KARYA ILHAM PUBLISHING
CONNECTING MINDS, BRIDGING IDEAS, INSPIRING READERS

Journal of Advanced Research in Business and Management Studies

Journal homepage:
https://karyailham.com.my/index.php/arbms/index
ISSN: 2462-1935

Leveraging Artificial Intelligence to Enhance Strategic Information Systems: A Competitive Edge for the Logistics Industry

Chong Wee Kuan[1], Pe Sook Chin[1], Muhammad Naj Nizam Roslan[1], Kasthuri Subaramaniam[1,*], Oras Baker[2], Sellappan Palaniappan[3]

[1] Department of Decision Science, Faculty of Business and Economics, Universiti Malaya, 50603 Kuala Lumpur, Malaysia
[2] Faculty of Computing and Emerging Technology, Ravensbourne University London, London SE10 0EW, United Kingdom
[3] Corporate Office, HELP University, No. 15, Jalan Sri Semantan 1, Off Jalan Semantan, Bukit Damansara 50490 Kuala Lumpur, Malaysia

ARTICLE INFO

Article history:
Received 6 July 2025
Received in revised form 15 July 2025
Accepted 2 August 2025
Available online 4 September 2025

Keywords:
Artificial Intelligence (AI); competitive advantage; Strategic Information Systems (SIS); logistics

ABSTRACT

Artificial Intelligence (AI) is revolutionizing how strategic information systems (SIS) operate across industries by offering organizations new ways to gain a sustainable competitive advantage. This paper examines the integration of AI technologies such as machine learning, robotics, natural language processing (NLP), and predictive analytics into the logistics sector's SIS. The study identifies specific applications of AI within primary logistics activities, including inbound and outbound logistics, warehousing, marketing and sales, and customer service by using Porter's Value Chain framework. The paper adopts a thematic analysis approach based on a systematic literature review of 25 studies, revealing how AI enhances operational efficiency, cost reduction, and customer satisfaction. Findings indicate that AI enables superior delivery standards, optimized pricing, and smarter inventory and fleet management. The paper also highlights critical challenges such as ethical risks, data security, and system integration. Recommendations include implementing AI governance frameworks, ensuring GDPR compliance, and adopting phased integration strategies with expert support. This study offers practical and theoretical insights into the role of AI in strategic systems and emphasizes the importance of innovation balanced with risk management to gain a competitive edge in logistics.

1. Introduction

Organizations have been forced to find a competitive advantage through innovation and improve efficiency in its business environment. If a business manages to combine artificial intelligence (AI) into strategic information systems (SIS), it will gain an advantage of being distinct from its competitors. During the articles review, we often see mentioned a few branches of AI technologies such as machine learning, robotics, natural language processing (NLP), and predictive analytics. Generally, such technologies complement each other within AI to learn as well as emulate the human

* *Corresponding author.*
E-mail address: s_kasthuri@um.edu.my

https://doi.org/10.37934/arbms.40.1.7282

behavior and are a potent tool that can be employed in the logistics industry to enhance the performance, productivity as well as enhance the satisfaction towards the customer. Based on Porter's Value Chain, we find the core business activities for the logistics industry to be marketing and sales, inbound logistics, warehousing, outbound logistics, and customer service. These activities can be easily streamlined and used more efficiently with AI technology.

As an example, in inbound logistics, machine learning can provide real time route optimization through considering the traffic, weather, and road conditions. Robots for warehousing that can automate processes, paired with AI integrated warehouse management systems to make warehousing more efficient. In outbound logistics, machine learning algorithms can reduce downtime by allowing predictive maintenance capability thus enhancing operational efficiency. Additionally, NLP can be used in the customer service process to make sure delivery of a better customer service end to end by establishing a smooth transition between machines and humans via chatbots and analysis tools. Predictive analytics also enable organizations to make data driven decisions which are more accurate and at the same time, they are also competitive in a tumultuous market. In conclusion, organizations must be able to address potential challenges such as ethical concerns, data security, system integration, and the need for experts to manage AI systems when integrating AI into SIS in business. This paper explores how AI technologies can integrate with SIS in the logistics industry to gain a competitive advantage for sustainable growth in this data-driven era. It also discusses the challenges faced and provides recommendations to mitigate them.

2. Literature Review

2.1 Definition of Artificial Intelligence

Artificial Intelligence (AI) is defined as the ability of machines to produce human intelligent performances like learning, reasoning, and perceiving and making decisions to solve problems [1]. The goal of artificial intelligence is to apply machine learning as well as the other higher-level technologies to let the systems accomplish the particular tasks on their own or with minimal human input [2]. The role of Artificial Intelligence in enhancing strategic information systems in the field of logistics which apply AI technologies to improve and facilitate the strategic management and operations of logistics. They aim to improve efficiency, reduce costs, and foster innovation through implementing AI in various logistics procedures.

2.2 Key Trends

2.2.1 Machine learning - data optimization

Machine learning (ML) is a subset of artificial intelligence (AI) that aims at creating systems that learn from data to optimize certain tasks. It is a collection of procedures from diverse fields such as mathematics-statistics, probability theory, neuroscience, and computation to derive solutions from an analysis of data [3]. Lately, it takes an important position in current AI development and contributes to fields like data science and statistic [4]. Machine learning consists of many types of algorithms and methods, some of which are neural nets, support vector methods, decision trees and genetic programming. These algorithms are used for operations in regression, classification and clustering [5].The other subset of ML that is inspired by architecture of human brain known as deep learning has gained popularity in recent days due to its ability to recognize images and voices [6]. In the field of logistics, a number of research studies studied the application of machine learning to the area of predictive maintenance (PdM). It is very vital in PdM because ML treatments offer means to head off likely failures prior to undergoing reconstruction to ensure that the downtime is kept low [7].

2.2.2 Robotics - process automation

Robotics and automation are sectors closely connected to AI that is gradually revolutionizing many industries through improving their speed, accuracy, flexibility etc. AI technology is implying robotics technologies that allow machines to autonomously do job roles, thereby changing various industries such as manufacturing, health care, agriculture and logistics [8]. Automated systems involving AI work with sophisticated mathematical models that allow streamlining warehouse processes such as inventory management and order delivery. AI technologies- machine learning analyze the historical data and gives the probability of the future trend; with it, the warehouse can predict what other customers are likely to need in the future and adjust with the changes occurring in the customer requirements [9]. Computer vision using artificial intelligence offers robotic vision of identifying the non-conforming product quickly and accurately as desired by Sodiya *et al.,* (2024) [9]. AI - driven systems like AMRs, robotic arms and AGVs can help to calculate pick routes, picking, material handling, transporting in warehouses [10].

2.2.3 Natural Language processing (NLP) - customer service

NLP stands for Natural Language processing, a sub discipline of AI which aims to understand and produce human language in natural and practical contexts across a number of different domains [11]. NLP's disciplines as machine translation, spam filtering, information retrieval, summarization and question answering [12]. It is also important in the creation of technologies like chatbots, digital assistants, recommendation systems that are already in mainstream everyday use [11]. The improvements of deep learning have contributed to the better performance of NLP applications thus to solve harder language problems and interact with people [13]. NLP's development came along with the access to plentiful textual data, a powerful computational base and extensive neural models. However, NLP comes with drawbacks that include biases with the training data, and privacy issues. They aggravate the question of ethical and responsible artificial intelligence promotion [14].

2.2.4 Predictive analytics

The freight forwarding industry has started adopting AI predictive analytics that deliver enhanced operations, supply chain methods and decision-making tools that are expanding rapidly. Use of artificial intelligence and machine learning are instrumental to altering the flow of logistics management as they can indeed solve many of the functional problems that the organizations engaged in logistics face, whether it is processing the order, restocking the inventory or designing the delivery routes [15]. This kind of automation helps to set the rate as well as reducing human interferences thus increasing reliability [16]. In the case of using of prediction analytics in logistics particularly in forecasting delays, accuracy levels are very high using artificial neural networks and decision trees most preferred by machines to help in proper planning and management of resources.

2.3 Role of Strategic Information Systems

Strategic Information Systems are designed to support or shape a business's competitive strategy by altering how business is conducted, which can lead to a competitive advantage. Strategic Information Systems are key to the development of generic strategies for the organizational gaining of competitive advantages with information technology. These systems are especially well suited to support business process re-engineering and to weave together virtual organizations to increase operation efficiency and strategic positioning [17]. Implementation of information systems has been successful for achieving competitive advantage in sectors such as marketing, financial services and aviation [18]. However, the effectiveness and impact of using these systems will be dependent on the organization's ability to understand and use them. From the perspective of the competency-based view, information systems can play an important role in building organizational competencies at different levels thereby enhancing organizational competitiveness [19].

2.4 Key Theories and Frameworks

While using AI to improve competitive positioning by enhancing strategic information systems to organizations also offers opportunities, it also poses challenges. Several frameworks are useful in understanding the adoption, implementation, as well as management of the AI-based SIS to circumvent these challenges. Figure 1 are the frameworks that identified from the relevant studies that will guide the understanding of the part played by AI in enhancing SIS and its effect on business success.

Framework	**Descriptions**	**Application in AI**
Technology Acceptance Model (TAM)	Technology Acceptance Model (Fred Davis,1986) is used to understand how technology acceptance and subsequent use comes to be. It primarily focuses on two key variables: Technology acceptance is influenced by two antecedent factors, perceived ease of use and perceived usefulness.	As more and more AI applications become prevalent in different industries, researchers have been exploring how TAM can be adjusted in order to understand AI adoption more effectively. (Baroni, Calegari, Scandolari, & Celino, 2022)
Technology-Organization-Environment (TOE)	The Technology-Organization-Environment (TOE) framework (Tornatzky and Fleischer,1990) is used to understand human uses and the adoption and implementation of technological innovations across different sectors or fields. It categorizes factors influencing adoption into three contexts: Technological, organizational, and environmental.	By addressing technological, organizational, and environmental factors, organizations can better navigate the challenges and leverage the opportunities presented by AI technologies. (Khneyzer, Boustany, & Dagher, 2024)
Resource-Based View (RBV)	The Resource-Based View (RBV) (Birger Wernerfelt, 1984) is used to focus on its resources which lead to competitive advantage and its sustainability. Existing theory explains performance differences between firms and it has been widely used to explain performance differences in the context of entrepreneurship, operations management and international business.	RBV helps us to understand how AI technologies can be viewed as valuable, rare and hard to imitate resources that can be leveraged to improve the firm's performance and efficiency. (YewWong & NoorlizaKaria, 2010)
Dynamic capabilities	Dynamic Capabilities (David J. Teece, Gary Pisano, and Amy Shuen, 1997) to study how firms can create and sustain superior performance through dynamic capabilities (DCs), which are central to the issue of firm adaptation in strategic management.	Firms who integrate AI in their operations can innovate their business models and improve performance but there are challenges in scalability and in integration. (YewWong & NoorlizaKaria, 2010)
Porter Value Chain	Porter's value chain (Michael Porter, 1985) is used to analyze an organization's activities to identify the sources of competitive advantage. The value chain framework breaks apart the individual main and support activities that a company comprises within its totality that are necessary to perform a valuable product or service for the market.	The framework can be applied to the area of Artificial Intelligence (AI) to alert businesses of how AI technologies can boost efficiency and cut costs while improving competitiveness along the value chain.

Fig. 1. Key theories and frameworks

2.5 Theoretical Framework

This article primarily adopted the theoretical framework of the Porter Value Chain which was introduced by Michael Porter in 1985. Porter's value chain is a powerful tool that enables an organization to analyze its activities in a bid to ascertain how each contributes to competitive advantage [20]. Porter’s value chain model categorizes the operations of a company into two main categories as illustrated in Figure 2, the primary activities that include inbound logistics, operations, outbound logistics, marketing and sales and customer service and the supporting activities that include procurement, technology, human resource and firm infrastructure. These integrated activities help the organization to minimize costs, improve the performance and raise the value of offerings received by customers, thus contributing to the organization’s profitability and its market position.

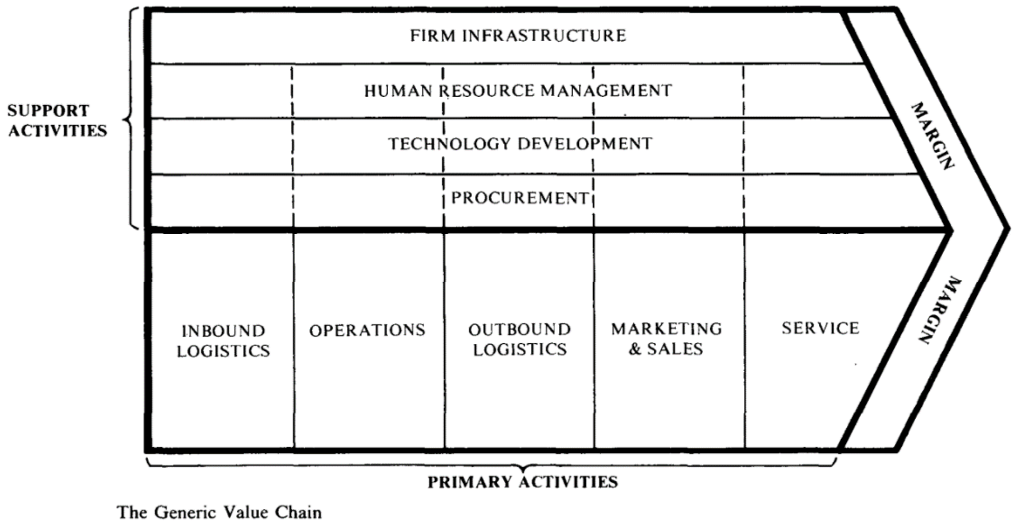

Fig. 2. The Porter's value chain framework

3. Methodology

The study used the literature review and thematic analysis to respond to the research question in line with recommendations by Benedettini *et al.,* (2012) [21], Hanafizadeh *et al.,* (2020) [22]. A comprehensive database search was performed on the keywords "artificial intelligence," "strategic information systems," "logistics," "Porter's value chain," and "competitive advantage." A search returned 25 articles which were carefully reviewed and selected on the relevance of the AI role in logistics. The articles were selected based on applying a standardized SLR protocol, to guarantee that the articles were concerned with the specific role of AI in improving the strategic information systems in logistics.

The Six Step thematic analysis approach discussed by Braun *et al.,* (2006) [23] was also used by the study. Initially, all 25 articles were carefully reviewed to distinguish articles relevant to the topic of the research. In the second step of the research, initial codes were developed to classify the data as based around AI enhancement including predictive analytics, automation, real time tracking, customer personalization and customer engagement. In the third step, five primary themes emerged from the data, corresponding to Porter's primary activities: inbound, sales and marketing, operations, outbound and customer service.

Finally, in the fourth step, these themes were refined to be aligned with their specific roles in the value chain. For example, the operations theme was further enriched with automation of warehouses and predictive maintenance applications and the marketing and sales theme focused on applications such as behavioral analysis of customers and personalized promotions. In the fifth step, the research objectives were then validated and confirmed against the final set of themes and their subcategories. In the sixth and final step, a comprehensive report was created to present the findings of and to provide insight into how AI technologies help to support the value chain using systems with strategic information within the logistics industry.

4. Findings & Discussions

4.1 Application of AI in Logistics Field

AI technologies and its subsets, such as machine learning, robotics, natural language processing (NLP), and predictive analytics, play a critical role in transforming how businesses operate in the 21st century. These technologies have revolutionized the entire value chain across nearly all industries, ultimately increasing operational effectiveness, productivity, and overall customer satisfaction. This article explains how AI technology can enhance strategic information systems (SIS) in every primary business activity within the logistics industry to gain a competitive advantage based on the Porter's Value Chain framework. In general, AI has begun to automate logistic operations, particularly in warehouses and material handling, leading to improved overall accuracy and speed [24]. Figure 3 below shows logistic value chain adapted from Porter's Value Chain.

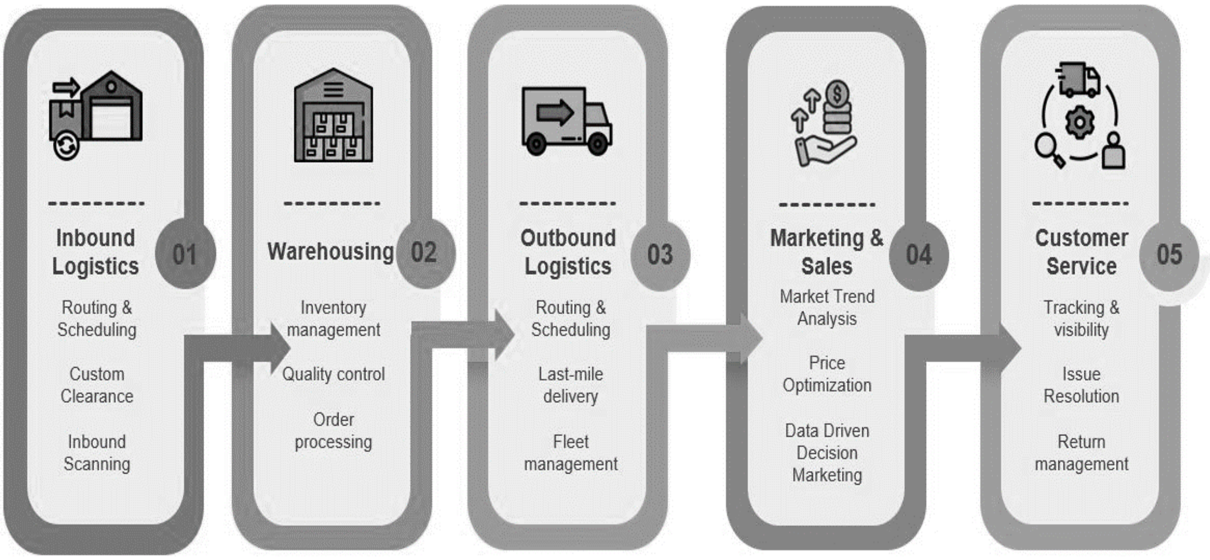

Fig. 3. Logistic value chain adapted from Porter's Value Chain

4.1.1 Marketing & sales

Similar to most revenue-generating businesses, logistics companies will find potential opportunities for sales. The business developments team will begin with understanding the landscape and segment of customers that require logistic services. Organizations will be required to capture the existing and emerging trends of the customers, based on their behaviors and ever-changing business preferences. Hence, it is critical that data is analyzed based on the latest historical data and parameters. Critical information includes percentage shares of physical versus online sellers, seller location origin, parcel size, and parcel types. Finding the opportunities in the dimensions of these parameters can be complex and involve massive data points, which machine learning is more adaptable in understanding non-linear relationships or interactions between contributing factors [25]. Machine learning will be able to provide a comprehensive analysis of the market by creating customer profiles and their respective shares of the market. This information allows management to prioritise marketing and sales efforts based on the primary customer profiles identified [26]. This ultimately allows logistic companies to focus their effort on relatively more promising opportunities with a high win rate percentage in acquiring business deals.

Once the opportunity is identified, negotiation of the logistic rate card will take place. The rate card is determined and negotiated with customers in order to achieve an optimized price for revenue maximization. Generally, logistic companies will apply the cost-plus pricing strategies to set the rate card as it covers the logistic cost via a simple calculation of logistic cost components, e.g., drivers pay, sorters pay, vehicle purchases, warehouse rental, and overhead cost. With AI, however, it allows for price optimization, where it allows for dynamic pricing by understanding ever-changing real-time demand and market conditions [26]. Machine learning is able to analyze recent historical data and provide the most competitive rate cards to customers who also understand the market rate of logistics services. Supported with the company's high delivery standards, the rates proposed will have a higher chance of being agreed upon, cutting down the time-consuming contract negotiation and beginning operation quickly.

4.1.2 Inbound logistics

Once sales are obtained, Logistics supply chain kicks off with inbound logistics, which essentially is the movement of goods from the supplier to the warehouse. The movement requires a reliable transportation management system (TMS) to manage vehicle routing & manpower scheduling whereby artificial intelligence is applied. With the capability of machine learning, the system can suggest the best route in real-time that considers various factors such as traffic congestion, distribution volume, distribution time, road condition, and real-time weather conditions [1]. A study conducted in Chennai further strengthens the claim that AI provides a meaningful impact on route optimization. This information is provided based on historical data recorded, which is then ingested into predictive models to forecast the quickest and safest route for delivery. This capability assists humans, especially when it has to factor in multiple conditions for an effective movement that optimizes low traffic flow, congestion, and delays [1]. Alternatively, given the comprehensive level of data points, it can be fully automated to make judgement calls with the governance of human oversight.

Additionally, in the inbound stage, inbound scanning takes place, which can also apply artificial intelligence. As the nature of logistics companies that support multiple types of shipping labels and packing lists is called airway bill (AWB) which, different between customers hence manual scanning will cause bottlenecks and handling errors [27]. With AI, this can be seamless via auto-detecting the airway bill information on a single distribution belt. This is called optical character recognition (OCR), which is automating the data entry into warehouse management systems (WMS).

4.1.3 Warehousing

Next, it enters the next process of logistics, which is warehousing via the warehouse management system. Once it is captured in WMS, it is able to automatically identify and classify goods, making sure of seamless warehousing and unloading goods more efficiently and accurately. Logistic companies are able to train AI-operated carts to pick, load, and sort goods into designated storages for structured inventory management that will reduce labour costs, human errors, and accidents. Once it is stored structurally, machine learning is able to perform forecast demand by analysing the trend and seasonality analysis and prediction on quantity of goods outbounded from the warehouse versus the supplies coming in for a specific period [28]. Then the system will be able to suggest a good timeframe for purchasing the next batch of supplies. A significant analysis conducted in Chennai identified that AI has a significant relationship in demand forecasting and inventory management for software project management tool users [24].

Besides, ensuring a safe working environment within the facility is crucial for warehousing. Artificial intelligence is also able to assist, monitor, and predict traffic accident risk and safety hazards [1]. AI-powered cameras are able to detect areas within the facility that may expose it to risk that may cause fire and unwanted accidents. Sensors with heat detection and traffic level will detect anomalies if equipment gets too hot or unregistered human movements in high-risk areas, which then signals the health and security (HSE) team to respond swiftly and accordingly. Additionally, the frequency of anomalies will be recorded, and machine learning will also be able to suggest improvement measures after a pattern of high risk is identified.

4.1.4 Outbound logistics

The final process in logistics is outbound logistics, whereby the sorted parcels and goods will be moved to delivery locations within a given timeframe. This is called the last-mile delivery, where the customer or buyer will receive the goods. During last-mile delivery, routing and scheduling similar to inbound logistics will take place with the assistance of artificial intelligence through big data and machine learning. An additional component of last-mile delivery is fleet management, whereby the TMS will identify and allocate the best fleet for the delivery. The fleet considers multiple factors such as type of parcels and area of coverage. There are small parcels, fresh, frozen foods, and bulky parcels, which later will be delivered to different regions and zones. These considerations may be complex; hence, human planning could be less accurate given limited human capacity. Therefore, artificial intelligence comes to assist in determining the best fleet to be allocated, such as in-house fleets, 3rd party logistics, and special vehicles such as refrigerated trucks to move frozen goods. AI is able to cater to additional constraints, such as real-time performances by each type of fleet and the most competitive rate cuts, in order to minimise the logistic cost without neglecting delivery performance to maximise customer experience.

An additional portion of fleet management is the maintenance of logistic vehicles. Multiple parts and components of vehicles that depreciate and require routine maintenance to operate at an optimum level. This task is complex as it involves a well-planned servicing schedule across hundreds of vehicles while not jeopardising a huge backlog on parcel delivery. With sensors placed at critical areas of the vehicles and connected via the Internet of Things (IoT), it will be able to provide real-time data collection on various parameters, such as vibration, temperature, pressure, and humidity, to deliver constant insights into the life of the assets [29]. With such data, AI-powered predictive maintenance analysis can be provided so that managers can act swiftly for the vehicle. Ultimately, it helps with downtime reduction and operational disruption while optimising maintenance costs, which are key decisions for logistics companies [29].

4.1.5 Customer service

After the deliveries are made, customer satisfaction needs to be measured; hence, companies require the best capabilities to respond to customer purchases. The primary example is the need to provide tracking visibility to customers so that buyers are well informed of the parcel's estimated delivery time. Unfortunately, hiccups may happen, such as delays in parcel delivery, which resulted in customers filing enquiries and complaints as part of user feedback. The customer service team will then respond to enquiries one ticket at a time. This is a time-consuming service that takes a lot of manpower to resolve all the cases, especially during business disruptions or natural causes such as floods. With AI, it helps to perform user feedback analysis in terms of speed, accuracy, consistency, and sentiment analysis, which humans have relatively limited capabilities compared to AI v

This real issue has led to the usage of AI chatbots to respond to multiple queries simultaneously, powered by natural language processing (NLP) capabilities that allow bots to converse in a natural, human-like tone across various languages. Chatbots can provide accurate responses to queries such as the movement status of their parcels, estimation of delivery, request for parcel return and refund, or capturing daily feedback for company future improvements. In essence, natural language processing allows a detailed user feedback analysis whereby it performs text classification, sentiment analysis, keyword extraction, and topic modelling, which helps logistic companies to better understand their customer segments and personas [29]. Artificial intelligence indeed shows its capability to support the entire supply chain of logistics, from receiving the goods, storing, sorting, delivering goods, and managing overall customer experience. The current landscape shows significant benefits of AI applications.

5. Conclusion and Recommendations

5.1 Recommendations

The effectiveness and trustworthiness of AI technology will be undermined if organizations fail to prepare an approach to address the challenges of deploying AI within SIS in their business processes. Organizations need to balance innovation with potential risks such as ethical concerns, system integration and data security risks issues properly. First, ethical issues like transparency, environmental impact, bias and safety should be dealt with very carefully and vigilantly, to ensure AI is used responsibly and ethically. An AI governance framework is a structured set of policies, standards, regulations and best practices, that need to be in place to guide as a guideline for development, use and application of AI technologies. Additionally, the framework should also take into account fairness, accountability, transparency and non-discrimination to create more trust and satisfaction.

Second, the risk of data security has been one of the biggest concerns regarding the adoption and acceptance of AI technology, as people are concerned about their privacy. Organizations that don’t manage this concern wisely are subjecting themselves to serious financial and reputational damage, losing the trust of their customers. Organizations should thus take steps to minimize their risks by taking action that conforms with applicable laws and that also follows how such actions should be undertaken in the realm of AI ethics, e.g. as specified under the General Data Protection Regulation (GDPR). Besides, they also implement data governance policies to ensure that the data being written, read, used has access control, monitoring usage and data integrity. Protect the customer’s privacy, frequently data encryption and data anonymization are used.

Last, organizations encounter problems like data integration and system interoperability, and lack of professional assistance in integration processes. In order to tackle these challenges, positive approaches should be implemented by organizations to use the following models: phased implementation strategy in which an organization tests an application of AI in a limited scope in the organization through pilot projects. That is why, in case of identification of interfibrillar incompatibility during the pilot test, the APIs and middleware solutions should take place to resolve the issue. Partnering with external service providers or hiring your own IT personnel is crucial for handling and implementing AI systems rather easily.

5.2 Conclusion

It is important to acknowledge that the AI technologies play an essential role in our life today. Instead of trying to reign in a perceived power of artificial intelligence, we should accept it and look to leverage it. For instance, organizations can use AI technology in business processes for increasing business effectiveness, promoting innovation and, therefore, attaining sustainable competitive advantage. In this report, we have looked at how AI technologies are impacting SIS within the different aspects with a special focus on the logistics sector where automation is fully integrated across the logistics value chain process. Specifically, AI technologies are applied for predictive maintenance, the optimization of routes, better management of warehouses, better customer service experiences and improved operations. It affects the development of the logistics industry and is turning into a necessity to survive in the competitive environment.

But then again, we are aware that any innovation entails certain risks. It is vital to come up with a proper set of rules regarding the implementation of AI technology that would solve the latter issue and approximate different societies to addressing the ethical questions of AI technology; the data security matters should be treated as well, with the observance of such standards as the GDPR. The implementation of phase implementation strategy and the adoption of middleware in the use of AI technology should also be done to enhance integration of the system. Also, integrating with the experts is crucial in order to implement AI without hitch and mitigation of the possible impacts.

In conclusion, AI offers organizations opportunities for innovation and efficiency in an increasingly competitive world by advancing SIS in business processes. The positive effects of AI in SIS are promising, and continuous advancements are expected in the future. However, the associated challenges with integration must be addressed proactively. Only then can organizations fully harness the transformative power of AI and position themselves as market leaders in the logistic industry.

Acknowledgement
This research was not funded by any grant.

References

[1] Zhu, J. "Analysis on the Application of Artificial Intelligence in the Field of Logistics." *Frontiers in Business, Economics and Management* 14, no. 3 (2024): 66-68. https://doi.org/10.54097/3pd01b02
[2] Morandín-Ahuerma, F. "International Journal of Research Publication and Reviews What is Artificial Intelligence?." *Int. J. Res. Publ. Rev.* 3, no. 12 (2022): 5500. https://doi.org/10.55248/gengpi.2022.31261
[3] Carleo, Giuseppe, Ignacio Cirac, Kyle Cranmer, Laurent Daudet, Maria Schuld, Naftali Tishby, Leslie Vogt-Maranto, and Lenka Zdeborová. "Machine learning and the physical sciences." *Reviews of Modern Physics* 91, no. 4 (2019): 045002. https://doi.org/10.1103/RevModPhys.91.045002
[4] Jordan, Michael I., and Tom M. Mitchell. "Machine learning: Trends, perspectives, and prospects." *Science* 349, no. 6245 (2015): 255-260. https://doi.org/10.1126/science.aaa8415
[5] Lary, David J., Amir H. Alavi, Amir H. Gandomi, and Annette L. Walker. "Machine learning in geosciences and remote sensing." *Geoscience frontiers* 7, no. 1 (2016): 3-10. https://doi.org/10.1016/j.gsf.2015.07.003
[6] Iliadis, Lazaros S., Vera Kurkova, and Barbara Hammer. "Brain-inspired computing and machine learning." *Neural Computing and Applications* 32, no. 11 (2020): 6641-6643. https://doi.org/10.1007/s00521-020-04888-6
[7] Cummins, Logan, Alexander Sommers, Somayeh Bakhtiari Ramezani, Sudip Mittal, Joseph Jabour, Maria Seale, and Shahram Rahimi. "Explainable predictive maintenance: A survey of current methods, challenges and opportunities." *IEEE access* 12 (2024): 57574-57602. https://doi.org/10.1109/ACCESS.2024.3391130
[8] Ning, Yihan, and Chongjun Yang. "Intelligent Route Planning Algorithm based on Genetic Neural Network." In *Proceedings of the 3rd Asia-Pacific Conference on Image Processing, Electronics and Computers*, pp. 1035-1038. 2022. https://doi.org/10.1145/3544109.3544405
[9] Sodiya, Enoch Oluwademilade, Uchenna Joseph Umoga, Olukunle Oladipupo Amoo, and Akoh Atadoga. "AI-driven warehouse automation: A comprehensive review of systems." *GSC Advanced Research and Reviews* 18, no. 2 (2024): 272-282. https://doi.org/10.30574/gscarr.2024.18.2.0063

[10] G. Mallesham. “Leveraging AI in Embedded and Extended Warehouse Management for Enhanced Efficiency.” *International Journal of Scientific Research and Management (IJSRM)* 10 (2022): 1–10. https://doi.org/10.18535/ijsrm/v10i6.ec04
[11] Khurana, Diksha, Aditya Koli, Kiran Khatter, and Sukhdev Singh. "Natural language processing: state of the art, current trends and challenges." *Multimedia tools and applications* 82, no. 3 (2023): 3713-3744. https://doi.org/10.1007/s11042-022-13428-4
[12] A. Sharma, K. Upman, D. Saini, and A. Raj. “NLP and Its Application in AI.” *Tuijin Jishu/Journal of Propulsion Technology* 43 (2023): 1–10. https://doi.org/10.52783/tjjpt.v43.i4.2328
[13] Lauriola, Ivano, Alberto Lavelli, and Fabio Aiolli. "An introduction to deep learning in natural language processing: Models, techniques, and tools." *Neurocomputing* 470 (2022): 443-456. https://doi.org/10.1016/j.neucom.2021.05.103
[14] Pugalenthi, R., A. Prabhu Chakkaravarthy, J. Ramya, Samyuktha Babu, and R. Rasika Krishnan. "Artificial learning companionusing machine learning and natural language processing." *International Journal of Speech Technology* 24, no. 3 (2021): 553-560. https://doi.org/10.1007/s10772-020-09773-0
[15] Sodiya, Enoch Oluwademilade, Boma Sonimitiem Jacks, Ejike David Ugwuanyi, Mojisola Abimbola Adeyinka, Uchenna Joseph Umoga, Andrew Ifesinachi Daraojimba, and Oluwaseun Augustine Lottu. "Reviewing the role of AI and machine learning in supply chain analytics." *GSC Advanced Research and Reviews* 18, no. 2 (2024): 312-320. https://doi.org/10.30574/gscarr.2024.18.2.0069
[16] Woschank, Manuel, Erwin Rauch, and Helmut Zsifkovits. "A review of further directions for artificial intelligence, machine learning, and deep learning in smart logistics." *Sustainability* 12, no. 9 (2020): 3760. https://doi.org/10.3390/su12093760
[17] Telikani, Akbar, Amirhessam Tahmassebi, Wolfgang Banzhaf, and Amir H. Gandomi. "Evolutionary machine learning: A survey." *ACM Computing Surveys (CSUR)* 54, no. 8 (2021): 1-35. https://doi.org/10.1145/3467477
[18] Clemons, Eric K. "Information systems for sustainable competitive advantage." *Information & Management* 11, no. 3 (1986): 131-136. https://doi.org/10.1016/0378-7206(86)90010-8
[19] Zhang, Michael J., and Augustine A. Lado. "Information systems and competitive advantage: a competency-based view." *Technovation* 21, no. 3 (2001): 147-156. https://doi.org/10.1016/S0166-4972(00)00030-4
[20] Porter, Michael E. *Competitive Advantage: Creating and Sustaining Superior Performance*. New York: Free Press, 1985.
[21] Benedettini, Ornella, and Andy Neely. "Complexity in services: an interpretative framework." In *23rd annual conference of the production and operations management society (POMS)*, pp. 1-11. 2012.
[22] Hanafizadeh, Payam, and Ahad Zareravasan. "A systematic literature review on IT outsourcing decision and future research directions." *Journal of Global Information Management (JGIM)* 28, no. 2 (2020): 160-201. https://doi.org/10.4018/JGIM.2020040108
[23] Braun, Virginia, and Victoria Clarke. "Using thematic analysis in psychology." *Qualitative research in psychology* 3, no. 2 (2006): 77-101. https://doi.org/10.1191/1478088706qp063oa
[24] Krisknakumari, S. "Artificial intelligence in enhancing operational efficiency in logistics and SCM." *International Journal of Scientific Research in Science and Technology* 11, no. 5 (2024): 316-323. https://doi.org/10.32628/IJSRST24115107
[25] Alizamir, Saed, Kasun Bandara, Ali Eshragh, and Foaad Iravani. "A hybrid statistical-machine learning approach for analysing online customer behavior: An empirical study." *arXiv preprint arXiv:2212.02255* (2022).
[26] Basal, Murat, and Emel Saraç. "Dynamic pricing strategies using artificial intelligence algorithm." *Open Journal of Applied Sciences* 14, no. 8 (2024): 1963-1978. https://doi.org/10.4236/ojapps.2024.148128
[27] Berg, Sigurd A., Soo-Yeon Seo, and Richard HY So. "Application of optical character recognition with Tesseract in logistics management." *International Journal of Internet Manufacturing and Services* 6, no. 3 (2019): 285-304. https://doi.org/10.1504/IJIMS.2019.10022461
[28] Taparia, Vinit, Piyush Mishra, Nitik Gupta, and Hitesh Chandiramani. "Data-driven retail excellence: Machine learning for demand forecasting and price optimization." *Journal of Graphic Era University* (2024): 37-52. https://doi.org/10.13052/jgeu0975-1416.1213
[29] Tian, Tian, Huang Zichen, and Yubing Tang. "Enhancing Organizational Performance: Harnessing AI and NLP for User Feedback Analysis in Product Development." *arXiv preprint arXiv:2405.04692* (2024). https://doi.org/10.62836/iaet.v3i1.203