



AI-Powered Business Intelligence and Profit Management System for Small Retail Businesses: A Review

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Abstract: Small retail businesses generate significant amounts of data through sales, purchases, inventory, expenses, customer payments, and supplier activities. However, many small retailers still depend on manual records and basic software, making it difficult to obtain timely insights about business performance and profitability. Artificial Intelligence (AI), Machine Learning (ML), and Business Intelligence (BI) technologies provide opportunities to transform operational data into useful information for decision-making. This review examines existing research on AI-enabled business intelligence, retail analytics, inventory management, demand forecasting, and profit-oriented decision support systems, with particular emphasis on small and medium-sized businesses. Recent studies indicate that machine learning can support demand prediction, inventory optimization, and business forecasting, while BI dashboards can provide accessible visual representations of business information. However, existing solutions frequently focus on individual functions such as forecasting, inventory, or analytics rather than providing an integrated and affordable system designed specifically for small retailers. The review identifies challenges including limited historical data, technical expertise, implementation cost, model reliability, and data quality. Based on these findings, an integrated AI-powered business intelligence and profit management system is proposed as a potential approach for combining sales, inventory, expenses, and profit analysis with AI-based insights.

Keywords: Artificial Intelligence, Business Intelligence, Machine Learning, Retail Analytics, Profit Management, Inventory Management

I. INTRODUCTION

Small retail businesses need to continuously manage sales, purchases, inventory, expenses, customer payments, and supplier transactions. These activities generate valuable business data, but small retailers may not have dedicated analytical systems or technical expertise to convert this data into actionable information. Business Intelligence (BI) provides methods for collecting, processing, analyzing, and visualizing business data to support decision-making. Recent systematic research indicates that BI and data-mining technologies are increasingly being applied to SMEs, with dashboards and analytical techniques playing an important role in business decision support. However, implementation cost, technological complexity, and skills gaps remain significant barriers for SMEs. Artificial Intelligence and Machine Learning can extend traditional BI by identifying patterns in historical data and generating predictions. Research has investigated ML applications in demand forecasting, financial analysis, marketing, and business decision-making. In retail, AI can potentially assist with predicting future demand, identifying slow-moving products, estimating inventory requirements, and analyzing sales patterns.

A. Objectives of the Review

1. To study existing applications of AI and BI in small and medium-sized businesses.
2. To examine ML techniques used for retail demand forecasting and inventory management.
3. To analyze the role of dashboards and data analytics in business decision-making.
4. To identify limitations of existing retail management and BI systems.
5. To identify research gaps related to integrated profit-management solutions for small retailers.
6. To propose possible directions for an AI-powered retail business intelligence system.

II. REVIEW METHODOLOGY

This review considers research related to Artificial Intelligence, Machine Learning, Business Intelligence, retail analytics, inventory management, demand forecasting, and SME performance.

A. Search Sources



IEEE Xplore, ScienceDirect, SpringerLink, MDPI, and Google Scholar were considered as academic and research sources.

B. Search Keywords

“AI in small businesses”, “Business Intelligence for SMEs”, “AI retail management”, “machine learning demand forecasting”, “AI inventory management”, “retail profit prediction”, “business analytics SMEs”, and “machine learning in business and finance”.

C. Inclusion and Exclusion Criteria

Studies were considered when they discussed AI, ML, BI, or data analytics and addressed retail, SMEs, business management, inventory, forecasting, or business performance. Duplicate, unrelated, or insufficiently documented studies were excluded.

III. BACKGROUND / THEORETICAL FRAMEWORK

Artificial Intelligence refers to computational techniques that allow systems to perform tasks involving learning, prediction, pattern recognition, and decision support. For the proposed retail system, AI can be used for sales prediction, demand forecasting, inventory analysis, product classification, profit analysis, expense analysis, and anomaly detection.

A. Machine Learning

Machine Learning allows a computer system to learn patterns from historical data and use those patterns for prediction or classification. Possible algorithms include Linear Regression, Decision Tree, Random Forest, XGBoost, K-Means Clustering, and time-series forecasting models. The appropriate model depends on the quantity and quality of available retail data.

B. Business Intelligence

Business Intelligence transforms raw business data into meaningful information through the sequence Data → Processing → Analysis → Visualization → Decision. A small-retailer dashboard can display daily and monthly sales, total expenses, current stock, low-stock products, estimated profit, best-selling products, slow-moving products, and sales trends.

C. Retail Analytics

Retail analytics involves analyzing sales, product, customer, inventory, and transaction data. Descriptive analytics answers what happened; diagnostic analytics explores why it happened; predictive analytics estimates what may happen; and prescriptive analytics supports decisions about what action could be taken.

IV. LITERATURE REVIEW

TABLE I LITERATURE REVIEW

Study	Approach / Area	Key Finding	Limitation / Challenge
Gao et al., 2024	ML in business & finance	ML supports forecasting, marketing and financial/business analysis.	Model reliability and application context vary.
AI in SMEs, 2025	AI applications in SMEs	ML, NLP, BI and analytics are increasingly applied to SME functions.	Skills and infrastructure requirements.
BI & Data Mining in SMEs, 2025	BI, dashboards, data mining	BI can support SME decision-making and operational performance.	Cost, complexity and skills gaps.
Mejía & Aguilar, 2024	Hybrid demand forecasting	Ensemble learning and feature engineering can improve category-level forecasting.	Demand differs across product categories.
Smart Retail, 2024	ML for demand, pricing, inventory	ML can support retail demand and inventory decisions.	Requires suitable business data.
AI Approach to SME Inventory, 2024	AI/data science for inventory	Product-specific forecasting is important; traditional methods can remain competitive with limited data.	Limited historical data.



ML-Infused Dashboards, 2024	ML + BI dashboards	Dashboards can integrate analytics for decision support.	Integration and data preparation.
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V. COMPARATIVE ANALYSIS

TABLE II COMPARATIVE ANALYSIS

Research Area	Techniques	Main Application	Common Limitation
SME Business Intelligence	BI dashboards, data mining	Decision support	Implementation complexity
Demand Forecasting	Regression, ML, time series	Future sales prediction	Historical data required
Inventory Management	ML, forecasting, optimization	Stock planning	Product-specific behavior
Retail Analytics	Clustering, association analysis	Product/customer analysis	Data quality
Financial Analytics	ML, regression	Business prediction	Model reliability
Integrated BI	Dashboards + analytics	Decision support	Integration complexity

VI. RESEARCH GAPS AND CHALLENGES

The literature identifies several areas for further research. Many existing studies focus on a single problem such as demand forecasting, inventory management, or business analytics. An integrated system combining sales, purchases, inventory, expenses, and profit analysis specifically for small retailers is therefore a useful research direction. Other challenges include limited historical data, implementation cost, technical skills, data quality, explainability, security, and privacy.

VII. FUTURE SCOPE

Future systems can integrate AI-based sales forecasting, automatic profit prediction, low-stock alerts, slow-moving product detection, purchase quantity recommendations, expense trend analysis, product performance analysis, customer purchasing-pattern analysis, automatic business reports, explainable AI recommendations, and cloud/mobile business monitoring. Future work may also investigate advanced forecasting, ensemble learning, and explainable AI while balancing model complexity with the amount and quality of available data.

VIII. PROPOSED SYSTEM

The proposed AI-Powered Business Intelligence and Profit Management System for Small Retail Businesses combines operational business management with AI-based analytics. The system can collect sales, purchases, inventory, expenses, and payment information in a central database. After data cleaning and processing, AI/ML models analyze the information and present results through a business intelligence dashboard. Example insights include identifying products with declining sales, detecting products likely to reach low stock, comparing expenses across periods, and identifying products contributing substantially to profit.

IX. CONCLUSION

This review examined the application of Artificial Intelligence, Machine Learning, Business Intelligence, and data analytics in small businesses and retail environments. Existing research demonstrates that AI and BI can support decision-making through predictive analytics, demand forecasting, inventory management, dashboards, and business performance analysis. At the same time, small businesses face challenges involving implementation costs, technical skills, data quality, and limited historical data. The literature indicates an opportunity for an integrated system combining operational business management with AI-based analytical capabilities. The proposed system addresses this direction by combining sales, purchases, inventory, expenses, and profit information with predictive and analytical functions.

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