from Israel developed a chatbot, which used first-time delivery and route optimization successfully to cut down operational logistic costs by almost 75%. The chatbot uses Facebook messenger or SMS to contact the recipients. It further coordinates specific instructions concerning location and delivery time.

According to the Prismetric company report (Shah, 2024), Artificial Intelligence market is projected to cross the $500 billion mark by 2033, marking a 46.7% Compound Annual Growth Rate (CAGR) between 2024 and 2033.
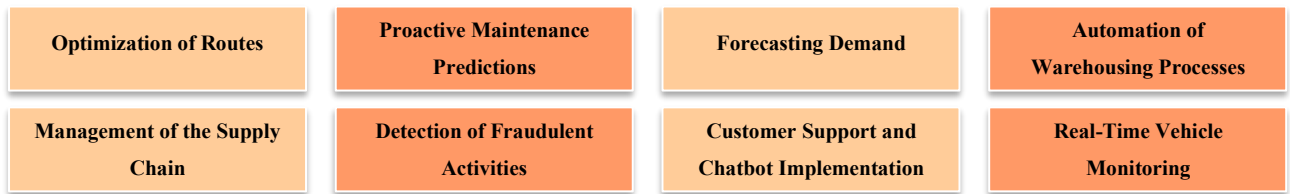

Source: according to https://market.us/report/ai-in-logistics-market/ (March, 2024)

Fig. 2. Global AI in Logistics Market

Importance of artificial intelligence solutions in logistics customer service
Artificial Intelligences solutions have in recent years become a game changer in logistics, playing an important role (Du et al., 2023) to meet the rising customer demands on speed and reliability, thus promoting quality and effective customer service. Customer service is a critical prerequisite for building a strong company brand, making it stand out from competition and attract more customers. The competitive advantage earned from AI paves way for increased customer satisfaction and company revenue.

In logistics customer service, AI works by handling routine inquiries, real-time tracking of shipment, automating management of orders, prediction and management of delays, offering 24/7 customer service, optimization of delivery routes, and continuous learning and improvement.
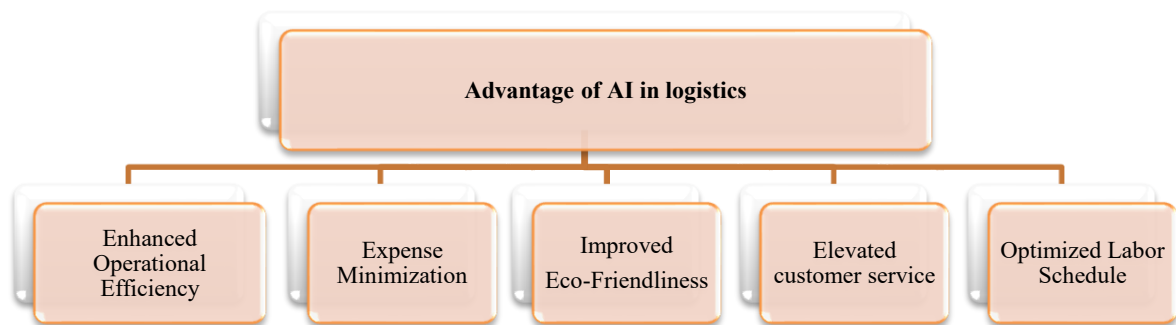
Optimization of Routes	Proactive Maintenance Predictions	Forecasting Demand	Automation of Warehousing Processes
Management of the Supply Chain	Detection of Fraudulent Activities	Customer Support and Chatbot Implementation	Real-Time Vehicle Monitoring

Source: *SPD TECHNOLOGY (Leleko & Holoborodko, May 31, 2024)*

Fig. 3 Applications of AI in logistics

Automation of routine tasks provides enhanced overall customer experience, instant updates for customers and reduced response time. Real time tracking is integrated with IoT and GPS devices to provide customers with accurate and transparent information throughout the shipping process.

Automation of order management improves accuracy and reduced manual workloads, while predictive analytics forecasts possible delays owing to customs issues, unfavourable weather conditions or traffic congestion, thereby notifying customers appropriately and providing alternative solutions like adjusted delivery times and rerouting of shipments. Consequently, continued interactions with customers and operational data allow AI solutions to handle more complex algorithms.

Advantage of AI in logistics

Enhanced Operational Efficiency	Expense Minimization	Improved Eco-Friendliness	Elevated customer service	Optimized Labor Schedule

Source: *SPD TECHNOLOGY (Leleko & Holoborodko, May 31, 2024)*

Fig. 4 Advantages of AI in logistics

The various functionalities of AI-driven logistics customer service comes with numerous benefits, including increased efficiency, 24/7 availability, real-time visibility, proactive problem solving, reduced operational costs, improved route optimization and scalability.

Greater efficiency is manifested in less time spent in processing more customer requests while ensuring that customer issues are resolved faster. Logistics customer services are also accessed at any time because of the 24/7 availability. The communication improved through transparent operations enhances trust between logistics stakeholders and their customers.

Operational logistical costs are also reduced significantly (McKinsey & Company, 2021) given logistics customer services are offered at high quality without incurring more operational costs. Optimized routes reduce delivery time, operational costs and fuel consumption, while scalability provides for handling of huge volumes from customers while offering consistent support, even during peak shipping periods.

An investigation of an e-commerce company established that integration of AI using automated order fulfilment systems and chatbots enhanced customer satisfaction by 20% while bringing order processing time down by 25% (Chen & Wang, 2021).

Challenges of implementing artificial intelligence solutions in logistics customer service

Some common challenges in implementing technological disruptions of the magnitude of artificial intelligence solutions include resistance to change by both companies and customers, the legal challenge of data privacy and compliance with security, the potential risk of losing jobs due to automation, high costs of implementation and the lack of funding thereof, the technical challenge of integrating systems, and the challenge of access and training data quality. According to Capgemini (2022), there may be technical delays in using AI solutions due to excessive mass data updates. This particular challenge may call for partnerships between companies in order to develop new systems.

Table 1. Customer Service Automation

Use case	Description	ZBrain Functionality
Customer queries	Deals with queries and provides timely and accurate responses regarding delivery schedules, product availability and shipment status.	Upon inquiring, the follow up agent sends personalized messages to promote engagement with customers. Messages are tailored on communication preferences and service history.
Automated delivery notifications	Notifications sent to customers are automated. The notifications contain expected delivery time and status of customers' orders.	Integration of ZBrain with tracking systems of delivery. The app personalizes notifications based on preferences of customers.
Returns management	Automates the complete process of returns (verification, refilling or disposals)	Returns are processed automatically, conditions validated and restocking workflows managed.
Personalized customer experience	Engagement is improved based on order history as set using customer preferences and communications.	The AI agents make use of customer data to tailor promotions and personalize communication based on purchase history updates.
Complaint resolution	Carries out analysis of complaints by customers, triggers actions for correction and enhances speedy resolutions.	Complaints can be tracked, timely alerts used to prioritizing issues that are unresolved, promotes customer satisfaction and enhances integration that is seamless to promote high service quality.

Source: according to LeewayHertz (2025)

The SPD Technology report noted a significant number of institutions do not have adequate funding for acquiring clean and relevant data, thus hindering proper integration. Missing or incorrect information may also result in AI models that are not accurate, thus providing unreliable results for customer service. According to Statista (2023), an estimated $154 billion was spent on AI systems around the world. Companies with tighter budgets may not feature well in this costing. Integrating old and new systems poses the challenge of compatibility, given some architecture may be outdated, thus lacking the requisite flexibility to integrate AI-driven solutions or processes (Wan et al., 2020). There is also the challenge of hiring qualified personnel, who may be experts in machine learning or data science.

Conclusions

1. Continuous advancements and integration of modern AI use cases with customers' needs not only addresses traditional logistics challenges but also creates endless possibilities. These possibilities demand that institutions mobilize resources to ensure availability of funds for acquisition of various AI products that will meet the institutional needs. The projected growth in compound annual growth rate of 46.7 % in Artificial Intelligence market by 2033 illustrates the endless possibilities and its economic impact around the world. Companies would do well to position themselves during this period.

2. AI-driven solutions mitigate potential disruptions and operational interruptions, streamline operations and enhance the accuracy of predictive analytics. The streamlining of operations remain a critical prerequisite for customer satisfaction. Past, present and future trends on customer behaviour can therefore be captured accurately, allowing institutions to prepare and position themselves adequately.

3. With advancing AI-technology, companies and industries must leverage the growth by investing in training and AI solutions specifically tailored to logistics customer service in order to retain or improve their competitive advantage. In so doing, institutions will address customer needs and concerns in a timely manner, allowing such institutions to retain existing customers and increase general institutional performance and profit margins. Such customers would be contented in knowing that they are able to for instance track their parcels and make proper decisions from time to time.

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