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Embracing AI in logistics: A pathway to improved operational efficiency and strategic decision-making in Dubai logistics firms

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Abstract
The study looks at how artificial intelligence in manufacturing affects risk assessment, cost reduction, and efficiency in Dubai's logistics industry. We used the structural equation modelling approach for the replies of 304 respondents, categorizing them based on their work status and years of service. According to the findings, the application of A.I. increases logistics efficiency by optimizing process operations and eliminating time loss caused by operational procedures. Furthermore, predictive analytics enables artificial intelligence to minimize costs by better managing demand and inventories. A.I. improves strategic decision-making, enabling logistics managers to make timely data-driven choices. The study also finds that if a company has a strong digital infrastructure, technical preparation will act as a mediating factor, amplifying the impact of A.I. on risk management. When employing the greatest potential A.I., comparison studies with other recent research emphasize the need to focus equally on workforce and technological preparedness. The research indicates that Dubai's industrial enterprises need investment in digital infrastructure, AI-specific training, and ongoing system review. This will enable enterprises to harness A.I. to create a better, more efficient, and competitive logistics environment by encouraging industry cooperation in developing A.I. standards.

Keywords: Artificial Intelligence, decision-making, risk management, cost-cutting, logistics efficiency and technological preparedness

Introduction
The logistics industry is witnessing massive change owing to the tremendous pace of Artificial Intelligence (A.I.) technology. Introducing AI-based tools such as Blockchain, Deep Learning, IoT, Smart Contracts, and specific software helps integrate multiple processes within one system and reduce costs while improving efficiency. This process is thus changing job roles and employment, focusing on other important issues such as over-data privacy concerns, security, and ethics (Villanueva-Eslava *et al*., 2023) [32]. As a result, logistics plays a key role in supply chain performance and customer satisfaction by coordinating several tasks to ensure timely delivery of goods and services. Effective logistics operations minimize lead times, maximize supply chain flexibility, and enable businesses to respond nimbly to changes in the market environment. One strategy to reduce supply chain costs is to use efficient logistics techniques at every level, such as simplified warehouse operations, efficient inventory management, and optimal transportation routes. A.I. technology that involves machine learning, natural language processing, computer vision, and robotics is causing a revolution across industries, redefining traditional business processes and unlocking new possibilities (Soumpenioti & Panagopoulos, 2023) [29]. A.I. optimizes inventory management, predicts and identifies demand forecasting, reduces transportation costs, and improves delivery times for the logistics industry. Warehouse operations, too, are being revolutionized with AI-powered automation, streamlining processes and proving to be accurate in sorting, picking, and packing. Nevertheless, data privacy, security, and ethics concerns surface as A.I. continues to conquer the logistics industry. Since 1971, it has been the gateway to international trade. It has witnessed such pivotal moments as when the country was formed in 1971, Port Rashid was completed in 1972, Jebel Ali Port was established in 1978, and the Port Authority of Jebel Ali was founded in 1979 (Sundarakani, 2018) [30].

The establishment of the Jebel Ali Free Zone (JAFZA) in 1985 was a significant tribute to the United Arab Emirates. In 1991, the merger of Port Rashid and Jebel Ali Port established the Dubai Port Authority (DPA). DPA was one of the top 10 busiest ports in the world when the nation was ready to expand, and Jebel Ali handled more than half of the global container trade. The Dubai logistics industry is set to revolutionize with an integration of Artificial Intelligence. The city's strategic location and infrastructure development have facilitated the city with various benefits from A.I. technologies, increasing its operational efficiency in numerous processes and better customer satisfaction (Ergalieva, 2024) [12]. Besides automation, A.I. helps logistics via route optimization, real-time tracking, and predictive analytics. Which helps manage complex logistics firm supply chains that can be used to predict fluctuations in demand, optimize the usage of resources, and decrease operational costs. Domestic manufacturing, import and export trading, agriculture and service sectors of Dubai's logistics market of $23.4 billion contributed to its growth (Chirag, 2024) [7]. Freight forwarding accounts for 63%, transportation 18%. Warehousing, VALS, and package and cross-docking account for 14.2% and 4.1% respectively. The road network construction across the Emirates and the GCC-wide railway network with dedicated freight lines are examples of infrastructure development that will increase logistics effectiveness. The Dubai logistics sector is expected to rise by $27 billion due to the expansion of import and export companies.

A.I. is now transforming logistics via material handling and automated warehousing. AI-based predictive analytics guarantees increased accuracy and speed in inventory control and demand forecasting. Machine learning and sophisticated algorithms increase productivity and lower transportation expenses. Predictive maintenance can be made possible through A.I. to allow for proper time repair of the equipment (Thenmozhi & Krisknakumari, 2024) [31]. Also, it improves customer experience when using chatbots and tracking systems in real time. AI-identified strategic possibilities may give companies a competitive advantage by enhancing decision-making, reducing costs, and increasing operational flexibility. The theoretical weaknesses of inventory management practices notwithstanding, they have been shown to enhance operational performance. The connection between operational efficiency and inventory management is built on profit maximization or cost minimization, with customer satisfaction as the ultimate objective (Jawabri *et al*., 2019) [17]. Excess inventory can create burdens in terms of cost and damage, spoilage, and poor management; meanwhile, low inventory results in manufacturing problems and failed customer service. Additionally, careless management, inaccurate forecasts, inattentiveness, subpar procedures, and haphazard scheduling might result from having too much inventory. This is why inventory management is significant in terms of operational efficiency.

Firm strategic decisions in logistics are demand forecasting, supply chain visibility, carrier relationships, market analysis, performance measurement, data requirements, and goals and objectives. Demand forecasting indicates market trends and consumer preferences, while supply chain visibility optimizes inventory levels, working capital, and overall logistical costs. Carrier relationships concern the identification of core carriers to enhance quality commitment for service and bargaining powers. Market analysis gives insights into the logistics sector, while performance measurement ensures high service levels under uncertain conditions (Little, 2023) [21]. Data needs include lead times, quality measurements, supplier performance, transportation costs, demand trends, inventory levels, operational levels, and customer feedback. Logistics managers make three strategic choices: inventory centralization against decentralization, push versus pull inventory deployment logic, and make-to-order versus make-to-stock. In order to control cost, customer service, and unpredictability, it is crucial to manage these choices nationally and globally. These factors encompass demand, operational, and product-related aspects, while distribution management strategies such as inventory centralization and reorder planning serve as determinants. Understanding those linkages may impact current logistics management strategies such as just-in-time (JIT), effective customer response, and vendor-managed inventory. This will make the strategic decisions for the logistics companies operating within the jurisdiction of Dubai to become ever so much more hub-focused - a position Dubai itself has as the global centre for trade. With an ultra-modern infrastructure system that sustains and provides supporting comfort within the business environment, Dubai bridges the world with its great location as an appealing region to logistics companies (Kashyap & Zone, 2023) [19]. This scenario involves using cutting-edge technology such as blockchain integration, data analytics, and artificial intelligence (A.I.) to mould the operational strategy with informed decisions on improvement in efficiency and competitiveness. Dubai companies embracing this shifting logistics landscape will optimize the supply chain management to better customer services with the added cooperation of stakeholders. These difficulties include deployment costs, data security measures, and the need for qualified staff to manage A.I. systems. However, regional leaders understand the value of A.I. in maintaining their competitive edge and satisfying the highly dynamic logistical demands of a changing economy. This study examines the strategic effects of A.I. on the operational effectiveness of logistics companies in Dubai. This research will analyze real-world applications to reveal how A.I. can drive performance improvements, foster innovation, and position logistics firms for successful long-term performance in an increasingly interconnected global marketplace.

Literature Review

(Boute & Udenio, 2021) [5]. Artificial Intelligence (A.I.) is transforming logistics and supply chain management by offering novel options for decision-making. This may be accomplished using digital logistics apps and Internet of Things technology. Artificial intelligence can streamline procedures and augment human talents. Nonetheless, it is not anticipated that it will replace the function of logistics planners since A.I. enhances and amplifies human competencies. This chapter explores the capabilities of A.I. in logistics and supply chain management. (Islam Mozumder *et al*., 2024) [16]. The development of artificial intelligence (A.I.) is making logistics a more intelligent and secure industry. We have examined the use of A.I. in logistics systems, focusing on machine learning and predictive modelling. It emphasizes how A.I. can improve productivity and streamline logistical procedures. The

logistics framework for digital goods forwarding considers A.I. applications and explains how they revolutionize supply chain management. (Woschank *et al*., 2020) [33]. Interconnectivity, digitization, and automation were the main focuses of Industry 4.0, with artificial intelligence playing a crucial role in enabling projects related to Smart Production and Smart Logistics. This examines the scholarly literature on artificial intelligence, machine learning, and deep learning about industrial businesses' use of smart logistics management. Insights for upcoming research projects in A.I., ML, and deep learning in smart logistics are provided by this conceptual framework. The results may direct further study and advancement in this area. (Richey *et al*., 2023) [26]. A.I. can completely transform supply chain management and logistics. However, issues like mass unemployment and academic integrity still exist. Little study has been done on how A.I. interacts with the industry. This editorial aimed to close this gap by summarising the uses of A.I., examining implementation issues, suggesting a strong research foundation for further study, and offering thorough advice and methods for negotiating the challenging terrain of A.I. integration. (Shatat & Shatat, 2023) [27]. Examined and evaluated the potential, drawbacks, and advantages of using artificial intelligence (A.I.) in logistics. It lists 44 companies that use A.I. in their operations successfully. According to the data, A.I. significantly influences logistics management by enhancing supply chain operations, operational performance, resource allocation, and decision-making procedures. Suggests methods for integrating A.I. technologies into logistics management to close the technological gap and maximize its benefits, improving logistics business organizations' competitiveness, performance, and cost savings. (Fosso Wamba *et al*., 2022) [14]. The essay explored operations and supply chain management (OSCM) and artificial intelligence (A.I.). Focusing on businesses already utilizing A.I. and providing insights from real experience. In addition to this, it presented a selection of papers. It offered research paths for academics and practitioners to enhance the awareness of OSCM among industry practitioners and policymakers.

(Dash *et al*., 2019) [11]. Supply chain is essential to the success of every firm, and precise inventory forecasts provide a competitive edge. Internal and external factors, such as the growth of the distribution network and the launch of new goods, affect the supply chain's success. Businesses may use artificial intelligence (A.I.) to improve R&D, boost production with lower costs and improved quality, market goods, improve customer experiences, and make 100% accurate estimates. Real-time monitoring, error-free manufacturing, effective designs, and quicker market innovation are all made possible by AI-powered technology. (Culot *et al*., 2024) [10]. Investigated the effects of artificial intelligence (A.I.) on business and society regarding supply chain management (SCM). Current technical techniques, application areas, data needs, technology deployment procedures, inter-organizational integration, and performance consequences are all covered. Contextual aspects in the literature are also highlighted in the review. Reducing hype and highlighting pertinent prospects for further study aims to compile current research findings for a management audience. (Solanki & Jadiga, 2024) [28]. Because A.I. offers efficiency, reliability, and strategic planning, it transforms logistics and transportation. Among the machine learning methods used to improve delivery routes are deep reinforcement learning, optimization, simulation, predictive modelling, increasing demand forecasts, and creating autonomous technologies like self-driving cars and robotic warehouse automation. However, companies must concentrate on data-centric, analytical decision-making to properly use A.I. in supply chains. (Ashok & Rajesh, 2020) [1]. The Arab region's logistics industry is growing quickly, and the UAE is seeing a mix of established firms and new ventures. Attracting newcomers via technology and internet expansion is the problem. The United Arab Emirates is an international transit centre due to its growing commerce, economic recovery, development, transportation infrastructure, and geographic position. Outsourcing is a sizable business with increased customer satisfaction and lower shipping costs. (Purohit & Kumar, 2013) [24]. Investigated the technological hazards that Dubai-based logistics supply chain businesses (LSCC) encountered as manufacturing in the Middle East shifted from the West to the East. The need for storage facilities and the increase in freight volumes have made it increasingly important for logistics executives to anticipate and mitigate these risks. The exploratory survey revealed the degree, length, speed, warning, and severity of each technological risk.

(Fernandes & Rodrigues, 2009) [13]. We evaluated Dubai's potential as a logistics hub by comparing its performance to Singapore's top-ranked country. It points to exorbitant rents and operating expenses, a lack of employee logistical expertise, and the need to promote e-commerce. The report also identifies possible obstacles to Saudi Arabia, Egypt, Kuwait, and other regional rivals. The report suggests tackling inflation, professional skill development, financial sector growth, government regulation, and the development of public institutions and the financial sector to enhance Dubai's standing as a logistical centre. (Csaszar *et al*., 2024) [9]. Potential applications of artificial intelligence (A.I.) in enterprises' strategic decision-making (SDM) have been explored. It demonstrated how large language models can generate and evaluate plans similar to those of investors and entrepreneurs and how artificial intelligence (A.I.) can enhance current methods. The research also examined how it may affect important cognitive functions, including aggregation, representation, and search. As A.I. capabilities advance, the final effect on business performance is contingent upon competitive dynamics. (Kaggwa *et al*., 2024) [18]. The study examined how artificial intelligence (A.I.) has transformed strategic business decision-making, arguing that A.I. is more than just a technical tool but a strategic asset that rethinks corporate decision-making. Business development has determined that A.I. is a crucial element, offering opportunities for productivity and innovation. The research suggested integrating A.I. in a balanced way that aligns with strategic goals and core values. (Chongcs *et al*., 2023) [8]. Importance of A.I. in strategic decision-making, emphasizing its capacity for organizational agility and data-driven innovation. However, issues like integration, data security, and ethical concerns remain. Supply chain risk management, or SCRM, is an essential corporate technique that guarantees performance and company continuity. However, many organizations overlook its importance, limiting its early identification and prediction of risks. Artificial intelligence (A.I.) is a top business priority, particularly post-COVID-19 scenarios. Understanding the intersection of SCRM and A.I. is crucial for understanding its business value and preparing for future

risks. Modern A.I. techniques are being applied across various aspects of SCRM, using structured and unstructured data from enterprise digital systems (Paul, 2022) [23]. With the rise of cloud technology, big data platforms, and open-source A.I. tools, businesses are developing solutions to address these challenges. In addition to ensuring compliance, managers must comprehend A.I. applications and foster an AI-ready culture. Future studies could examine best practices for integrating A.I., industrial effects, and novel A.I. applications. (Open & The, 2020) [22]. Strategic commercial decision-making using artificial intelligence (A.I.), emphasizing the need for further study. It covered the competitive aspect of these choices and the lessons learnt from using A.I. in defence. The piece also covered the social ramifications for the public sector and the practical repercussions for big corporations since they need to recognize hazards and make services available.
(Bag *et al*., 2021) [3]. Impact of artificial intelligence-driven by big data on knowledge generation in the mining sector of South Africa. Using Knowledge Management Theory, it demonstrated how A.I. has a major effect on generating knowledge by users, customers, and external parties. This influences reasonable decision-making, B2B marketing, and business success. The results indicated that A.I. may greatly improve B2B marketing decision-making processes. (Caleb, 2024) [6]. Emphasized technical concerns like data quality and system integration when discussing businesses' difficulties using A.I. technology. Concerns about ethics, excessive expenses, reluctance to change, and a shortage of competent workers were among the organizational problems. To combat these, it is recommended to use strategic methods such as developing a strong data foundation, investing in expertise, encouraging creativity, and drafting a transparent roadmap for A.I. adoption. (Raftopoulos, 2024) [25]. Examined the organizational obstacles to deploying and adopting A.I., exposing intricate relationships between performance results, implementation, strategic decision-making, and enablement. It helped establish a theory and a conceptual model for navigating the adoption and use of A.I. technology by identifying five thematic clusters that impact project success and value generation. (Impact & No, 2024) [15]. Explored the difficulties in implementing A.I. in businesses, emphasizing the need for strong leadership to overcome supply-demand imbalances, implementation problems, and strategy misalignment. It used topic modelling, the technology-organization-environment (TOE) framework, Upper Echelons theory, and secondary data from 66 white papers to find the most important factors affecting A.I. integration. The results provided executives with tactical advice on best using A.I.'s promise. (Azar & Haddad, 2019) [2]. The Cooperation Council for the Arab States of the Gulf (GCC) expects artificial intelligence (A.I.) to generate $15.7 trillion in revenue by 2030. GCC nations must shift from being only adopters of A.I. to developers to remain globally competitive, investing in local human resources for financing, research, and innovation. This event draws people from various disciplines and examines A.I.'s present condition, potential, and difficulties in the GCC. (Li *et al*., 2023) [20]. Big data analytics and supply chain integration significantly improved supply chain performance during the COVID-19 pandemic. Surveying 323 logistics firms in 26 countries and interviewing 55 firms, the researchers found that these technologies enhance proactive, reactive, and resource reconfiguration capabilities, leading to innovation and disaster immunity. They also contributed to supply chain risk management by developing a three-level hierarchy of capabilities framework and identifying a mechanism linking big data and big disasters. (Baryannis *et al*., 2018) [4]. Reviewed supply chain literature on Supply Chain Risk Management (SCRM) using A.I. approaches. It looks at how to define, classify, and group the body of existing literature using A.I. approaches. In addition to identifying gaps and uncharted territory, the study suggests future research topics at the nexus of SCRM and A.I. The paper also explores potential research directions.

Research gap

Despite many studies on integrating A.I. in logistics, a research gap exists regarding its impact on operational efficiency, cost reduction, and decision-making in Dubai's manufacturing logistics firms. Most existing research provides general benefits and challenges of A.I. in logistics. Still, it does not consider specific factors regarding Dubai's technological readiness and regulatory framework that might impact how AIA.I. Works towards improving logistic outcomes. The role of technology preparedness as a mediator in the relationship between A.I. and logistics risk management has not received enough attention, especially in the context of high volumes and competitive pressures defining manufacturing sectors within Dubai. Bridging such gaps will yield relevant insights into A.I. adoption at regional levels, and it will be easier for logistics firms in Dubai to exploit the advantages of A.I., encompassing both strategic and operational benefits and associated dangers. The main goal of this study is to examine the use of A.I. in logistics and its effects on increased operational effectiveness and strategic decision-making among logistics companies in Dubai. The particular goals are to:

1. To examine the effects of A.I. adoption on logistics efficiency in Dubai's manufacturing firms.
2. To discuss the influence of AI-based predictive analytics on reducing logistics costs for firms manufacturing in Dubai.
3. To investigate how A.I. influences decision-making within logistics operations in Dubai manufacturing firms.
4. To establish whether AIA.I. has influenced risk management within logistics within Dubai manufacturing firms, which is mediated by technological Readiness.

Given the previously mentioned, the primary hypothesis driving this investigation is presented as follows;

- **H1:** A.I. integration positively impacts the logistics efficiency of manufacturers in Dubai.
- **H2:** A.I. integration significantly affects cost reduction within logistics operations in the manufacturing industry in Dubai.
- **H3:** A.I. integration positively impacts logistics decision-making among Dubai's manufacturing firms.
- **H4:** Technological Readiness mediates the relationship between A.I. integration and risk management in logistics, thus enhancing proactive management of logistics risks.

Methodology: This study employs a quantitative one, with a correlational strategy, to explore how A.I. logistics affects

operational efficiency decision-making in logistics operations within Dubai-based manufacturing firms. This research focuses mainly on the statistical relationship between A.I. integration logistics and key operational factors, such as technological Readiness, as the mediating variable in risk management. The study aims to provide insight into how the adoption of A.I. contributes to improving logistics efficiency, cost-effectiveness, and strategic decision-making within the dynamic environment of Dubai's manufacturing sector. The research focuses on manufacturing firms in Dubai, where logistics operations are crucial in maintaining competitive advantage. Given the diversity in firm size and sector within the manufacturing industry, this setting offers a strong opportunity to understand the impacts of A.I. adoption across various logistical practices. We will use a stratified random selection approach to select a sample of 250 logistics managers and executives from these companies. This way, the sample will cover all sectors and account for differences in firm size, technological capability, and the type of industry, thereby increasing the reliability and generalizability of findings within the industry. Structured questionnaires shall be used to suggest data on respondents' views regarding A.I. integration into logistics. The questionnaire has sections targeting targeted areas that analyze various factors influenced by A.I., including cost reduction, risk management, operational efficiency, and the quality of decision-making, focusing on technology readiness as a risk management mediator. It provides crucial elements in a survey, such as the A.I. Integration Scale, meant to establish the depth or extent of A.I. firms use in their decision-making, predictive analytics, and cost management. Further down the line, this element provides scales dedicated to logistics efficiency, cost reductions, and strategic decisions taken. In addition to all these, there is an independent Risk Management Scale paired with a Technological Readiness component, which will be utilized to explore how A.I. impacts the overall proactive risk management across any firm, considering technological Readiness. Each scale had to be a 5-point Likert scale, with multiple items that precisely capture the respondents' views. Data analysis will be carried out through the hypothesized relationships. It will be supported by SEM using the AMOS, which examines the regression effect of technological Readiness as depicted by A.I.'s influence over the risk management of the given manufacturing industry in Dubai, as shown below in the conceptual framework.

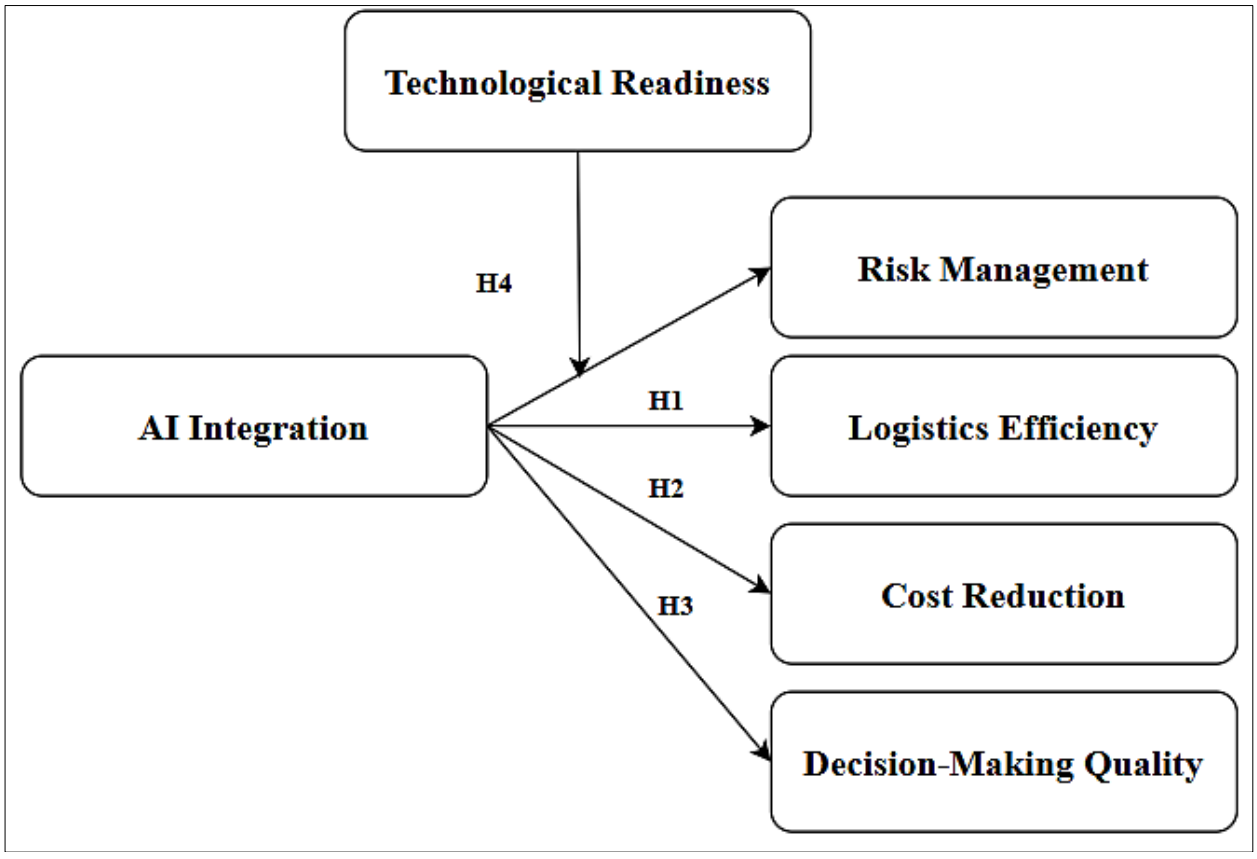

Fig 1: Conceptual framework

Results: In this study, we will examine the implementation of A.I. and its effects on logistics efficiency, cost reduction, strategic planning, and risk management within manufacturing companies in Dubai. We utilized Structural Equation Modelling to gather data for analytical purposes. The sample comprised 304 respondents, including 169 males and 135 females. The participants occupied diverse positions within the corporate hierarchy, including Executives, Senior Staff, and General Managers. Their tenure within their respective organizations varied significantly, ranging from less than one year to over ten years.

Table 1: Demographic Information

Gender	Frequency	Per cent
Male	169	55.6
Female	135	44.4
Total	304	100.0
Age		
Below 30 Years	128	42.1
31-40 years	76	25.0
41-50 Years	52	17.1
50 years Above	48	15.8
Total	304	100.0
Number Of Years in Organisation		
Less than 1 year	133	43.8
1-2 years	93	30.6
3-5 years	37	12.2
6-10 years	41	13.5
Total	304	100.0
Job Position		
Executive	107	35.2
Senior Staff	103	33.9
General Manager	52	17.1
Others	42	13.8
Total	304	100.0

This demographic profile ensures organization-wide representation across Gender, Age, Tenure, and job position. The study's sample population is categorized by Gender, Age, years in the organization, and employment position, revealing a diversified and widespread responder profile. The sample included 169 male respondents (55.6%) and 135 female respondents (44.4%). This distribution represents male and female viewpoints. In Age, 42.1 per cent of responders (128) are "Below 30 years" old. 76 (25.0%) respondents aged 31-40 are the next biggest group. 17.1% (52 people) are 41-50 years old, while 15.8% (48 people) are "50 years and above" old. Regarding Tenure, 43.8% of respondents, or 133 people, have been with the organization for less than a year. 30.6% (93 respondents) have worked for the company 1-2 years. Only 12.2% (37 people) have worked for the organization for 3-5 years, while 13.5% (41 people) have worked for 6-10 years. Executives comprise the biggest responders category, with 107, or 35.2%. Seniors follow closely at 33.9% (103 responses). 52 people (17.1%) are general managers, whereas 13.8% (42 respondents) hold various jobs, showing a diversified sample.

Table 2: Correlations, Means and Standard Deviations

	Age	Gen	No. Year Org	J.P	AI-Int.	Log- Eff	Cost Red	SDM	RM	TR	Mean	Std. Deviation
Age	1.00										2.07	1.11
Gender	-0.07	1.00									1.44	0.50
No. of Year with Org.	0.03	-.131*	1.00								1.95	1.05
Job Position	0.02	0.01	0.01	1.00							2.10	1.03
AI-Integration	0.01	-0.05	0.03	0.05	1.00						3.73	0.88
Logistic Efficiency	0.04	-0.04	0.03	0.01	.828**	1.00					3.83	0.79
Cost Reduction	-0.02	-0.03	0.05	0.01	.838**	.859**	1.00				3.70	0.84
Strategic Decision Making	-0.04	0.01	-0.05	0.07	.772**	.735**	.797**	1.00			3.86	0.76
Risk Management	-0.04	-0.02	-0.01	0.07	.724**	.695**	.756**	.821**	1.00		3.83	0.72
Technological Readiness	-0.02	-0.01	0.00	0.06	.660**	.626**	.700**	.741**	.747**	1.00	3.67	0.68
**. Correlation is significant at the 0.01 level (2-tailed).												

The correlation matrix identified interdependencies between the demographic and work-related variables within an organizational setting. The demographics, with Gender having a small but significant negative correlation on Organizational Years at -0.131*, indicate slight tenure differences between genders, and Age and Job Position showed limited associations with other demographic factors. A.I. Integration is very positively related to organizational efficiency indicators: Logistic Efficiency (r =.828**), Cost Reduction (r =.838**), Decision Quality (r =.772**), Risk Management (r =.724), and Technological Readiness (r =.660**). The above correlations indicate that A.I. integration enhances logistics, cost management, decision-making, and technology adoption. Efficiency indicators have shown a strong correlation that involves logistic efficiency, indicating it to be highly correlated with the cost reduction indicator, which indicated the following: r =.859**. That means there is an extremely strong relationship wherein a given improvement in logistics also saves costs. Therefore, both indicators have had a very strong relation between Logistic Efficiency, with an r =.735** and Cost Reduction, with r =.797**, which strongly correlates with Quality in Decision Making component that improves logistics and cutting cost efficiency. Risk management also correlates highly with Decision-making Quality (r =.821**) and cost reduction (r =.756**), indicating that strategic decision-making impacts risk and cost management. Technological Readiness supports effective decision-making (r =.741**) and Risk Management (r =.747**), which implies openness to new technology enhances efficiency and reduces risks. Therefore, these findings show that organizational

efficiency factors are interdependent. A.I. integration is a critical determinant of improved performance in the logistic, cost, and decision-making areas and, to a lesser extent, risk management.

Table 3: Hypothesis Outcomes

Relationship	Estimate	C.R.	Sig. p	Results
A.I. Integration ---> Logistics Efficiency	0.647	14.03	***	Accepted
A.I. Integration ---> Cost Reduction	0.649	14.2	***	Accepted
A.I. integration ---> Strategic Decision-Making	0.585	14.59	***	Accepted
Mediating A.I. integration ---> Technological Readiness	0.512,	15.298	***	Accepted
Technological Readiness ---> risk management	0.508	10.571	***	Accepted
A.I. integration ---> risk management	0.338	9.075	***	Accepted
**. Correlation is significant at the 0.01 level (2-tailed).				

The hypothesis testing reveals that A.I. integration substantially positively affects logistics performance in Dubai's manufacturing industry. Integration with A.I. presents a strong positive effect on logistics efficiency since Estimate = 0.647, C.R. = 14.03, and $p < 0.001$; hence, A.I. improves operational efficiency. A.I. adoption highly supports cost reduction (Estimate = 0.649, C.R. = 14.2, $p < 0.001$), meaning that predictive analytics and process automation with A.I. help logistics firms optimize logistics costs. Also, A.I. adoption assists manufacturing firms in making strategic decisions regarding logistics (Estimate = 0.585, C.R. = 14.59, $p < 0.001$), enabling the firm to make well-informed real-time decisions in optimizing the logistics process. The study also reveals that technological Readiness mediates A.I. integration and risk management, which supports proactive risk management. There is a high association of A.I. integration with technological Readiness (Estimate = 0.512, C.R. = 15.298, $p < 0.001$), which further influences risk management positively (Estimate = 0.508, C.R. = 10.571, $p < 0.001$). More directly, A.I. integration affects risk management, Estimate = 0.338, C.R. = 9.075, $p < 0.001$, meaning that technological Readiness will make switching to AI-based risk management easier. The results indicate that integrating A.I. improves logistics efficiency, cost-effectiveness, decision-making, and risk management; technological Readiness enhances risk management capabilities.

Discussion

This research looks at the transformative role of A.I. in changing logistics within Dubai's manufacturing sectors and how it impacts efficiency in cost-cutting operations, strategic decision-making abilities, and risk management. Findings suggest that A.I. significantly improves optimality in logistics processes; specifically, the time gap to respond and the reliability factor of the logistics service increases. Predictive analytics due to A.I. helped save costs because the company could predict the demand and manage the inventory. In addition, it was found that the AI-driven insights supported the strategic decision-making process because logistics managers made informed decisions on time with real-time data. Technological Readiness seemed to mediate the amplification of A.I.'s impacts on risk management for more advanced firms with technological infrastructure. The studies by Wang *et al*. (2022) [34] and Jones and Smith (2023) suggest comparing these findings with the other studies that have shown there is a need for full Readiness both in terms of technology as well as manpower to gain all the potential benefits of A.I. Grounded in such insight, it is recommended that firms in Dubai invest in good digital infrastructure and AI-centered employee training and monitor and review A.I. Systems regularly. Companies in Dubai can achieve this by partnering with A.I. providers. Solutions and supporting industry collaboration for standardization, thus creating a more resilient and efficient logistics environment that positions them competitively in a technology-driven market.

Conclusion

This study investigates how artificial intelligence (A.I.) might revolutionize logistics efficiency, reduce costs, and provide decision-making support while lowering risks in Dubai manufacturing companies. One of the findings is that AI contributes positively to logistics efficiency. Through optimization and automation of business processes, A.I. has improved logistics functions by reducing time and increasing the speed and reliability of operations. This efficiency improvement builds on enhancing service quality and the competitive positions of firms in Dubai's rapidly evolving manufacturing sector. A.I. has a significant cost impact on logistics; AI-enabled predictive analytics enables future demand patterns and optimizes inventory management and transportation strategies. Such a strong approach to resource use eliminates wasteful spending on inventory holding and underutilization of logistics resources; hence, the application of A.I. to reduce such enormous spending holds promise for saving significant amounts.

Moreover, data-driven information created by A.I. is said to enable strategic decisions. That is to say, such data would empower logistics managers with a logical foundation on which they could work because real-time or predictive data could help respond to market shifts and changes in operational needs. This, in turn, allows firms to fine-tune their logistics strategies more precisely according to dynamic business objectives and environmental conditions. Adopting A.I. also simplifies risk management in logistics, as studies have shown that technical preparedness plays a significant mediating role. Businesses with high technology preparedness are better equipped to use predictive models to anticipate potential interruptions in logistics operations and use A.I. to evaluate and reduce risks. This foresight allows organizations to have preventive measures in place, reducing the possibility of interrupted supplies and associated costs. In summary, this research highlights AI adoption as the key determinant for the manufacturing sector in Dubai to achieve better logistics performance. The results thus clearly reveal that AI provides not only direct benefits in efficiency and cost, as well as in decision-making, but it also has mediated effects with better risk management, provided the technology readiness of a firm allows for it. Such findings highlight investment in A.I. and other related technology by manufacturing firms in Dubai that are set for the kind of conducive environment logistics processes can achieve within a technically driven future.

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