Examining How Integrated Smart Logistics Ecosystems Enhance E-Commerce Efficiency in the UAE Retail Sector

Ahmad Mohammad Jaffar Hussain Kazim[1], Kamaladevi Baskaran[2]

Abstract

This study examines how integrated smart logistics ecosystems enhance e-commerce efficiency in the UAE's fast-growing retail sector. As digital transformation and evolving consumer expectations reshape the market, companies are turning to smart logistics solutions, combining advanced technologies, last-mile delivery optimization, and collaborative frameworks to improve operational performance. Adopting a quantitative methodology within a positivist and deductive approach, the research analysed data using SPSS through descriptive and correlation techniques. Findings indicate that while AI, IoT, and other smart technologies contribute to logistics efficiency, their direct impact on e-commerce performance is significantly increased when aligned with strong stakeholder collaboration. Collaboration within the supply chain emerged as the most influential factor, enhancing both logistics strategy effectiveness and sales outcomes. The study concludes that logistics technologies must be embedded in a cooperative, integrated ecosystem to realize meaningful improvements. It contributes to e-commerce and logistics by integrating Resource-Based and Supply Chain Integration within a smart logistics framework.

Keywords: *Smart Logistics, E-Commerce Efficiency, UAE Retail, Digital Transformation, AI.*

Introduction

The e-commerce industry within the UAE has witnessed different growth for exponential factors in the previous decade, which has its driven by a population that is tech-savvy, penetration of higher amount of smartphones, and a stronger preference towards internet shopping (Alsibaei et al., 2022).The dynamic consumer behaviour in the region is quite dynamic, which has its combination towards significance of investment in the digital infrastructure, which has encouragement from both international and local players for establishing a proper presence within the UAE market. However, due to the intensification of competition, the efficiency of logistics has emerged as an important aspect in improving and sustaining the sales of e-commerce. The effectiveness of the strategies of logistics is quite fundamental in meeting the expectations of consumers. The UAE has a unique landscape in geography, which has the inclusion rapid expansion in urban areas, as well as regions with different kinds of density populations, which creates logistical challenges, where reliability, speed, as well as seamless delivery has its priority (Faccia et al., 2023).The companies have investments in the advancement of technology, technologies like AI, where automated warehousing, helps in the delivery of solutions in last-mile delivery for operational streamlining, and reduction of cost.

Other than such advancements, where the industry has still faced obstacles, which include

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[1] MBA Research Affiliate, Amity University Dubai, Dubai, UAE. Email: ahmadK@amitydubai.ae

[2] Program Leader – MBA and EMBA, Amity University Dubai, Dubai, UAE. Email: kbaskaran@amityuniversity.ae, (Corresponding Author).

congestion, regulations being quite stringent, and limited availability in the workforce (Jawabri et al., 2019). Moreover, the increasing demands of consumers in the form of next-day deliveries continues its pressure on the supply chain. The thesis has explored the right kind of methods in efficient logistics that drive sales of e-commerce within the UAE retail industry. This study is grounded in the recognition that logistic efficiency plays a pivotal role in shaping the evolving landscape of e-commerce in the UAE's retail sector (Rao et al., 2020). As consumer expectations shift toward faster and more reliable delivery, e-commerce companies are increasingly compelled to optimize and innovate their logistics networks to remain competitive. Given the UAE's unique geographic and urban challenges, ranging from rapid urbanization to complex delivery demands, there is a critical need to understand and analyse the methods that can effectively enhance logistic performance. (Baskaran, 2019 & 2019b). The rationale for this research is further driven by the urgent need to explore how various logistics strategies influence e-commerce sales outcomes. By conducting this study, valuable insights can be generated into the most effective practices for overcoming persistent obstacles such as delivery delays, traffic congestion, and customer dissatisfaction, factors that directly affect market share and sales growth (Zennaro et al., 2022).

The consideration of the retail sector and addressing the logistic efficiency in this e-commerce sector is important due to the UAE's role as the biggest trade hub and commerce hub across the global index. In the UAE, the e-commerce retail industry is one of the fastest growing industries and companies regardless of the size have the tendency to improve logistical operations by integrating long-term strategies and technologies to meet the demand of consumers (Zennaro et al., 2022). In 2023, the United Arab Emirates (UAE) retail industry was estimated to be worth US$30.17 billion. Through 2029, the market is anticipated to expand at a "Compound Annual Growth Rate" (CAGR) of 6.2% (IMARC, 2024). These are additional retail market size projections for the UAE.

The companies in the UAE retail sector faced potential logistical issues regarding urban expansion strict regulation and varied population density. To overcome these challenges, companies need to integrate the tailored strategy view and meeting with the consumer demand of the e-commerce market. The aim of this study is to examine the effective methods of logistics efficiency in enhancing overall e-commerce sales within the context of the UAE retail industry by analysing technological advancements, warehousing strategies, last-mile delivery optimization, and collaborative networks.

Research Questions

How do advanced logistics strategies influence e-commerce sales performance in the UAE retail industry?

To what extent do key customer satisfaction factors—such as product condition upon delivery, overall delivery experience, and the return/refund process—affect e-commerce sales performance in the UAE retail sector?

How are logistics strategies, technology adoption, last-mile delivery performance, and stakeholder collaboration interrelated in enhancing logistics efficiency within the UAE e-commerce sector?

Literature Review

The literature review has the purpose of reviewing the empirical studies on logistical efficacy and its impact on e-commerce retail store sales in developed and developing countries like the UAE. It represents the conceptual framework, logistic operation of the retail sector, strategies included in logistic operation to improve the business model, the integration of technologies and automation that impact consumer satisfaction and logistic operation, etc. The research aim, objective, and hypothesis have been presented in the following Table 1.

No.	Author	Framework	Key Findings	Impact on logistics efficiency
1	(Alsibaei et al., 2022)	B2C E-commerce Systems	Same-day delivery logistics enhance customer satisfaction and operational efficiency, resulting in faster turnover and increased e-commerce sales.	Helps to achieve faster fulfilment and better customer experience.
2	(Faccia et al., 2023)	Innovation and E-commerce	Digital innovations, such as blockchain and IoT, improve process transparency and reduce delays, boosting customer trust and repeat purchases.	Enhances operational transparency and efficiency, leading to higher sales.
3	(Zennaro et al., 2022)	Logistic Perspective	AI integration optimizes inventory management, reduces costs, and ensures quick delivery, directly increasing sales performance.	AI-driven processes reduce lead times and optimize inventory control.
4	(Janjevic & Winkenbach, 2020)	Urban Distribution Models	Last-mile delivery optimization mitigates urban congestion, ensuring reliable and timely deliveries, enhancing customer loyalty.	Ensures smooth last-mile delivery, which is critical to e-commerce growth.
5	(Mohammad et al., 2023)	Last-mile Solutions	Automation and same-day delivery enhance delivery reliability, improving customer retention and repeat orders.	Improves delivery speed and reduces operational delays.
6	(Klumpp & Loske, 2021)	Order Picking Strategies	Warehousing automation reduces	Increases efficiency in order processing and

			order processing time, allowing faster order fulfilment, driving higher sales volumes.	inventory management.
7	(Custodio & Machado, 2020)	Automated Warehousing	Robotics streamline operations and reduce errors, leading to cost savings and increased operational capacity for more orders.	Lowers operational costs and enhances logistics scalability.
8	(Rahman et al., 2022)	Social Network Theory	Collaboration with resellers reduces logistics costs and expands market reach, resulting in increased sales potential.	Strengthens supply chain partnerships and market penetration.
9	(Hu et al., 2020)	AI Route Optimization	AI-based route planning decreases transportation costs and enhances delivery speed, improving profit margins and customer satisfaction.	Optimizes routing strategies to reduce costs and improve delivery accuracy.
10	(Sun et al., 2022)	IoT and Transparency	IoT-enabled tracking provides real-time updates, increasing transparency and customer satisfaction, which drive loyalty and repeat sales.	Enhances trust and order tracking capabilities, leading to customer retention.
11	(Archetti & Bertazzi, 2021)	Inventory Routing Models	Optimized inventory routing reduces delays and ensures product availability, directly boosting sales opportunities.	Improves order fulfilment efficiency and reduces stock shortages.
12	(Escudero-Santana et al., 2022)	Urban Logistics Challenges	Proactive urban logistics solutions reduce delivery incidents, improving service quality and fostering customer confidence.	Addresses challenges related to urban infrastructure, ensuring timely deliveries.

Table 1. Overview of Related Studies

In the context of the UAE's e-commerce retail sector, logistics efficiency is critical to meeting growing customer expectations and maintaining competitiveness in a dynamic market.

According to (Faccia et al., 2023), sustainable growth in e-commerce depends on leveraging logistics innovations—such as AI, IoT, and real-time tracking—to streamline the supply chain and reduce operational frictions. This includes integrating modern strategies, automating operations, improving delivery systems, and ensuring effective collaboration among stakeholders.

Logistics efficiency is achieved through a balanced integration of four interdependent pillars that reflect the typical flow of logistics operations:

• Strategic Logistics Planning – including practices like just-in-time inventory, centralized warehousing, and cross-docking to reduce costs and increase speed.

• Technological Innovation – through the adoption of AI, Blockchain, IoT, robotics, and real-time tracking technologies to enhance automation and transparency.

• Stakeholder Collaboration and Regulatory Alignment – fostering partnerships between retailers, suppliers, logistics providers, and government bodies to enable efficiency and regulatory compliance.

• Last-Mile Delivery Optimization – focusing on delivery speed, reliability, and urban logistics infrastructure to improve customer satisfaction.

When combined, each of these components reinforces the others and contributes to a unified goal of maximizing value and minimizing waste in logistics systems. As illustrated in the visual framework below, they collectively define and drive logistics efficiency.
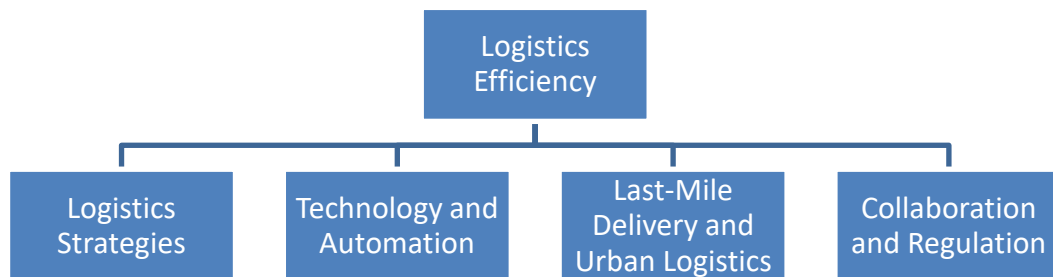

Figure 1.Visual Framework: Pillars of Logistics Efficiency, Source: Self-Made.

As per Figure 1 above, this framework guides the structure of the literature review, where each section delves deeper into how these dimensions contribute to logistics efficiency. The

integration of these components results in operational resilience, reduced lead times, improved customer service, and increased e-commerce sales—key outcomes demonstrated by leading UAE retailers like Noon, Amazon.ae, and Carrefour.com (Jawabri et al., 2019),(Qin et al., 2021), (Majidalfuttaim, 2022)

Logistics Strategies

In the UAE, logistics strategies are integral to the enhanced performance of the e-commerce retail sector. These strategies address operational challenges, optimize inventory management, and ensure efficient order fulfilment. According to (Faccia et al., 2023) sustainable e-commerce growth in the UAE is deeply rooted in technological innovation and logistics streamlining. Social network theory supports the notion that collaboration among suppliers, resellers, and distribution centres enhances market reach and operational efficiency (Rahman et al., 2022). Key variables influencing logistics strategies include inventory management, sales performance, and order accuracy. Specific strategies frequently employed include:

- Just-in-time (JIT) Inventory: Minimizing inventory holding costs by maintaining minimal stock levels and synchronizing inventory replenishment closely with demand, significantly enhancing order accuracy and sales performance by reducing inventory wastage.

- Centralized Warehousing: Consolidating inventory in strategic locations facilitates better inventory management and reduces storage costs. For example, Noon.com maintains shared warehouses and sortation centres, effectively distributing inventory and significantly reducing fulfilment lead times and costs (Qin et al., 2021)

- Cross-docking: Direct transfer of products from incoming transportation to outgoing delivery vehicles without extended storage, reducing handling costs and inventory management complexities.

- Third-party Logistics (3PL): Outsourcing logistics functions to specialized providers to benefit from their expertise, reduce fixed costs, and enhance operational flexibility, thereby improving order accuracy and sales performance.

Noon.com exemplifies successful logistics strategies by utilizing an extensive network of shared warehouses and sortation centres strategically positioned across the UAE. This network enables rapid inventory turnover, minimizes storage requirements, significantly reduces fulfilment lead times, and directly enhances inventory management and order accuracy, positively influencing sales performance (Qin et al., 2021).

Technology and Automation

Technology and automation have significantly transformed logistics operations within the UAE's retail industry, enabling operational excellence and customer-centric outcomes. Specific technologies currently used in UAE logistics include AI-driven demand forecasting, robotic picking systems, blockchain platforms for transparency, and IoT-enabled tracking systems. AI is used extensively for demand forecasting, allowing retailers to predict consumer demand patterns based on real-time and historical data. (Baskaran, 2022) This predictive capability helps reduce overstocking and stockouts, thus improving inventory accuracy and minimizing carrying costs. Robotic picking systems enhance warehousing operations by speeding up order picking and reducing human error, especially during peak demand periods (Custodio & Machado, 2020).

Blockchain technology is being implemented to secure logistics transactions, improve process

transparency, and create tamper-proof audit trails. In the UAE, retailers and third-party logistics providers use blockchain to track goods at each stage of the supply chain, reducing the risks of fraud and administrative delays (Li et al., 2020). IoT-enabled tracking systems allow real-time monitoring of shipments and provide customers with live updates, enhancing service transparency and boosting customer trust and satisfaction (Hu et al., 2024). The operational benefits of these technologies include real-time data collection, predictive analytics for proactive decision-making, and reduced dependency on manual labour. RFID tags and warehouse management systems (WMS) ensure product visibility throughout the fulfilment process, while AI-driven route optimization algorithms reduce fuel consumption and enhance delivery reliability (Sun et al., 2021).

These digital innovations directly support key variables in this study AI, blockchain, IoT, and automation—by improving logistics efficiency, reducing operational costs, and elevating customer satisfaction. As demonstrated by retailers such as Amazon.ae and Noon, the successful integration of these technologies leads to greater agility, more accurate order fulfilment, and measurable improvements in e-commerce performance.

Last-Mile Delivery and Urban Logistics

Last-mile delivery represents one of the most critical and cost-intensive stages in the e-commerce logistics chain, especially in dense urban environments like those found in the UAE. It directly influences customer satisfaction, delivery speed, and overall service quality. Key variables associated with this domain include route optimization, delivery reliability, transportation costs, and customer experience.

To address these variables, UAE retailers are increasingly adopting innovative last-mile solutions. These include:

- **Micro-fulfilment centres:** Strategically placed small-scale warehouses that enable quick dispatch of products to customers. By positioning inventory closer to urban hubs, retailers like Amazon.ae reduce delivery times and support same-day delivery models (Gulfbusiness, 2022).

- **Locker-based delivery systems:** Secure, self-service lockers installed in residential and commercial areas allow customers to collect parcels at their convenience, improving first-attempt delivery success rates and reducing last-mile logistics costs.

- **On-demand delivery apps:** Platforms that enable real-time dispatching of couriers based on proximity and availability. These systems enhance flexibility and responsiveness, especially during peak demand.

- **AI-based route optimization:** Algorithms analyse traffic data, delivery density, and customer availability to dynamically plan the most efficient routes. This not only reduces delivery times but also cuts down fuel usage and operational delays (Hu et al., 2020)

Despite these innovations, several challenges persist. Urban congestion remains a major hurdle in large UAE cities like Dubai and Abu Dhabi, leading to delays and increased transportation costs. Infrastructure limitations, such as insufficient loading zones and traffic restrictions in dense urban areas, further complicate logistics planning. Delivery delays due to customer unavailability or misrouted packages also affect the overall delivery success rate. (Baskaran, 2023 & 2023b)

Retailers have taken strategic measures to overcome these barriers. Amazon.ae, for instance, has

invested in a network of local fulfilment centres to enable faster delivery and streamline last-mile operations (Gulf business, 2022). Carrefour.com launched a strategy offering 30 days of free delivery, supported by a digitally integrated logistics model that improves service accessibility and customer satisfaction (Majidalfuttaim, 2022). These initiatives directly impact variables such as delivery speed, urban logistics performance, route optimization, and customer experience. Efficient last-mile operations enable retailers to enhance customer loyalty through timely and transparent delivery experiences, translating into repeat purchases and higher sales volumes in the UAE's competitive e-commerce landscape.

Collaboration and Regulation

Collaboration and regulatory alignment play pivotal roles in shaping logistics efficiency within the UAE's e-commerce sector. Collaborative logistics models, such as partnerships between retailers, suppliers, and third-party logistics providers, enable improved resource utilization, cost efficiencies, and broader market access (Rahman et al., 2022). From a Resource-Based View (RBV) perspective, such partnerships constitute strategic assets that are valuable, rare, and difficult to imitate, thereby offering sustained competitive advantage (Barney, 1991). A foundational element of effective collaboration is the use of shared distribution centres and integrated logistics platforms. For instance, retailers like Noon.com partner with regional suppliers and logistics providers to co-manage warehousing and transportation infrastructure, leading to lower overhead costs, faster deliveries, and enhanced inventory visibility (Qin et al., 2021). These shared facilities minimize operational redundancies and enhance order accuracy and fulfilment efficiency, particularly in densely populated urban zones.

Moreover, supply chain integration, which includes real-time data sharing, coordinated planning, and joint performance monitoring, has been shown to significantly improve overall logistics performance (Simatupang & Sridharan, 2005). Retailer-supplier partnerships facilitate greater responsiveness by aligning stock replenishment, demand forecasting, and product return cycles. Integrated digital systems also enable real-time communication, allowing for agile decision-making and swift responses to demand fluctuations. (Baskaran, 2020) In parallel, public-private partnerships (PPPs) in the UAE are fostering innovation and infrastructure development within the logistics sector. Government-led initiatives, such as customs digitalization, smart city frameworks, and enhanced free zone regulations, create enabling environments for logistics innovation. However, regulatory challenges persist, including cross-border compliance, customs clearance bottlenecks, and evolving e-commerce data standards.

Together, collaborative practices and regulatory alignment affect critical operational variables including cost reduction, service reliability, market reach, and regulatory compliance. Companies that engage in strategic collaborations while aligning with national logistics policies benefit from greater operational flexibility, reduced compliance burdens, and improved customer experience. (Baskaran, 2014) For example, Carrefour.com leverages both government incentives and private-sector partnerships to implement a digitally integrated logistics model offering features like free 30-day delivery. These collaborations allow Carrefour to serve diverse population zones efficiently and consistently (Majidalfuttaim, 2022). Similarly, collaboration with local and regional suppliers enhances distribution agility and service reliability.

Collaboration is not merely a tactical choice but a strategic enabler of logistics efficiency. It amplifies the capabilities of e-commerce firms by leveraging external resources and aligning them with internal logistics processes. When coupled with coherent regulatory frameworks, collaboration fosters scalable, responsive, and customer-centric logistics networks essential for

thriving in the UAE's dynamic and competitive e-commerce environment.

Customer Satisfaction

Customer satisfaction is both a key outcome and a performance indicator of logistics efficiency. It reflects how effectively logistics systems meet consumer expectations related to order accuracy, delivery speed, product condition, and service transparency. As logistics systems become more optimized and technology-enabled, their influence on customer satisfaction becomes increasingly evident (Sun et al., 2022). In the UAE, e-commerce customers prioritize fast delivery, accurate order fulfilment, real-time tracking, and convenient return policies. Retailers like Amazon.ae and Noon have responded by leveraging technologies such as AI-powered route planning, real-time delivery updates, and automated customer support, all of which enhance user experience and trust (Qin et al., 2021).

Studies such as (Hu et al., 2020) and (Janjevic & Winkenbach, 2020) suggest that improvements in last-mile delivery, inventory visibility, and real-time communication significantly boost customer loyalty. Additionally, warehousing accuracy and efficient returns management contribute to overall satisfaction. Efficient collaboration with third-party logistics providers also ensures higher consistency in service levels, which positively affects perceptions of reliability and quality. As this review demonstrates, the four pillars of logistics efficiency—when well-integrated—create a system that not only supports operational performance but also directly impacts the customer experience, reinforcing brand loyalty and repeat purchases in the competitive UAE e-commerce market.

Literature Gap

The studies on logistics efficiency emphasize the reduction of the cost and even the delivery speed and even the satisfaction level of the customers which are the key drivers in the case of e-commerce success. Limited research focuses on the ways these types of strategies impact the sales associated with e-commerce within the retail industry in the UAE. The current literature addresses the optimization of the "last-mile delivery" and even the opportunities and even the challenges associated with "last-mile delivery optimization." There is minimal research on the ways UAE retail companies utilize technology such as AI and even the IoT to enhance the efficiency of the logistics services that are linked with the performance of the sales. Identifying these gaps would increase the understanding of the logistics in the UAE's e-commerce landscape.

Conceptual Framework

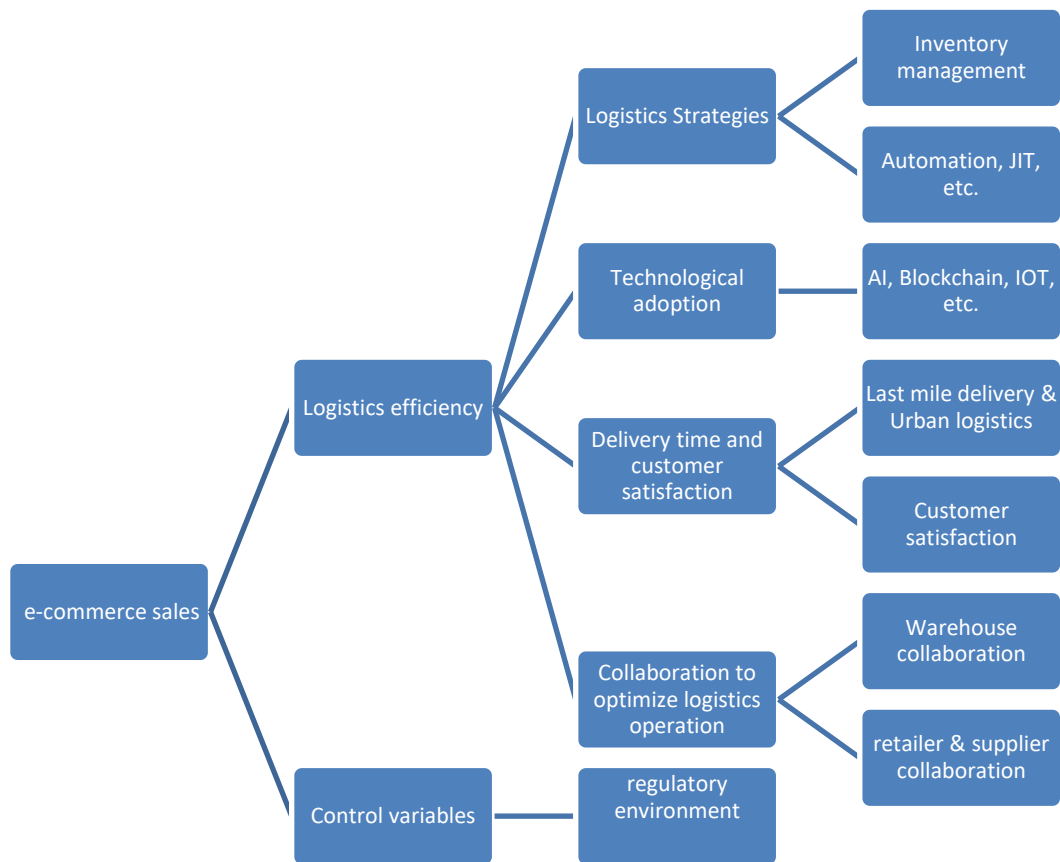The conceptual framework is as follows:

Figure 2. Conceptual Framework, Source: Self-Made.

As per Figure 2 above, the conceptual framework shows how we will use overall Logistics efficiency which is made up of four aspects:

- Logistics strategies.

- Technological adoption

- Delivery time and customer satisfaction.

- Collaboration within the industry

And use them to measure their impact on overall e-commerce sales achieving our 4 objectives and testing our hypothesis, we will also have one control variable in regulatory environment. This conceptual framework aligns with the identified variables and will help achieve the objective of this research.

Research Methodology

This study employed a positivist research philosophy and a deductive approach, aligning with its objective to empirically test hypotheses regarding the influence of logistics strategies, technological innovations, delivery performance, and stakeholder collaboration on e-commerce efficiency in the UAE retail sector. A quantitative survey strategy was adopted to ensure objectivity and statistical rigor. Data were collected through a structured questionnaire with closed-ended questions, distributed electronically via Google Forms. The instrument was designed to capture standardized responses across multiple dimensions including logistics practices, technology adoption, last-mile delivery, collaboration frameworks, and sales performance.

To ensure relevance and depth, a judgmental (purposive) sampling technique was employed, targeting 52 logistics and supply chain professionals from leading UAE e-commerce firms, each with a minimum of five years' industry experience. This approach enabled the collection of high-quality insights from individuals with direct operational knowledge. Ethical standards were rigorously upheld through informed consent, confidentiality assurances, and voluntary participation. The responses were cleaned, coded, and analyzed using SPSS, applying descriptive statistics, and correlation analysis to identify patterns and relationships. This robust methodology provided a solid empirical foundation for understanding how integrated smart logistics ecosystems enhance e-commerce performance in the UAE retail context.

Results and Discussion

The results begin by evaluating the internal consistency of the measurement instruments using Cronbach's Alpha, followed by correlation analysis to explore initial relationships among variables. These insights are discussed in the context of relevant theoretical frameworks such as the Resource-Based View (Barney, 1991) and supply chain integration (Simatupang & Sridharan, 2005)literature, offering both practical implications and recommendations for future research in the UAE e-commerce sector.

Reliability Analysis

Before conducting further statistical procedures, the reliability of the measurement scales was assessed using Cronbach's Alpha(Field, 2018) (Tabachnick & Fidell, 2013). Cronbach's Alpha values above 0.70 are generally considered acceptable for basic research, while values below 0.60, may indicate problematic reliability that should be interpreted with caution (George & Mallery, 2019)

The table below summarizes the reliability analysis results for the five key composite constructs used in the study:

Scale Name	Number of Items	Cronbach's Alpha	Interpretation
Logistics Strategies	6	0.705	Acceptable
Technology & Automation	6	0.785	Good
Collaboration &	6	0.655	Acceptable (Borderline)

Regulation			
Customer Satisfaction	4	0.533	Low (Caution Required)
Last-Mile Delivery & Urban Logistics	3	0.495	Low (Unacceptable for conclusions)

Table 2. Reliability Analysis Summary

As seen in table 2 above, the reliability analysis of the survey constructs revealed varying levels of internal consistency. The Technology & Automation construct, which encompassed all Likert-scale questions related to technology adoption along with the item assessing its perceived impact on sales, demonstrated the highest internal consistency with a Cronbach Alpha of 0.785. Similarly, the Logistics Strategies construct, which included Likert-scale items measuring the effectiveness of implemented logistics strategies and their impact on e-commerce sales, showed an acceptable reliability level of $\alpha = 0.705$, supporting its treatment as a stable composite variable in the analysis.

Descriptive Statistics

Statements	**Most Frequent Response**	**Frequency**	**Unique Categories**	**Total Responses**
The company has been operating in the UAE for...	More than 10 years	21	3	52
The respondent's primary role in the organization is...	Operations Manager	16	9	48
The total number of employees in the company is within the range of...	100–500	19	4	52
The industry segment to which the company belongs is...	Fashion & Apparel	16	10	50
The company's annual revenue falls within the range of...	AED 10–50 million	22	4	50

Table 3. General Information About Participating Companies

As seen in table 3 above, the demographic profile of the surveyed companies and respondents reveals several notable characteristics. A significant portion of the participating firms (40%) have been operating in the UAE for over 10 years, indicating a foundation of established business practices and operational maturity. Most respondents held roles in operations management, which underscores the reliability of the data, as these individuals are likely to have direct, hands-on experience with logistics and supply chain activities. In terms of organizational size, most companies employed between 100 and 500 staff members, classifying them as mid-sized enterprises within the UAE market. Industry representation was led by the Fashion and Apparel sector, which aligns with the sector's high reliance on e-commerce platforms for customer engagement and fulfilment. Additionally, the revenue distribution revealed that most

firms reported annual earnings in the AED 10–50 million range, suggesting a solid market presence, though not at the scale of large multinationals.

Strategy	Mean Rating	Std. Dev	Min	Max	Most Frequent Rating
Other Strategy	5.00	0.00	5.0	5.0	5
Just-in-Time Inventory	4.26	0.90	1.0	5.0	5
Automation & AI-driven Logistics	4.16	0.99	1.0	5.0	5
Efficient Last-Mile Delivery	3.88	1.09	1.0	5.0	4
Warehousing & Fulfilment Optimization	3.62	1.16	1.0	5.0	4
Third-Party Logistics (3PL) Partnerships	3.57	1.23	1.0	5.0	4

Table 4. Logistics Strategies

As seen in table 4 above, the analysis of logistics strategies revealed varying perceptions of effectiveness among the surveyed companies. Third-Party Logistics (3PL) was rated the least effective, with an average score of 3.57, suggesting it may be either less impactful in the UAE context or inconsistently implemented across firms. In contrast, Just-in-Time inventory systems and Automation/AI-based strategies emerged as the most effective approaches, receiving the highest average effectiveness ratings. Last-Mile Delivery and Warehousing strategies fell within a moderate effectiveness range, though respondent ratings showed considerable variation, possibly reflecting differences in execution or infrastructure capabilities. In addition to the predefined strategy options, several companies reported using alternative logistics practices, such as delivery process automation, real-time tracking, capacity planning, FIFO and LIFO inventory methods, Incoterms compliance, and green logistics initiatives. While some of these may conceptually overlap with the broader category of Automation and AI, others, particularly those focused on sustainability or international trade practices, represent distinct strategic directions. Interestingly, these "other strategies" were rated consistently with an effectiveness score of 5, underscoring their potential relevance and value for future research and practical adoption. These insights can be used to recommend investing in in-house operational technologies and lean practices, while reevaluating third-party partnerships for consistency and service level expectations.

Inventory Management Method	N	Mean Rating	Std. Dev.	Min	Median (50%)	Max
Third-party warehousing solutions	15	1.40	1.06	0.0	1.0	3.0
Automated inventory management software	31	1.26	1.21	0.0	1.0	3.0
Manual tracking	4	0.75	1.50	0.0	0.0	3.0
Mixed auto + manual	1	0.00	—	0.0	0.0	0.0
SAP WMS + RFID	1	0.00	—	0.0	0.0	0.0

Table 5. Inventory Tracking and Stock Shortages

As seen in table 5 above, the analysis of inventory management methods and their relationship to stock shortage frequency revealed distinct performance differences across approaches. Third-party warehousing recorded the highest average frequency of stock shortages, with a mean of 1.40 shortages per month, indicating potential limitations in external inventory control or communication lags. Automated inventory software emerged as both the most widely adopted system and a relatively effective solution, with a lower monthly stock shortage mean of 1.26. Interestingly, manual tracking methods demonstrated the lowest average stock shortage frequency at 0.75, though this result must be interpreted cautiously due to the small number of firms (4) using this method, resulting in higher variability. Additionally, two companies reported using custom or hybrid inventory systems, such as SAP WMS integrated with RFID or other mixed-method approaches, highlighting that some firms adopt tailored inventory control solutions to meet specific operational needs

Technology	Mean Rating	Std. Dev.	Min	Max	Most Frequent Rating
AI Route Optimization	4.67	0.58	4.0	5.0	5
Barcode and QR-based tracking systems	4.32	0.89	1.0	5.0	5
RFID-based Smart Warehousing	4.11	0.95	1.0	5.0	4
Real-time Order Tracking (Mobile/Web)	4.04	0.92	1.0	5.0	4
Automated Sorting and Fulfilment Tech	3.94	1.07	1.0	5.0	4
Robotics/AGVs in Warehousing	3.89	1.31	1.0	5.0	5

Table 6. Technology Adoption and Automation

As seen in table 6 above, the evaluation of technological tools used in logistics operations revealed clear preferences and performance trends among UAE-based firms. AI-based route optimization emerged as the most effective technology, with a near-perfect mean score of 4.67 and minimal variability, indicating widespread confidence in its ability to enhance route planning and last-mile delivery efficiency. Barcode and QR code tracking systems also received strong ratings, with a mean of 4.32, underscoring their continued importance in ensuring operational visibility and inventory traceability. In contrast, robotics and automated guided vehicles (AGVs) were perceived as the least effective technology in relative terms, with a lower mean score of 3.89 and the highest standard deviation among the technologies assessed. This suggests divergent experiences across companies, likely reflecting differences in adoption levels, implementation maturity, or cost-benefit outcomes associated with these advanced automation tools. The above shows how technology when adopted and applied to logistics will still be highly effective as the least effective still had a mean of 3.89.

Customer Experience Area	Mean Rating	Std. Dev.	Min	Max	Most Frequent Rating
Product condition upon	4.15	0.92	1.0	5.0	5

delivery					
Overall delivery experience	3.96	0.94	1.0	5.0	4
Return and refund process	3.94	1.02	1.0	5.0	4

Table 7. Customer Satisfaction

As seen in table 7 above, the customer satisfaction indicators revealed generally positive feedback across multiple service dimensions, with product condition receiving the highest average rating of 4.15. This suggests that firms maintain consistent fulfilment standards and effective quality control throughout the logistics process. Delivery experience and refund procedures followed closely, with average scores ranging from 3.94 to 3.96, though these areas exhibited greater variability (standard deviation around 1), indicating inconsistencies in execution across firms. While all satisfaction metrics exceeded a 3.9 average, none achieved perfect ratings, highlighting opportunities for improvement—particularly in areas such as delivery communication, ease of returns, and policy transparency to further enhance customer experience.

Impact Factor	Mean Rating	Std. Dev.	Min	Max	Most Frequent Rating
Logistics Strategy Implementation	4.25	0.93	1.0	5.0	5
Collaboration with Supply Chain Partners	4.18	1.05	1.0	5.0	5
Use of Technology in Logistics	3.80	1.02	1.0	5.0	3
Inventory Management Improvements	3.78	1.05	1.0	5.0	3
Delivery Optimization	3.65	1.04	1.0	5.0	4

Table 8. Ecommerce Sales Impact

Participant responses indicated that the implementation of logistics strategies was perceived as the strongest driver of e-commerce sales, with a mean score of 4.25. This was closely followed by collaboration with supply chain partners, which also received a high effectiveness rating (mean = 4.18), reinforcing the importance of integrated, cooperative logistics frameworks. In contrast, other factors such as technology adoption, inventory management practices, and delivery optimization were rated as having a moderate impact, with mean scores ranging from approximately 3.6 to 3.8. These elements also showed greater variability in responses, suggesting that benefit realization from these initiatives may differ significantly between firms, likely due to variations in implementation depth, technological maturity, or operational alignment.

Relationship Between Logistics Efficiency Variables

To examine the relationships between key variables in the study, a Pearson correlation analysis was conducted. This analysis explores the strength and direction of linear relationships between the computed constructs: logistics strategies, technology adoption, last-mile delivery and customer satisfaction, and collaboration benefit. The results are shown in the table below:

Variables	Logistics Strategies Effectiveness	Technology & Automation Effectiveness	Last-Mile Delivery & Customer Satisfaction	Collaboration Benefit
Logistics Strategies Effectiveness	1.000	.415**	.597**	.779**
Technology & Automation Effectiveness	.415**	1.000	.245	.394**
Last-Mile Delivery & Customer Satisfaction	.597**	.245	1.000	.672**
Collaboration Benefit	.779**	.394**	.672**	1.000

Table 9. Relationship Between Logistics Efficiency Variables

Note: All correlations significant at $p < .01$ (2-tailed), except where noted.

As seen in table 9 above, the correlation analysis revealed several moderate to strong positive relationships among key variables, highlighting the interconnected nature of logistics practices in the UAE e-commerce sector. Collaboration benefit demonstrated a strong and statistically significant correlation with logistics strategies effectiveness ($r = .779$, $p < .001$), as well as with last-mile delivery and customer satisfaction ($r = .672$, $p < .001$), suggesting that effective collaboration enhances both strategic execution and end-customer experience. Additionally, collaboration was moderately correlated with technology and automation effectiveness ($r = .394$, $p < .01$), indicating that firms that collaborate well also tend to utilize advanced technologies more effectively. Meanwhile, logistics strategies effectiveness showed a moderate positive correlation with technology adoption ($r = .415$, $p < .01$) and a stronger correlation with last-mile delivery performance ($r = .597$, $p < .001$), reinforcing the idea that strategic logistics planning is closely linked to both technological capability and delivery efficiency. These findings underscore the interdependent nature of logistics functions, where improvements in one area often support performance gains in others. These findings suggest that companies perceiving high collaboration benefits also tend to report higher effectiveness in logistics strategies and other operational dimensions. This supports theoretical expectations from supply chain integration literature (Simatupang & Sridharan, 2005) and the resource-based view (Barney, 1991), where external and internal capabilities reinforce each other.

Conclusion

This study explored the interplay between logistics strategies, collaboration, technology, and regulatory dynamics in influencing e-commerce sales performance in the UAE retail sector. Grounded in the Resource-Based View (RBV) and Supply Chain Integration (SCI) theories, the research examined how logistics efficiency can be leveraged to enhance competitive advantage in the digital marketplace. The findings revealed that while logistics strategies and technologies such as Just-in-Time systems, automation, and AI are widely adopted and positively perceived, their standalone impact on e-commerce sales was limited. In contrast, collaboration with supply chain stakeholders consistently emerged as the strongest predictor of both logistics' strategy effectiveness and e-commerce performance. The results highlight that logistics efficiency

requires a collaborative and integrated framework to achieve meaningful business outcomes. While the UAE's supportive regulatory environment did not significantly distort performance, firms must remain agile in adapting to policy shifts. Practical recommendations emphasize the strategic importance of collaboration, the need for synchronized logistics-technology investment, and the development of cross-functional coordination mechanisms. Finally, the study contributes to theory by empirically validating that logistics resources become impactful only when embedded in collaborative structures, reinforcing the combined value of RBV and SCI frameworks in logistics and supply chain research. These insights provide a foundation for both academic inquiry and practical transformation in the UAE's evolving e-commerce landscape.

Recommendation

Based on the study's findings, the following actionable recommendations are proposed:

Prioritize Strategic Collaboration

Firms should build long-term partnerships with suppliers, logistics providers, and resellers to enhance agility, responsiveness, and customer service consistency.

Align Logistics Strategies with Collaboration Frameworks

Tactics such as Just-in-Time and centralized warehousing are most effective when implemented within a collaborative supply chain ecosystem.

Leverage AI Route Optimization and Automation Selectively

While technologies such as AI and blockchain are perceived as beneficial, firms must ensure proper integration with logistics operations and customer experience touchpoints.

Invest in supply chain visibility and data-sharing tools

Real-time dashboards and inventory management systems will support more coordinated decision-making among logistics partners.

Address last-mile and urban delivery challenges proactively

Utilize micro-fulfilment centres, locker delivery options, and route optimization to overcome delivery delays and urban congestion.

Future scope

The study opens several avenues for future research:

Expanding beyond internal perspectives

This study focused on the views of logistics professionals. Future research could incorporate customer perspectives to measure satisfaction and loyalty more robustly.

Longitudinal studies on technology adoption

The current data may not fully capture the time-lag effect of adopting AI, IoT, or blockchain on logistics performance. A longitudinal approach could provide deeper insights.

Sector-specific logistics strategies

Analysing logistics efficiency in specific segments such as grocery, electronics, or fast fashion could reveal nuanced strategies.

Multi-country comparisons

Comparative studies between the UAE and other Gulf Cooperation Council (GCC) countries could help generalize findings and identify regional logistics trends.

Simulation or optimization modelling

Applying operations research techniques to simulate logistics strategy performance under various collaboration or urban infrastructure scenarios could support strategic planning.

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