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INTEGRATING AI TECHNOLOGIES INTO BUSINESS INTELLIGENCE SYSTEMS FOR SMARTER SUPPLY CHAINS

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Abstract

This study examines the integration of artificial intelligence (AI) into business intelligence (BI) systems and its influence on supply chain performance. It focuses on awareness, adoption, benefits, challenges, and user satisfaction related to AI-enabled BI systems. The research adopts a quantitative approach using a structured questionnaire to collect primary data from practitioners across manufacturing, retail, logistics, healthcare, and energy sectors. A total of 318 valid responses were analyzed using descriptive statistics and reliability testing. Key variables, including AI adoption, supply chain performance, strategic benefits, and implementation challenges, were measured through a Likert scale. Cronbach's Alpha values ranged from 0.812 to 0.901, confirming strong reliability of the research instrument. The findings reveal that most respondents possessed high or very high familiarity with AI in BI systems, indicating considerable organizational awareness. In terms of adoption, many organizations reported partial implementation, while others had fully integrated AI into their BI processes, suggesting a growing trend toward adoption. Machine learning and predictive analytics emerged as the most commonly used AI technologies. AI integration was found to positively affect real-time decision-making, forecasting, inventory management, and risk identification, demonstrating its practical value in enhancing supply chain efficiency. However, high implementation costs and poor data quality were identified as major barriers to successful integration. Despite these challenges, user satisfaction was largely positive, with most respondents expressing confidence in the reliability and usefulness of AI-generated insights. The study offers valuable implications for managers, policymakers, and organizations by emphasizing the importance of effective data management, workforce training, infrastructure, and strategic planning to maximize AI benefits in BI systems and create smarter, more resilient supply chains.

Keywords: Artificial Intelligence, Business Intelligence, Supply Chain Management, AI Integration, Predictive Analytics, Decision-Making, Digital Transformation, Supply Chain Performance

1. Introduction

In this rapidly changing digital landscape, companies are turning to cutting-edge technologies to improve efficiency and drive competitiveness. One such technology is artificial intelligence (AI), which is increasingly applied in business intelligence (BI) systems. Historically, BI systems have been employed to gather, manage and analyse past data to facilitate managerial decision-making (Shorif & Islam, 2024). But the

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increasing complexity of global supply chains, as well as the need for real-time information, has highlighted the shortcomings of traditional BI systems (Marques & Santos, 2025). This has driven the incorporation of AI technologies into BI systems to support predictive, prescriptive and automated decision-making (Radhakrishnan et al., 2025).

Globalisation, digitisation, and evolving customer preferences have created more dynamic and complex supply chains (Mohammed et al., 2025). Companies need to deal with a large volume of data from suppliers, logistics providers, inventory management, and customer feedback (Hasan, 2025). Conventional methods of data analysis may struggle to keep up with such high-velocity data. AI-driven BI systems help overcome these limitations by using machine learning, predictive analytics and natural language processing to learn from data, make predictions, manage inventory and detect anomalies.

AI plays a crucial role in enhancing supply chains with the application of AI in BI systems. AI enables companies to transition towards being reactive and data-driven in their decision-making (Charles et al., 2023). To illustrate, machine-based forecasting and planning methods could be used to improve demand forecasting to avoid the problem of overstock or understock. Similarly, BI systems in real-time can enhance supply chain visibility to allow managers to respond to changes and uncertainties (Nweje & Taiwo, 2025). This is essential in the modern world where geopolitical incidents, pandemics, and market uncertainties may have an impact on supply chain management (Attah et al., 2024).

Nonetheless, the introduction of AI into business intelligence systems is not easy. Some difficulties can arise in the companies, such as cost of implementation is high, talent is not available, data quality and problem of integration with the current systems (Riad et al., 2024). Such aspects might hinder effective adoption and application of AI technologies. Moreover, the issue of data security and privacy is vital to the decision to adopt AI as well (Wu et al., 2025).

The findings of data analysis indicate that despite the fact that a lot of organisations have begun to implement AI into their BI systems, most of them remain in the partially or pilot phases. This shows that AI has not been fully developed in different sectors but is still in its infancy. Moreover, the respondents consider that incorporating AI in BI systems can assist in enhancing the supply chain performance, decision-making procedures and developing a competitive advantage. But they too realize that there are a lot of challenges.

This study aims to investigate the use of AI technologies in BI systems, and its impact on supply chain performance. Specifically, it is going to understand the awareness, adoption, advantages and difficulties of utilization of the AI-based BI systems. This analysis offers information concerning how the companies can leverage the power of AI to come up with intelligent and resilient supply chains.

Generally, AI integration in BI systems is an enormous shift in how organizations ought to conduct their supply chains and how they ought to manage them. It has the ability to reshape the traditional practices into dynamic and effective systems. As the business environment constantly shifts and there is a lot of uncertainty, AI-based BI systems will be significant in future supply chain management.

Problem Statement

The fast-increasing complexity of our supply chain must be supported with advanced analytical capabilities that are not always contained in the old fashioned business intelligence systems. Artificial intelligence has the power to improve decision-making and efficiency, however, integrating AI and the current BI systems is also a challenge. It is extremely difficult with high implementation cost, absence of quality data and human resources and compatibility with the existing systems. This leaves the optimum utilization of AI-based insights impossibly resulting in inefficiency and competitiveness. The current paper will answer this requirement by researching the role of AI in enhancing the performance of a supply chain by integrating it with BI systems and the challenges to effective AI implementation.

Importance of the Study

This study is meaningful since it highlights the new area of artificial intelligence in uniting business intelligence systems with better supply chain management. In the modern data-centric world, the understanding of the role of AI in enhancing BI systems provides an indication of organisations aiming to increase their performance and competitiveness. The research benefits both academia and practice by exploring the benefits, limitations and adoption of AI-based BI systems.

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Practically, the insights can help managers, policymakers and technology providers make decisions about implementing AI. It also helps managers and organizations understand critical issues of cost, data and skills, and how to overcome these to successfully implement AI-BI systems. Furthermore, the research helps guide future research by offering a basis for investigating more advanced use of AI in supply chain management and digital transformation.

2. Literature Review

AI in Business Intelligence Systems

The use of artificial intelligence has greatly empowered the traditional business intelligence systems to undertake more sophisticated data processing and analytics (Chowdhury, 2024). In contrast to traditional BI tools with a descriptive orientation, AI-based systems integrate machine learning algorithms and machine learning to produce predictive and prescriptive insights (Mirza et al., 2026; Mohsin, 2023). This development enables organizations to process huge volumes of data more effectively and make well-informed decisions using real-time data.

AI Applications in Supply Chain Management

AI technologies have been broadly implemented in many areas of the supply chain management system such as demand forecasting, inventory optimization, logistics planning and supplier management. Predictive analytics assists businesses with predicting market trends and consumer preferences, whereas optimization algorithms enhance the management of resources and minimize operational inefficiencies (Sharma et al., 2022). Also, AI-based automation will improve the efficiency of the process and will minimize human error.

Integration of AI and BI for Smarter Supply Chains

The integration of AI and BI systems forms a robust decision-making system. AI supplements BI as it offers real-time analytics, anomaly detection, and analysis of scenarios (Noor and Alim, 2023). This integration allows organizations to have a better understanding of how their supply chain works and be more proactive towards the possible disruptions (Hasan et al., 2026). Consequently, organizations will realize increased efficiency, agility, and resiliency (Majumder et al., 2026).

Challenges in AI Adoption

Irrespective of the benefits, there are a number of obstacles to the use of AI in BI systems. Quality and access to data is also a major issue since AI models need high-quality and complete datasets to operate successfully (Sultana et al., 2024). The implementation cost is also high, and specialized skills are also barriers to adoption especially among small and medium-sized enterprises (Ullah and Khan, 2024). Moreover, AI may be difficult and time-consuming to integrate with the currently existing legacy systems.

Strategic Benefits of AI Integration

By effectively integrating AI into their BI systems, organizations will be able to gain a competitive advantage by making better decisions, lowering the costs, and increasing customer satisfaction. Insights provided by AI can help to improve the forecasting process, efficient inventory management, and effective risk mitigation (Hasan et al., 2025). These advantages add to a comprehensive supply chain enhancement and sustainability of the long run business.

Research Questions

1. What is the level of awareness and adoption of AI technologies in BI systems?
2. How does AI integration impact supply chain performance?
3. What are the major challenges faced in integrating AI into BI systems?
4. What strategic benefits do organizations gain from AI-driven BI systems?
5. How satisfied are users with AI-enabled BI system performance?

Research Objectives

1. To examine the level of awareness and adoption of AI in BI systems.
2. To evaluate the impact of AI integration on supply chain performance.
3. To identify key challenges in implementing AI technologies.
4. To analyse the strategic benefits of AI-driven BI systems.
5. To assess user satisfaction and system performance.

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3. Methodology

Research Design

To investigate the use of artificial intelligence (AI) technologies in a business intelligence (BI) system and how the technologies influence the supply chain performance, the study will apply quantitative research paradigm. To critically examine the links between AI adoption, benefits of operations and challenges in implementation, the relationships are analytically examined through the assistance of the descriptive and explanatory research design. The quantitative design allows collecting the data that is standardized and can be analysed statistically in order to make sure that the obtained results are objective and reliable.

Research Approach

It is deductive research that involves empirical testing of the already available theories and concepts in regard to AI, BI systems and supply chain management using empirical data. The methodology used is reasonable since the study will be used to confirm the theoretical frameworks formulated by measurable variables that constitute awareness, the level of adoption, performance impact and user satisfaction.

Data Collection Method

The structured questionnaire was used to gather primary data that would assist in the capturing of perception of the respondents with respect to AI integration in BI system. The questionnaire was divided into different sections on awareness and adoption, the performance of the supply chain, challenges, Strategic benefit and system satisfaction. The responses were measured by strongly agree (to strongly disagree) and Likert scale (five points scale) was considered, and it offers the reliability and convenience of the analysis process.

Sampling Technique and Sample Size

The researchers employed non-probability convenience sampling method that entailed meeting professionals engaged in the supply chain processes, data analysis and IT management. The sample consisted of supply chain managers, business analysts, data scientists, IT professionals, and executives of different industries, including manufacturing, retail, logistics, healthcare, and energy industries. The sample size (318 responses) is believed to provide a broad spectrum of representative data acting as a representative sample of different organizational roles and sizes.

Data Analysis Techniques

Statistical approach was used in the analysis of the data gathered, and the assistance of descriptive statistics and reliability analysis. Frequency distribution and percentages interpreted demographic data and patterns of response. The internal consistency of the measuring tool was also determined using the Cronbach Alpha and all the constructs are above the acceptable level (0.70) which implies that the measurement tool is very reliable. The analysis also included comparative evaluation of the responses so as to determine trends related to adoption of AI, its advantages, and challenges.

Measurement of Variables

The research involved five constructs that were quantified in awareness and adoption of AI in BI systems, effect on supply chain performance, issues in the implementation of AI, strategic benefits and future prognosis, and system performance and satisfaction. Every construct was measured through several items to achieve a holistic measurement of the results and its validity.

Ethical Considerations

The research process was conducted with ethical standards. This was voluntary and the respondents were promised confidentiality and anonymity. The data was only gathered to aid in academic purposes, and no personal or sensitive information was released. All the participants gave informed consent before collecting data.

4. Results

Results are the part of a research study, in which the data collected and analysed are clearly, logically, and objectively revealed. In this part, the results of the research are identified by using the statistical analysis, tables, chart, and descriptive summaries without any personal interpretations and discussion. The results section allows readers to comprehend whether the research objectives and questions have been met in the context of the obtained evidence or not. It normally involves demographic data, reliability testing, descriptive

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statistics, hypothesis testing and other analysis findings of the research.

Table 1

Reliability Analysis

Description	No. of Items	Cronbach's Alpha (α)	Reliability Level
Awareness & Adoption of AI in BI Systems	3	0.812	Good
Impact on Supply Chain Performance	5	0.886	Very Good
Challenges in AI Integration	5	0.874	Very Good
Strategic Benefits & Future Outlook	4	0.901	Excellent
System Performance & Satisfaction	3	0.845	Good
Combined Instrument Reliability	20	0.889	Very Good

The findings of the reliability analysis indicate that the research instrument has a high degree of internal consistency as well as measurement reliability. The values of Cronbach Alpha of all constructs are higher than the generally accepted value of 0.70, which proves that the items in the questionnaire are valid and can be utilized to collect and analyse data.

The construct Strategic Benefits and Future Outlook recorded the highest score on the reliability (α= 0.901) and thus it has an excellent measurement of consistency in the items used to measure the respondents' perceptions about the strategic value of AI and its future potential. On the same note, the constructs Impact on Supply Chain Performance (α = 0.886) and Challenges in AI Integration (α = 0.874) were shown to be very good in reliability meaning that, the items in these sections measure the intended concepts. Moreover, the reliability of such items as System Performance & Satisfaction (α = 0.845) and Awareness and Adoption of AI in BI Systems (α = 0.812) showed the good level of reliability, which indicates the reliability in measuring the answers using these items. Above all, the score of the combined instrument reliability is α=0.889, which means that the entire questionnaire is highly internally consistent and can be regarded as a validated instrument to investigate AI integration, supply chain performance, and Business Intelligence systems.

Table 2

Demographic Information

Demographic Variable	Category	Frequency	Percentage
Primary Role	Supply Chain Manager	96	30.2%
	Business Analyst	64	20.1%
	Data Scientist / AI Specialist	58	18.2%
	IT Professional	50	15.7%
	Executive / Decision Maker	32	10.1%
	Other	18	5.7%
Industry Sector	Manufacturing	92	28.9%
	Retail / E-commerce	70	22.0%
	Logistics & Transportation	62	19.5%
	Healthcare	40	12.6%
	Energy / Utilities	32	10.1%
	Other	22	6.9%
Years of Experience	< 2 years	38	11.9%
	2–5 years	96	30.2%
	6–10 years	88	27.7%
	11–15 years	56	17.6%
	> 15 years	40	12.6%
Organization Size	Small	52	16.4%
	Medium	88	27.7%
	Large	96	30.2%
	Enterprise	82	25.8%

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1. Primary Role Distribution

Supply Chain Managers (30.2%) represent the largest group, which suggests the data is heavily based on the decisions of operations. It is supplemented by Business Analysts (20.1%) and Data Scientists/AI Specialists (18.2%), which implies a considerable analytical and technical approach. IT Professionals (15.7%) also support the technical aspect, but the Strategic aspect is provided by the Executives (10.1%). The role distribution in general provides multi-level insights at the operational, analytical and strategic levels.

2. Industry Sector Representation

Manufacturing (28.9%) and Retail/E-commerce (22.0%) are the main factors of the sample with the highest share of the supply chain efficiency being essential in these two sectors. Logistics & Transportation (19.5%) is an additional layer to distribution- and movement-oriented operations. Bigger but less significant contributions made by healthcare (12.6%), and Energy/Utilities (10.1%), contribute to the diversity of the sector. Such distribution suggests a good fit to the industries where data-driven supply chain optimization can be of great use.

3. Experience Level

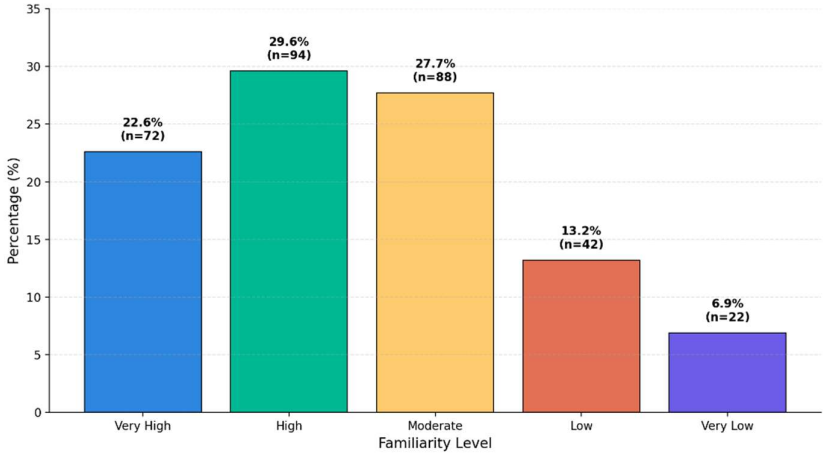
Respondents are primarily mid-career professionals, with 2–5 years (30.2%) and 6–10 years (27.7%) forming the majority. This suggests a workforce that is experienced enough to understand operational challenges while still adaptable to new technologies. Senior expertise is also present (11–15 years: 17.6%, >15 years: 12.6%), ensuring informed perspectives, while early-career participants (11.9%) contribute fresh viewpoints.

4. Organization Size

The results are biased towards bigger companies, where Large (30.2%) and Enterprise (25.8%) companies comprise more than half of the sample. There is also good representation of medium-sized organizations (27.7%), although small firms (16.4%) have lesser contribution. This implies that results can be more indicative of well-organized and resource-endowed settings with greater potential of adoption of advanced technologies.

Figure 1

Familiarity with AI in BI



The results suggest that the respondents are in general highly aware of the use of Artificial Intelligence (AI) in Business Intelligence (BI). Most of the respondents noted that the level of familiarity was high (29.6%) and very high (22.6%), which showed that AI-based BI technologies are well-known and comprehended by the professionals. Moreover, 27.7% of participants have a moderate percentage of familiarity, which implies that a significant segment of the participants is aware of the AI integration in the processes of BI at least at the fundamental level.

On the other hand, few respondents found low (13.2%) and very low (6.9%) familiarity levels. This relatively low percentage means that there has been a great growth in awareness and exposure of AI-enabled systems of BI across the organization and in the area of practice. Comprehensively, the findings indicate a

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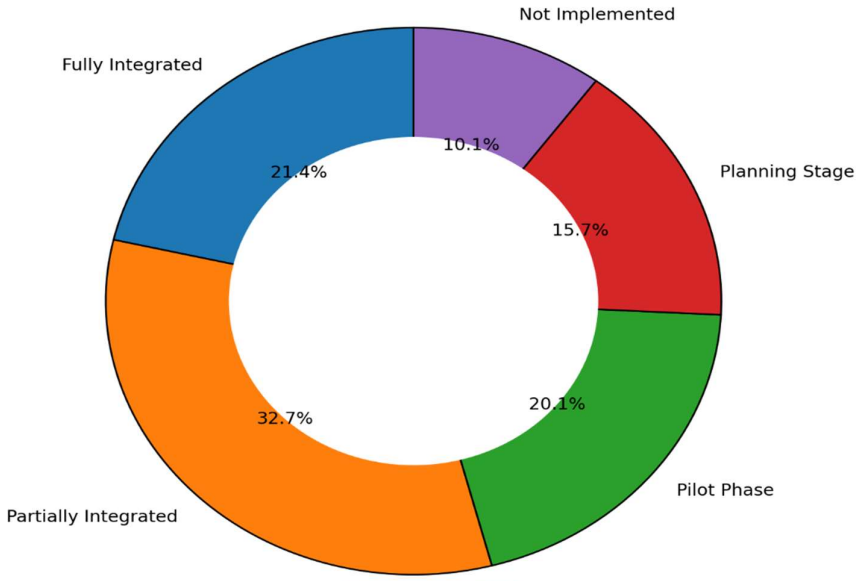
good amount of knowledge about the application of AI in the context of BI, which is conducive to the increasing use of smart analytics, automation, and data-driven decision-making behaviours by contemporary companies.

Figure 2

AI Integration Level

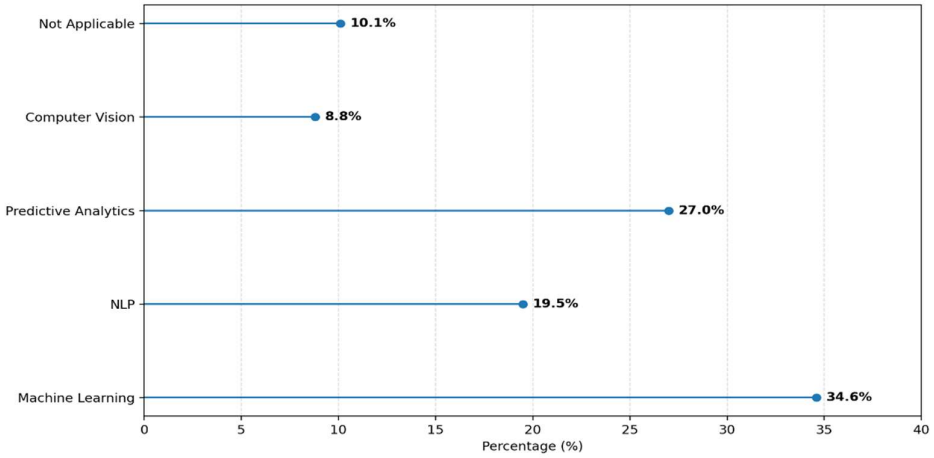


The findings indicate a diverse extent of AI adoption by the Business Intelligence (BI) systems in different organizations. The highest percentage of the respondents reported that AI is partially part of the organization (32.7%), which implies that a lot of organizations adopted AI technologies in some of the BI functions, yet, they have not reached full implementation. Moreover, 21.4% of the respondents have confirmed that AI is completely been incorporated into their BI process, which indicates an excellent amount of technology adoption and business preparation.

Moreover, 20.1% of the respondents answered that their organizations are only at the pilot stage, which implies that they are still experimenting and assessing AI-based BI solutions. In the meantime, 15.7% responded that they were in the planning phase, which indicated their intentions to adopt AI and embrace digital transformation in the future. The proportion of respondents that stated that AI is not implemented was only 10.1% confirming that most of the organizations have adopted or are contemplating adopting AI in BI systems. In general, the results indicate a rising trend in the application of AI-dependent BI in which organizations are moving out of planning and testing phases to wider scope of operational integration.

Figure 3

AI Technology Used



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The results indicate that 34.6% of the participants noted that a Machine Learning represents the most used AI technology in Business Intelligence (BI) systems. This implies that machine learning is mostly used by organizations to work on pattern recognition, forecasting, automation, and intelligent decision-making. The second most utilized technology was Predictive Analytics 27.0% as the growing significance of data-driven forecasting and strategic planning in the contemporary ventures has become apparent.

Natural Language Processing (NLP) was cited by 19.5% of the respondents, which also implies an increasing use of artificial intelligence (AI)-based communication, text analysis, and chatbots programs in BI settings. Contrary to this, Computer Vision had a comparatively low level of use at 8.8, which points to the fact that visual-data-based AI applications are not widespread in BI operations as opposed to other technologies. Moreover, 10.1% of the respondents chose the Not Applicable option, which suggests that there are still organizations that do not use AI technologies in their BI systems. On the whole, the findings indicate that Machine Learning and Predictive Analytics play the leading role in improving BI functionalities and decision-making in the organizations.

Table 3

Impact on Supply Chain

Statement	SA	A	N	D	SD
Demand Forecasting Improvement	110	120	50	26	12
Inventory Efficiency	104	118	52	30	14
Real-time Decision Making	122	112	46	26	12
Cost Reduction	96	110	64	32	16
Risk Identification	118	116	48	24	12

(SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree)

The findings show that the respondents are mostly of the view that AI integration has a positive influence on the performance of supply chains. The strongest support was to the statement about the process of real-time decision making and 122 respondents strongly agreed, 112 agreed and this indicates that AI technologies considerably increase the speed and accuracy of the operational decisions. Equally, the enhancement of demand forecasting also scored high in positive feedback with majority of the respondents affirming or heavily affirming that AI can help in enhancing better forecasting and planning facilities.

Another strongly rated area was inventory efficiency with the majority of respondents admitting that AI-driven systems lead to more effective inventory control, less stock-out and more optimal resource distribution. Regarding risk identification, the respondents mostly concurred that AI helps organizations to identify possible disruptions, operational uncertainties and vulnerabilities in the supply chain more efficiently.

Despite positive reactions to cost reduction, the degree of agreement was relatively low in comparison to other dimensions, which might imply that the financial benefits might take longer to be implemented or with greater investments in the first place to achieve significant savings. On the whole, the results support that the use of AI has a positive impact on a variety of areas of supply chain management, especially it improves the accuracy of forecasts, operational effectiveness, decision-making, and risk management.

Table 4

Challenges in AI Integration

Statement	SA	A	N	D	SD
Data Quality Issues	124	108	42	28	16
High Cost	130	102	40	28	18
Lack of Skills	116	104	50	30	18
Legacy System Integration	110	112	48	30	18
Security Concerns	120	106	44	28	20

(SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree)

The results show that the respondents are very aware of the strategic advantages of AI integration in the supply chain and Business Intelligence processes. The phrase AI is necessary in the future had the greatest level of concurrence and a high percentage of the participants agreed or strongly agreed. This is an overarching understanding that artificial intelligence technologies will be vital in maintaining organizational growth,

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innovation and competitiveness in the dynamic digital business landscape.

Similarly, future AI investment was evaluated as quite a positive one, which confirms that the companies are willing to invest more in AI in order to enhance their operational efficiency and analytics as well as the possibility to make the strategic decisions. The results also suggest that the respondents think that AI serves as a great competitive advantage, which can assist organizations to be more responsive, improve their performance, and improve the market position.

Regarding the sphere of supplier management, most of the respondents were also happy that AI has a positive impact on the sphere as it improves the sphere of coordination, monitoring of the suppliers, their communication, and performance assessment. Overall, the findings support the claim that the companies view AI as both a technological and a strategic resource that can support the future innovation, competitive advantage, and sustainable increased business growth.

Table 5

Strategic Benefits

Statement	SA	A	N	D	SD
Competitive Advantage	126	108	40	28	16
Supplier Management	110	116	50	26	16
Future AI Investment	132	104	42	24	16
AI Essential for Future	150	96	36	20	16

(SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree)

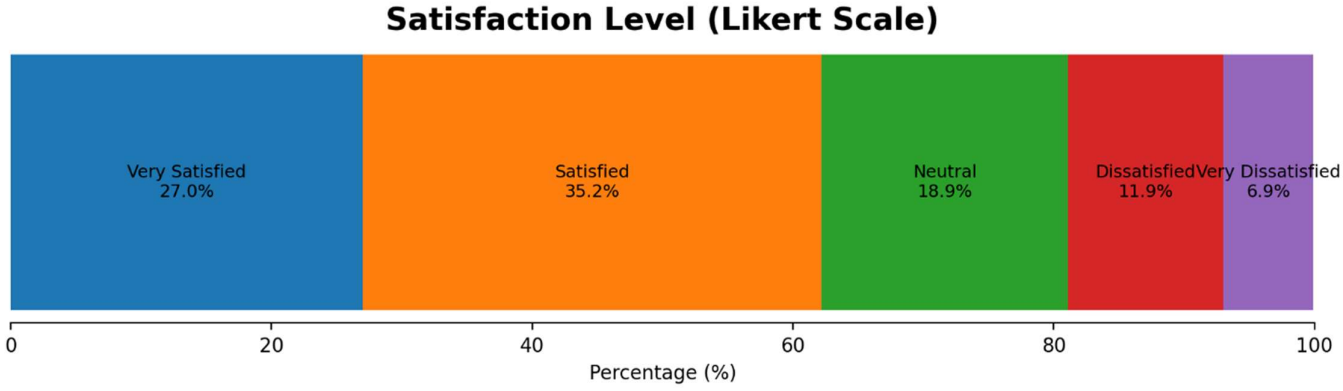
The findings indicate that the respondents highly appreciate the strategic importance of AI application in Business Intelligence and supply chain processes. The most agreed was the necessity of AI and there was a significant majority of people who strongly agreed or agreed. It is a pointer of an overall perception that AI technologies will play a central role in guaranteeing organizational development, innovation, and competitiveness in the dynamic digital business environment.

On that note, future investment in AI was rated extremely positively, which implies that organizations are willing to invest more in AI technologies to enable efficiency in their operations, their analytics, and strategic decision making. The results also show that AI is perceived by the respondents as a powerful competitive edge and enables the organization to become more responsive, more performance-oriented, and more market-oriented.

In the field of supplier management, most respondents felt that AI can positively influence the process, which promotes coordination, monitoring, communication, and performance evaluation of the suppliers. Overall, the findings suggest that organizations view AI not only as such a piece of technology but as a strategic resource that may help to generate innovation and competitive edge and ensure sustainable business growth in the future.

Figure 4

Satisfaction Level



The results indicate that the level of satisfaction with AI usage in Business Intelligence and supply chain processes is very positive. The majority of the respondents stated that they were satisfied (35.2%), or

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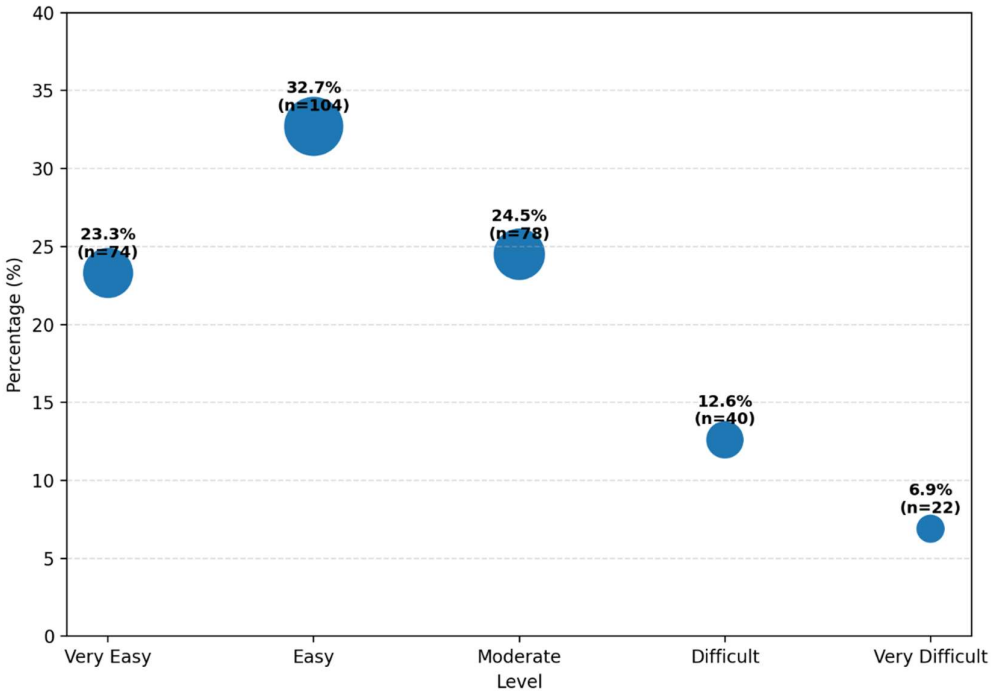
very satisfied (27.0%), with the results and performance of AI-powered systems. Such findings demonstrate that AI is introducing major changes to the companies, enhancing their operations, advancing decision-making, and expanding analytical skills.

Moreover, 18.9% of the respondents provided a neutral answer, which indicates that some organizations might remain in a transitional phase of AI application or have not yet discovered the full potential of AI. Conversely, a relatively smaller percentage of respondents experienced dissatisfaction with 11.9% not satisfied and 6.9% very unsatisfied. These adverse reactions can be linked to the lack of resources like the expensive nature of implementation, technical complexity, data quality problems, or integration problems.

In general, the results indicate that most organizations view the integration of AI positively and are typically satisfied with the contribution of AI on organizational performance and strategic operations in general.

Figure 5

Ease of Use



The results show that the respondents find AI-enabled Business Intelligence systems to be user-friendly and manageable in general. A significant percentage of respondents found the systems either easy (32.7) or very easy (23.3) to use, implying that most organizations have deployed AI systems that have readily available interfaces, functional usability characteristics, and friendly working systems. These findings can be attributed to the increased awareness and acculturation to AI-driven technologies in the workplace.

What is more, 24.5% of the participants mentioned a moderate degree of ease of use, which means that the systems are operational but still, some users might need further training or experience to make best use of the advanced AI features. On the other hand, a smaller percentage of respondents found the systems difficult (12.6%) or very difficult (6.9%) to use. Such reactions can be attributed to technical complexity, lack of training, technical deficiency, or issues of system integration.

Overall, the results suggest that most participants are optimistic that AI-facilitated BI systems are pretty easy to deploy, a factor that elicits the increasing maturity, accessibility, and usability of the existing AI resources in the commercial sector.

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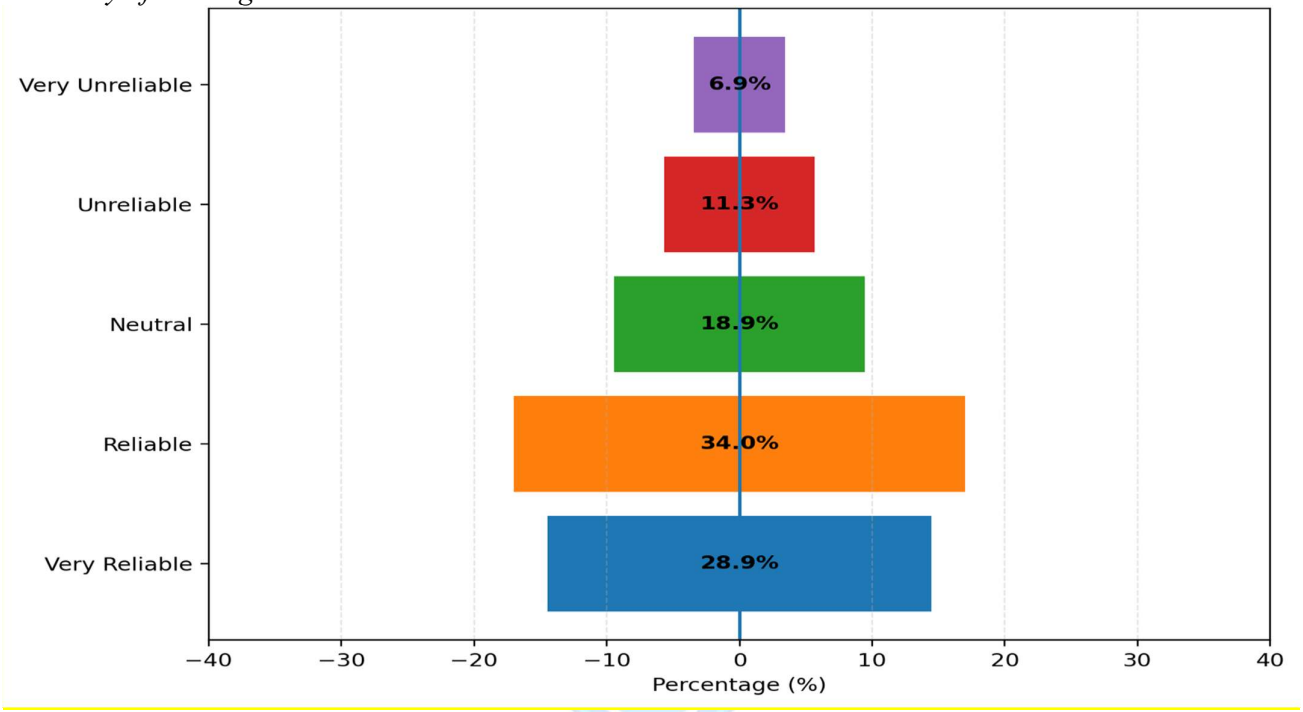
Figure 6

Reliability of AI Insights



The results indicate that overall, the respondents feel that AI-generated insights can be trusted and used to apply to the Business Intelligence and supply chain decision-making processes. Most of the respondents rated the AI insights based on reliability (34.0%), or very reliability (28.9%), which is that they were sure the AI-delivered analytics were precise, uniform, and beneficial in organizational operations. Such results indicate that AI technologies have been increasingly used in prediction regarding performance monitoring and other processes of strategic decision making.

Also, 18.9% of the respondents have a neutral opinion, which suggests that not all organizations have decided on the uniformity and reliability of AI systems, or they are less experienced with developed AI applications. Conversely, a comparatively low number of respondents observed AI insights as unreliable (11.3) or exceedingly unreliable (6.9%). These concerns can be based on the data quality, bias in the algorithms, a lack of transparency, or the fact that sometimes the outputs produced by the AI are not accurate.

On the whole, the obtained results indicate that companies mostly view AI insights as reliable and beneficial, which supports the increasing role of AI technologies in improving the accuracy of analytics, the efficiency of operations, and intelligent decision-making.

5. Discussion

The results of this paper give a solid argument that artificial intelligence (AI) integration in business intelligence (BI) systems has a great impact on improving the supply chain performance and that it also has significant realization difficulties. The good reliability scores of all constructs ensure that the data obtained is uniform and would be useful in assessing AI adoption, benefits, and barriers. The findings are consistent with past studies that state that AI-driven BI systems enhance the decision-making process by facilitating predictive and real-time analytics (Shorif and Islam, 2024; Radhakrishnan et al., 2025) .

One of the main findings of the research is the increased awareness and introduction of AI technologies into organizations. A majority of the respondents indicated moderate to very high levels of familiarity with AI in BI, which indicates that companies are gaining appreciation of the strategic value of AI. Nevertheless, the observation that many institutions are still either at stage of partial or pilot implementation suggests that the adoption of AI is still at its early stages and is yet to mature completely. This confirms prior results that organizations tend to implement AI slowly, because of both technical and organizational challenges (Marques

and Santos, 2025).

The analysis of the impact shows that AI integration has a positive effect on several areas of supply chain management, especially the real-time decision-making, demand forecasting, inventory efficiency, and risk identification. Such results align with the previous research pointing to the capacity of AI to improve the benchmark of forecasts and the speed of operations (Nweje and Taiwo, 2025; Mohammed et al., 2025). Cost reduction, however, had a comparatively lower level of agreement indicating that the financial gains might not be short-term and potentially rely on long-term implementation and optimization.

Although the study reveals these benefits, the challenges faced are also substantial, such as high costs, quality of data, insufficient experienced personnel, and problems with integrating them into the legacy systems. These obstacles have been the most recognized in the literature as the key limitations to the adoption of AI (Naureen & Mohammad, 2026; Riad et al., 2024; Sultana et al., 2024). Also, the security factor is an urgent matter, which indicates the necessity of effective data protection systems.

Furthermore, the results depict that organizations consider AI as a strategic asset that creates competitive edge and leads to future growth. High measures of satisfaction and perceived reliability of AI insights confirm the worth of AI-driven BI systems in enhancing the performance of organizations. Overall, the discussion suggests that despite the serious benefits of AI integration, companies must address technical, financial and human resource-related challenges to realize the potential of this technology in designing more intelligent and resilient supply chains.

6. Conclusion & Recommendations

This study concludes that artificial intelligence application in the business intelligence systems is revolutionary in enhancing the supply chain performance and decision making within an organization. The findings indicate that AI-driven BI can add significant value to the capacity of the organizations to make more effective decisions on the spot, anticipate demand, inventory control, risks detection and works better in more complex and dynamic settings. Higher awareness and adoption rates imply that the companies are now beginning to recognize the applied strategic importance of AI in their pursuit to achieve business competitiveness and efficiency in their operations. However, also in the study, it is stated that most organizations are at the initial stages of adoption, which suggests that the opportunities of the AI integration have not been fully utilized. The major problems of high implementation costs, data quality problems, and the absence of skilled professionals and the integration with the existing systems remain the obstacles to its prevalence. Nevertheless, user satisfaction and trust in AI-generated insights are very high in general and these obstacles demonstrate the importance of AI as an essential solution in the current supply chain management.

According to these findings, they make a number of recommendations to facilitate the successful use of AI in BI systems. Organizations are encouraged to invest more in good data management practices because without good and reliable data to run their AI, then good performance will not be achieved. It is also necessary to build workforce skills, which can be achieved through training and upskilling opportunities in AI, machine learning, and data analytics to close the current skills gap. To reduce the risks and optimize costs, business organizations should implement AI in a gradual but continuous manner, starting with pilot projects and gradually increasing its application. Furthermore, companies must modernize their IT systems to make sure that they can readily assimilate AI technologies in their systems. More policy and data security and privacy should also be improved to gain trust and address possible risks related to the use of AI. Knowledge sharing and innovation can also be achieved through a collaboration of experts in the industry, technology providers and policymakers. Finally, investing into the BI systems, which are already driven by AI, and concentrating on the issues of implementation, the organizations will be better placed to create resilient, agile, and intelligent supply chains that will be able to sustain long-term growth and competitive advantage.

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Contribution of Authors

All the authors participated in the ideation, development, and final approval of the manuscript, making significant contributions to the work reported.

Conflict of Interest Statement

The authors declare no conflicts of interest.

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Informed Consent

Informed consent was obtained from all individual participants included in the study.

Ethical Approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Data Availability

The datasets generated during and analysed during the current study are available from the corresponding author on reasonable request.

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