International Journal of Information Technology and Computer Science Applications (IJITCSA)
p-ISSN: 2964-3139 e-ISSN: 2985-5330
Vol. 03, No. 01, page 33 - 39
Submitted 31/1/2025; Accepted 12/3/2025; Published 14/3/2025

Optimizing Retail Strategy with IBM Retail Data Warehouse (RDW): A Short Review of Data-Driven Approach to Customer-Centric Decision-Making

Maria Santos Fernandez
Information Technology, La Consolación College, Metro Manila, PHILIPPINES
e-mail: masfen@lccm.edu.ph

Corresponding Autor: Maria Santos Fernandez

Publisher's Note: JPPM stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Copyright: © 2025 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

Abstract
Retail businesses operate in highly competitive and unpredictable environments where customer demands continue to evolve rapidly. Whether catering to niche markets with premium products or competing at scale as mega retailers, businesses must deeply understand their customers and develop strategies that align with their preferences, behaviors, and expectations. Simply recording raw data is insufficient to gain meaningful insights; retail businesses must leverage advanced business intelligence tools to visualize and analyze data effectively. The integration of data mining techniques with business analytics plays a crucial role in extracting actionable intelligence, enabling retailers to enhance customer experiences, optimize inventory management, and improve operational efficiency. This paper explores the IBM Retail Data Warehouse (RDW) as a comprehensive solution for data-driven decision-making in the retail sector. By implementing robust data integration and governance frameworks, businesses can enhance their ability to derive valuable insights, streamline operations, and maintain a competitive edge in the dynamic retail landscape. Ultimately, mastering data-driven strategies through IBM RDW empowers retail businesses to transition from reactive decision-making to proactive, customer-centric approaches, ensuring long-term growth and sustainability in an ever-changing market

Keywords— Data Warehouse, Retail Data Warehouse Model (RDWM), Retail Services Data Model (RSDM)

1 Introduction

Retail businesses operating on a global scale face intense competition, requiring them to continuously adapt to shifting market dynamics. Consumer preferences are evolving rapidly, driven by technological advancements, economic fluctuations, and changing lifestyle trends. This creates an unpredictable environment where businesses must remain agile to sustain profitability [1]. As profit and loss margins grow increasingly narrow each year, retailers must navigate the delicate balance between cost efficiency and value creation [2]. Consumers now exhibit diverse purchasing behaviors, ranging from seeking the lowest prices on essential goods and commodities to favoring premium and niche providers that offer high monetary and personal value. In this landscape, businesses must implement data-driven strategies, leveraging advanced analytics and predictive insights to anticipate consumer demands and respond proactively [3].

Retailers that fail to adapt risk losing market share to more agile competitors who harness data intelligence, dynamic pricing models, and personalized customer experiences [4]. By embracing business intelligence tools, retail businesses can optimize their supply chains, refine pricing strategies, and enhance customer engagement, ultimately securing a sustainable competitive advantage in the ever-changing global marketplace [5]. Niche and premium providers face the challenge of competing against rapidly evolving industry trends and the dominance of large-scale, mainstream retail businesses. To remain relevant and competitive, these specialized retailers must quickly adapt to stricter industry standards, evolving consumer preferences, and technological advancements. Failure to do so risks their gradual displacement by emerging market trends and more agile competitors [6].

©2025 Maria Santos Fernandez

In an increasingly customer-centric retail landscape, businesses must recognize that consumer expectations drive every stage of the business cycle—from product development and marketing to sales and post-purchase engagement. Unlike mass-market retailers that thrive on volume and cost efficiency, niche and premium providers must differentiate themselves by offering superior quality, personalized experiences, and unique value propositions. This requires a deep understanding of customer needs, preferences, and purchasing behaviors. To achieve long-term success, these businesses must leverage data analytics, market research, and consumer feedback to refine their strategies continually. By implementing tailored marketing campaigns, enhancing product differentiation, and ensuring seamless customer experiences, niche and premium retailers can build lasting brand loyalty and thrive in an industry where adaptability is the key to survival.

To accurately determine and meet customer needs, merely collecting raw data is insufficient. Businesses must go beyond data accumulation and transform this information into actionable insights that drive strategic decision-making [7]. Effective data utilization enables businesses to understand not just what customers want, but also when, why, where, and how they prefer to receive products and services. This transformation requires the integration of advanced data analytics, business intelligence tools, and predictive modeling [8]. By analyzing purchasing patterns, customer behavior, and market trends, businesses can optimize inventory management, refine marketing strategies, and enhance supply chain efficiency. Additionally, leveraging artificial intelligence and machine learning can help identify emerging trends, anticipate demand fluctuations, and provide personalized recommendations, ensuring a more customer-centric approach [7, 8]. Furthermore, businesses must establish robust data governance practices to ensure data accuracy, security, and compliance. A well-structured data strategy allows companies to derive meaningful insights that improve decision-making, enhance customer satisfaction, and ultimately drive profitability. In an era where data is a crucial competitive asset, the ability to convert raw information into valuable intelligence is key to long-term success in the retail industry.

1.1 *Retail Data Warehouse (RDW)*

IBM's Retail Data Warehouse (RDW) serves as a centralized platform that consolidates vast amounts of collected data and efficiently manages business intelligence applications [9]. By integrating structured and unstructured data from multiple sources, RDW enables retail businesses to harness the full potential of their data for strategic decision-making. Once the RDW is fully implemented, data analysts can perform in-depth data mining, uncovering critical insights that drive informed retail management strategies and operational improvements. One of RDW's key strengths lies in its ability to support large-scale, regional supply chains, particularly those involving multiple competing retailers [9, 10]. In these dynamic environments, where two or more distinct competitors share supply networks and distribution channels, RDW facilitates real-time data synchronization, demand forecasting, and inventory optimization. By analyzing sales trends, consumer preferences, and logistical efficiencies, businesses can make data-driven decisions that enhance supply chain coordination, reduce operational costs, and minimize stock imbalances [11].

Additionally, RDW supports advanced analytics, including predictive modeling and trend analysis, which empower retailers to anticipate market shifts and respond proactively. This capability is especially beneficial in highly competitive retail outlets, where the ability to adapt quickly to changing customer demands and supply chain disruptions is crucial for maintaining a competitive edge. Through the integration of IBM's RDW, retail businesses can achieve enhanced operational efficiency, improved customer satisfaction, and sustained profitability in an increasingly data-driven industry [8, 12].

1.2 Advantages of RDW

1. **Provides Clear and Actionable Business Insights**
   RDW offers a structured framework for analyzing business data, ensuring that organizations gain a clear and comprehensive understanding of their operational needs, market demands, and customer behaviors. By transforming raw data into meaningful insights, RDW enables businesses to make data-driven decisions that align with their strategic objectives.
2. **Facilitates Step-by-Step Implementation of Business Strategies**
   RDW supports a phased and systematic approach to business planning and execution. Through its structured data integration and visualization capabilities, businesses can monitor and evaluate each stage of strategy implementation, ensuring alignment with organizational goals while minimizing risks and inefficiencies.
3. **Ensure Compliance with Industry Standards and Regulations**
   The evolving nature of IT and business environments necessitates adherence to updated regulatory requirements and industry's best practices. RDW ensures that businesses remain compliant by maintaining

data governance, security protocols, and adherence to legal and ethical data-handling standards, reducing risks associated with regulatory violations.

4. **Provides a Comprehensive Blueprint for Data Visualization Models**
   RDW enhances data interpretation by offering advanced visualization tools that enable businesses to represent complex datasets through dashboards, graphs, and interactive reports. These visual models allow decision-makers to quickly grasp key insights, track performance metrics, and identify trends that drive strategic planning and operational efficiency.
5. **Enhance Data Architecture and Modeling Best Practices**
   RDW promotes the adoption of robust data architecture models that align with industry-leading best practices in data modeling. By improving data structuring, integration, and retrieval processes, RDW ensures scalability, accuracy, and efficiency in managing vast amounts of retail data. This optimization fosters better data consistency, enhances predictive analytics, and supports long-term business intelligence objectives.
6. **Optimizes Retail Supply Chain and Inventory Management**
   By integrating real-time data analytics, RDW helps businesses optimize supply chain operations and inventory management. Retailers can monitor demand fluctuations, track stock levels, and forecast future inventory needs with higher accuracy, reducing wastage, preventing stockouts, and improving operational efficiency.
7. **Improvements in Decision-Making Through Advanced Predictive Analytics**
   RDW leverages machine learning and predictive analytics to identify emerging market trends, customer preferences, and potential business risks. This proactive approach allows retailers to adapt to changing consumer behaviors, optimize marketing strategies, and enhance overall business performance in a competitive retail landscape.

By leveraging these advantages, IBM's RDW empowers retail businesses to transform data into a strategic asset, driving innovation, operational excellence, and long-term profitability.

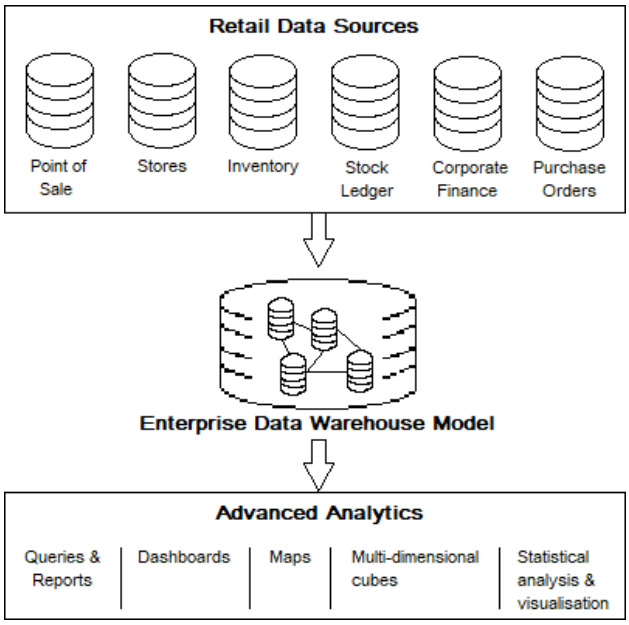

Figure 1. View of all retail information.

1.3 Retail Data Warehouse Model (RDWM)

IBM's Retail Data Warehouse Model (RDWM) is a highly customizable and scalable framework designed to integrate and centralize disparate data sources within a retail business [13]. By consolidating scattered data into a unified, comprehensive view, RDWM eliminates data silos, enabling seamless data access and analysis across various departments [6, 13]. This holistic approach ensures that businesses can derive meaningful insights without being constrained by specific products, organizational hierarchies, or account structures, making it a versatile solution adaptable to diverse retail environments. One of the key strengths of RDWM is its flexibility in accommodating the unique needs of different retail organizations [9, 13]. Whether a business operates as a small-scale niche retailer or a

global enterprise, RDWM can be tailored to align with specific business objectives, regulatory requirements, and operational workflows. This customization allows businesses to define their own data models, reporting structures, and analytical frameworks, ensuring that the system evolves alongside changing market conditions and strategic goals [13].

Additionally, RDWM supports multi-channel retailing by integrating data from online and offline transactions, supply chain operations, customer interactions, and financial records. This integration enhances decision-making by providing a single, reliable source of truth that enables retailers to track performance metrics, optimize inventory management, and enhance customer engagement strategies. Furthermore, RDWM facilitates predictive analytics and machine learning applications, allowing businesses to forecast demand, identify emerging trends, and implement data-driven strategies for competitive advantage. By leveraging RDWM, retail businesses can enhance operational efficiency, improve customer experiences, and drive sustained growth in an increasingly data-driven industry [7, 13].

Some Advantages of RDWM can be listed as:

1. Allow the business to select a particular channel of trade easily.
2. Reduces development, maintenance and running costs of business intelligence applications by using a reusable data structure environment and platform.
3. Offers a universal point of reference for combining older versions of data warehouses across supply chains.

1.4 Retail Services Data Model (RDSM) and Retail Business Solution Template (RBST)

IBM's Retail Services Data Model (RDSM) acts as a starter to the process of developing models by providing a relationship between analytics, data, and overall environment using a customisable hierarchy of business definitions and terminology [14].

IBM's Retail Business Solution Template (RBST) are customisable pre-defined or user-defined templates enable businesses to outline analytical reporting requirements by grouping data into specific areas [15]. Templates are usually made up of dimensions and measurable data. For example, business key performance indicators like the amount of sales, gross profit (GP), stock in inventory, promotional discounts, and liabilities. Pre-defined templates will generally include the areas of supply chain, multi-chain, regulatory compliance, corporate finance management, store operations management, products/services management, merchandising management, and customer management [14, 15].

2 Problem Formulation

Two different case studies regarding their problems and solutions will be examined here.

2.1 *Case Study 1: A Children's Place*

Children's Place is a retail business that has more than 1400 stores and 4000 cash registers. Each day they have more than 1.5 million transactions. The business has two primary brands, "The Disney Stores" and "The Children's Place". The business wants to merge sales and merchandising of these 2 primary brands. However, as these brands are distinct from each other and are separated, there is no consolidated enterprise view of the 2 brand's sales and merchandising. This results in limitations in responding to the needs of the business users [9].

After seeking help from IBM, the business utilises the RDW model and IBM's Retail Business Intelligence Solution. The business started using RBST to display data that is relevant to the terms and views of the business by using a model that is customised for financial reporting tasks. Now the business is able to analyse the whole picture via a customisable, flexible and integrated environment. In the future, less effort is required to add other parameters into the view [10, 13, 15].

2.2 *Case Study 2: Canadian Tire*

Canadian Tire is one of the most successful businesses in supplying their customers' automotive parts, accessories and services from local and retail brands. The business has more than 455 individual stores operating successfully along many coasts; however, they operate in enclosed groups (silos) and lack the enterprise-wide view of the business performance. As insufficient front-end tools like Microsoft Access and Excel are used for analysis and reporting, the IT department have problems understanding how the data was used, and back-end data alterations have become risky.

The business consulted IBM and said they wanted to handle both data management and business intelligence simultaneously. Following IBM's recommendations, they used a system that has IBM's RDW, Cognos 8 BI and IBM WebSphere Information Integrator for front-end analysis and reporting. This system enabled an enterprise-wide view

of the business, making the business able to think in real time ultimately leading to faster decision making [13, 14, 15].

3 Emergence of Big Data

In reference to RDWM, it collects all data that is scattered throughout the business into one view, this is called data integration and is performed in RDW. In retail businesses, data is commonly spread across different platforms, departments, and tools like business intelligence tools and big data platforms. As time goes by, these tools become outdated. Big businesses need to deal with unconsolidated data and complex architectures that have legacy systems in it, so it is expensive and difficult to reconsolidate the data. That is when data integration comes in handy for gathering all the data and turning it into useful data to create plans and access insights for growing the business [8, 11].

3.1 *Importance of Data Integration for Retail Businesses*

Data integration is the merge of data from 2 location sources into 1 unified source. In Case Study 2, each shop lot in Canadian Tire run as a silo. This means that the data shared in each shop is not in the enterprise-wide view. In Case Study 1, A Children's Place is facing problems with the speed of interactions of business users. As there are many interactions with customers from each shop lot, it is necessary to integrate these connections, transforming into useful consolidated customer intelligence for traceability of each shop's interactions. Consistent customer service will be achieved, and quick data analysis is possible by the business users if the business has an enterprise-wide view of their connections with leveraged data [7].

3.2 *Importance of Data Governance for Retail Businesses*

Data governance is the validation of data as per regulatory requirements and business rules set by the business, in other words, improving the quality of data by making sure data is consistent and trustworthy. Although a business might be efficient during operation, it might not be as efficient in keeping their data integrity and usability in the long run. As time passes, more and more transactions are piling up and newer data is created as a result. This new data could be adding new customers, suppliers, payments, materials, assets and liabilities. Each time manual data entry is done, there is a risk of human error such as producing duplicate data and incorrect values and this delays key decision making and implementing business growth strategies. This is the reason historical data leverage with new data is necessary to make key decisions and expand the business quickly. Data governance is one of the top 5 strategic goals for businesses in 2019 according to 2019 State of Data Management Report [3, 7, 10, 13, 14].

3.3 Common problems faced by IT staff in managing data

As described in Case Study 1, there was no data integration for the 2 primary brands, this leads to delays in responding to business users. Data integration is achieved by only 17% of the retail businesses from research by Salesforce [7]. Additionally, 42% of service agents are facing problems with data accessibility. As described in Case Study 2, the problem resides in not having the essential business tools in the front-end reporting of the business [13, 14]. Some new businesses other than Canadian Tires don't even have the resources to buy business intelligence tools, so this results in a steep slope to success and sustainability. As IT staff manage data gathered from shops that operate in silos, they might find inconsistent results. As these shops have no enterprise-wide insight into the business performance, there will be differences in data. The solution is to use business tools that enable enterprise-wide insight and allow the business to make decisions more efficiently and quickly.

3.4 Advantages & Disadvantages of Data Integration

1. *Resource optimisation*: If data is integrated, 2 or more data access and storage locations will become only 1 unified location, therefore it cuts additional resources for storing data which will reduce cost.
2. *Standardisation*: Homogenised data means that data will be in a universal format which makes leveraging legacy data easier.
3. *Leverage legacy data*: A data lake is generated out of historical data so data mining by data analysts is easier.
4. *Accessibility*: After data is mined and analysed, everyone in the business will be able to understand the data and it will be possible to create plans to grow the business further. Data becomes more valuable.

3.5 Advantages & Disadvantages of Data Governance

1. Ensures data consistency and reliability, therefore improving data quality.

2. Improves data accuracy and completeness.
3. By leveraging historical data with new data, it maximises the use of all the data from both sides.
4. As data mastery is maximised, it improves financial performance and business planning, leading to maximum profit generation.

4 Technical Architecture Proposal

In the context of managing a renowned retail business with two or more primary brands and over 100 shop lots, it is proposed to implement IBM's Retail Business Intelligence Solution by utilizing a Retail Data Warehouse (RDW) model for data integration. Additionally, IBM's WebSphere Information Integrator and Cognos 8 BI should be employed with the RDW model to enhance data governance. For making key business decisions focused on growth and maximizing profits, the Retail Decision Support Model (RDSM) and Retail Business Strategy Tool (RBST) are recommended. The RBST is particularly well-suited for this purpose, as it offers pre-defined templates that can be customized to meet specific needs or allow for the creation of new templates. This proposed system will effectively integrate data to establish a comprehensive data lake, facilitating data mining activities. Following the data mining process, the combination of historical data with new data will enable the extraction of valuable insights, thereby enhancing business capabilities and fostering growth. To ensure data reliability, the proposed system will eliminate the need for manual back-end maintenance and data alterations, thereby keeping data reporting streamlined and current within the front-end of business operations. This approach will significantly improve the reliability and timeliness of data.

5 Conclusion

Retail businesses need to understand that using effective data models like RDW, RDWM, RDSM and RBST to visualise the consolidated data, and business intelligence tools like IBM's Retail Business Intelligence Solution, IBM's WebSphere Information Integrator and Cognos 8 BI to make historical and present data useful for analytical insights to grow the business. In addition to having the right tools, the business must also understand the importance of utilising the concepts of data integration and governance to ensure an upper hand over their competitors and maintaining a successful business altogether.

BIBLIOGRAPHY

[1]. C. Glocker and P. Piribauer, Consumer preferences and inflation diffusion, 2023. doi:10.2139/ssrn.4593647
[2]. W. Muras and K. Szczepańska-Woszczyna, "Shareholders vs. efficiency of value creation in IT companies," Shareholders, Strategy and Value Creation, pp. 111–175, Dec. 2023. doi:10.4324/9781032650845-5
[3]. M. Farré, F. Todeschini, D. Grimaldi, and C. Carrasco-Farré, "Data-driven policy evaluation," Implementing Data-Driven Strategies in Smart Cities, pp. 197–225, 2022. doi:10.1016/b978-0-12-821122-9.00002-6
[4]. E. N. Torres and T. Zhang, "What is service? the origin and evolution of customer experiences," Customer Service Marketing, pp. 1–24, Dec. 2022. doi:10.4324/9780429263965-1
[5]. A. N. Chi, "Business intelligence (BI) system for budgeting and customer satisfaction," International Journal of Information Technology and Computer Science Applications, vol. 1, no. 2, Jun. 2023. doi:10.58776/ijitcsa.v1i2.31
[6]. H. Abbassi, Market analysis and sizing: Analyzing competitors and trends in the Organic Honey Market, 2024. doi:10.4135/9781071971574
[7]. D. Karyaningsih, "Decision support system for teacher performance assessment using the Weighted Product Method," International Journal of Information Technology and Computer Science Applications, vol. 1, no. 2, Jun. 2023. doi:10.58776/ijitcsa.v1i2.21
[8]. M. Konkathi, "Predictive modeling in Business Analytics: Leveraging AI & machine learning," International Journal of Science and Research (IJSR), vol. 13, no. 4, pp. 875–889, Apr. 2024. doi:10.21275/sr24403173852
[9]. O. CIRKIN, "Data Warehouse, detection and transfer of anomalies in Retail Data," The European Journal of Research and Development, vol. 3, no. 2, pp. 46–53, Jul. 2023. doi:10.56038/ejrnd.v3i2.265

[10]. L. Hedegård, "(re)framing used goods: Marketing strategies in second-hand retail," International Journal of Retail & Distribution Management, vol. 52, no. 13, pp. 136–153, Oct. 2024. doi:10.1108/ijrdm-05-2023-0300
[11]. P. Schelp, H. Skipworth, E. Aktas, and B. Vieth, "Supply Chain Risk Management," Supply Chain Disruptions and Stock Prices, pp. 1–23, 2024. doi:10.1007/978-3-031-68885-0_1
[12]. J. Li, "Predictive variables and exploratory analysis," Spatial Predictive Modeling with R, pp. 19–32, Jan. 2022. doi:10.1201/9781003091776-2
[13]. O. CIRKIN, "Data Warehouse, detection and transfer of anomalies in Retail Data," The European Journal of Research and Development, vol. 3, no. 2, pp. 46–53, Jul. 2023. doi:10.56038/ejrnd.v3i2.265
[14]. C. Gallouj, "The 'retail accordion' model of Hollander," Elgar Encyclopedia of Services, Jan. 2023. doi:10.4337/9781802202595.the.retail.accordion
[15]. N. Sathi and A. Sathi, "Case study 1 - retail shopping - solution overview," Introduction to Conversational AI for Business, 2021. doi:10.1007/978-3-030-73131-1_3