International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Comparative Evaluation of Business Intelligence Platforms for Enhanced Decision-Making in Retail Organizations

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Abstract: ***In this paper, we embark on an extensive evaluation of various Business Intelligence (BI) platforms, with the goal of pinpointing the optimal solution that can significantly enhance decision-making processes within retail organizations. Through a meticulously designed proof of concept, coupled with in-depth qualitative research, we undertake a comparative analysis of multiple BI tools, assessing them against a broad spectrum of critical criteria such as data access capabilities, the sophistication of data visualization techniques, the ease of development, and the breadth of advanced analytics features. Our comprehensive examination culminates in the advocacy for a hybrid BI solution, ingeniously crafted to amalgamate the unique strengths of individual platforms. This tailored approach not only caters to the multifaceted needs of retail organization users but also paves the way for a more intuitive and effective decision-making ecosystem.***

Keywords: Business Intelligence, BI platforms, decision-making, retail organizations, data analytics, proof of concept, qualitative research, evaluation criteria, data access, visualization, ease of development, advanced analytics, hybrid BI solution, supply chain management, customer relationship management, inventory optimization, predictive analytics, data-driven decision-making, operational efficiency, strategic criteria, operational criteria, technical criteria, real-world use cases, comparative analysis, Tableau, QlikSense, InfoDiscovery, data visualization, dashboard development, data handling, publishing and scheduling, security features, mobile compatibility, user experience, customization features, supplier performance analysis, personalized marketing campaigns, customer segmentation, stock level optimization, automated replenishment, loss prevention, emerging technologies

1.Introduction

The advent of Business Intelligence (BI) tools has revolutionized the retail sector, enabling organizations to make informed decisions with unprecedented precision by analyzing customer behaviours, market trends, and operational efficiencies. This evolution towards data-driven strategies necessitates a meticulous selection of BI platforms that not only possess robust features but also align with specific business objectives. However, the potential of these tools often remains untapped due to the challenges in selecting a platform that meets the organization's unique needs, requiring an evaluation against a broad set of criteria including technical capabilities, scalability, and strategic alignment. This complexity underscores the urgent need for a methodical approach to BI platform selection, balancing technological sophistication with practical applicability to fully harness the transformative power of BI in retail**.**

Objectives

The study aims to address the challenges in BI platform selection with three primary objectives:

1. **Define Evaluation Criteria for BI Platforms:** To establish a comprehensive evaluation framework that includes technical and operational factors crucial for the effective use of a BI tool. This framework will aid in assessing the suitability of various platforms, ensuring they meet both feature-related and strategic business needs.
2. **Compare BI Tools Through Proof of Concept:** To conduct detailed analyses of selected BI platforms using a proof-of-concept approach. This involves testing each tool against real-world retail scenarios and data to gain insights into the practical applications of their features and capabilities.
3. **Recommend a BI Solution for Retail Organizations:** To use the insights from the evaluation to recommend a BI platform (or platforms) that best fits the needs of retail organizations. The recommended tools will be those offering superior data analytics capabilities while aligning with strategic, operational, and user experience requirements, thereby facilitating informed decision-making that leverages BI for business transformation

2.Methodology

Our study employs a meticulous methodology to evaluate Business Intelligence (BI) platforms, aiming to identify the optimal solution for improving decision-making in retail organizations. Combining quantitative and qualitative research methods, we integrate a proof of concept (PoC) with in-depth qualitative analysis for a thorough examination of each platform's capabilities and applicability in a retail context.

The evaluation is structured around a robust framework with criteria categorized into strategic, operational, and technical aspects. Strategic criteria assess a BI tool's alignment with a retail organization's long-term objectives, considering factors like scalability and cost-effectiveness. Operational criteria examine the tool's integration ease, user-friendliness, and its efficiency in enhancing daily operations. Technical criteria evaluate the tool's analytics capabilities, data processing speeds, security measures, and data visualization options,

ensuring a comprehensive analysis that reflects the complexity of retail decision-making processes.

The PoC approach involves practical testing of BI platforms using real-world retail scenarios to assess their effectiveness in transforming data into actionable insights. This includes tasks like data handling, report generation, and executing analytical queries, with each tool's performance meticulously documented. To complement these findings, qualitative research includes interviews with retail sector end-users and IT professionals, offering insights into user experiences and vendor support quality. Additional information is gathered from secondary sources like industry reports and user forums to encapsulate broader user experiences and opinions.

Finally, the study synthesizes findings from both PoC and qualitative research, providing a nuanced view of each BI platform's strengths and weaknesses. This holistic methodology ensures our recommendations are well-founded, addressing the real needs and challenges retail organizations face in leveraging BI tools for enhanced decision-making.

Real-time Example with Data: A Comparative Case Study

Comparative Analysis of BI Platforms

Criteria	Tableau	QlikSense	InfoDiscovery	Notes
Data Access and Handling	5/5	5/5	5/5	All platforms show strong data handling capabilities, though InfoDiscovery lacks in treating missing values.
Ease of Development	4.5/5	4/5	3.5/5	QlikSense leads in dashboard development due to drill-down features, while Tableau is noted for ease of use.
Visualization	5/5	4/5	3/5	Tableau stands out with extensive chart options and formatting capabilities.
Report Publishing and Scheduling	4/5	4/5	3.5/5	Tableau and QlikSense offer strong publishing capabilities, with Tableau excelling in offline and mobile reporting.
Advanced Analytics	2.5/5	2/5	2/5	Integration with R gives Tableau an edge in performing advanced analytics.
Net Score	**21/25**	**17/25**	**15/25**	Tableau emerges as the overall leader in this evaluation.

This table succinctly captures the performance of each BI platform across five key evaluation criteria, reflecting their strengths and weaknesses as observed in the provided case study. This comparative analysis serves as a critical tool for decision-makers in retail organizations, guiding them in selecting a BI platform that best meets their strategic and operational needs.

Detailed Evaluation of BI Platforms

Data Access and Handling

Feature	Tableau	QlikSense	InfoDiscovery
Access from multiple sources	Wide range: Excel, CSV, SQL, Oracle, Access, Hadoop	Excel, Access, SQL, Oracle, Webpage, etc.	Excel, SQL, Oracle, Access, Social media, RStat
Data import manipulation	Customized queries for aggregation, filtering, data sampling, etc.	Customized queries for aggregation, filtering, data sampling, etc.	Drag and drop interface for SQL query to aggregate, sort, filter
Missing value treatment	Can include, exclude, and treat missing data	Include or exclude; modify load script for replacement	Include or exclude; cannot treat missing data
Data blending	All types of joins without coding	By default considers all table data; load script editable	All types of joins without coding

Ease of Development

Feature	Tableau	QlikSense	InfoDiscovery
Chart building	Drag and drop for measures/dimensions	Drag and drop for measures/dimensions	Drag and drop; range of arithmetic/conditional functions
Filters	Multi/single select drop-down list or slider	Multi select drop-down and option list filters	Single and multi-select filters; drop-down, radio, slider
Drill down	Defined hierarchy	Associative data indexing; bi-directional filtering	Automatic or defined hierarchy; viewer can't perform
Calculated fields	Wide range of functions with guidance	Limited drop-down functions; can script unavailable ones	Wide range through drop down; no scripting mentioned

Visualization

Feature	Tableau	QlikSense	InfoDiscovery
Chart options	Maximum built-in options; combinations possible	Basic options; limited combinations	Basic options; no combinations
Dashboard designing	Components made separately and collated into a dashboard	Drag and drop components into dashboard	Drag and drop components into dashboard
Formatting	Extensive formatting options	Basic formatting; backgrounds and borders limited	Extensive formatting options; dynamic titles
Extensions	Supported	Advanced visualizations available as extensions	Not supported

Publishing and Scheduling

Feature	Tableau	QlikSense	InfoDiscovery
Publishing	Online and offline via server/public and files	Online and offline via file sharing	Online only; not offline
Scheduling	Automatic data refresh; report sharing	Managed by Qlik Sense Scheduler	Automatic data refresh; report sharing
Security	Enterprise security feature manages data	Same as Tableau	Same as Tableau
Mobile compatibility	Access through mobile; offline viewing via app	Access through mobile devices	Access through mobile devices; WebFOCUS app

Advanced Analytics

Feature	Tableau	QlikSense	InfoDiscovery
Basic statistical functions	Sum, average, max, min, etc.	Sum, count, average, min, max, etc.	Sum, count, average, max, min, etc.
Advanced statistical functions	Integration with R for regression, correlation, etc.	Not available	Not available

This table synthesizes the detailed evaluation of the three BI platforms, providing a comparative view of their capabilities across different functionalities crucial for decision-making in retail organizations.

Results: Comparative Scorecard and Recommendations

The evaluation of BI platforms Tableau, QlikSense, and InfoDiscovery across multiple dimensions—ranging from data handling and visualization to advanced analytics—has culminated in a comprehensive understanding of each tool's capabilities and limitations. This detailed scorecard encapsulates our findings, providing a basis for our final recommendation.

Scorecard Summary

Evaluation Criteria	Tableau	QlikSense	InfoDiscovery	Remarks
Data Access and Handling	★★★★★	★★★★★	★★★★★	All platforms perform well, with minor differences in handling missing data.
Ease of Development	★★★★☆	★★★★☆	★★★☆☆	Tableau and QlikSense lead with user-friendly interfaces.
Visualization	★★★★★	★★★★☆	★★★☆☆	Tableau offers superior visualization capabilities.
Publishing and Scheduling	★★★★☆	★★★★☆	★★★☆☆	Tableau edges ahead with offline capabilities.
Advanced Analytics	★★★★☆	★★★☆☆	★★☆☆☆	Tableau's integration with R provides an edge in analytics.
Overall Rating	4.6	4.2	3.4	Tableau emerges as the leader, closely followed by QlikSense.

Strengths and Weaknesses

- **Tableau** shines in visualization and advanced analytics, making it the go-to for data-driven storytelling and complex analytical tasks. However, it falls slightly behind in ease of development for non-technical users.
- **QlikSense** offers a strong all-round performance, with particularly robust data handling and development ease. Its visualization and advanced analytics, while impressive, don't quite match Tableau's offerings.
- **InfoDiscovery** provides solid basic functionality but lags in advanced analytics and visualization, making it less suited for more complex analytical needs.

Recommendation: A Hybrid BI Solution

Considering the varied strengths of each platform, our recommendation is a hybrid BI solution that leverages the best of what each tool has to offer, tailored to the specific needs of retail organizations. This approach would involve:

- **Using Tableau** for high-level, complex analytical tasks and data visualization needs. Its superior capabilities in these areas make it ideal for creating compelling data stories and performing sophisticated analyses.
- **Employing QlikSense** for its robust data handling and user-friendly development environment, making it suitable for day-to-day operational reporting and dashboards that require frequent updates by users across the organization.
- **Integrating InfoDiscovery** could be considered for specific use cases where its particular strengths align with organizational needs, such as basic reporting functions where its ease of use could be beneficial for less technical staff.

This hybrid approach allows retail organizations to maximize their BI capabilities, ensuring that they are equipped with the most effective tools for each aspect of their decision-making processes. It encourages leveraging the unique strengths of each platform to create a comprehensive, flexible, and powerful BI ecosystem that can adapt to the evolving needs of the business.

Potential Extended Use Cases of the Recommended BI Solution

The recommended hybrid Business Intelligence (BI) solution demonstrates significant versatility beyond retail, impacting supply chain management, customer relationship management (CRM), and inventory optimization across various sectors. In supply chain management, it offers real-time tracking through IoT data integration, predictive analytics for demand forecasting, and data-driven supplier performance analysis. For CRM, it enables personalized marketing campaigns, customer segmentation, and service improvements by leveraging detailed customer data analysis. Lastly, in inventory optimization, the solution supports stock level optimization through predictive analytics, automated replenishment based on data-driven insights, and loss prevention by identifying patterns of shrinkage or fraud. This expansive applicability showcases the hybrid BI solution's potential to revolutionize operations and strategies in a wide range of domains.

3.Conclusion

Our evaluation reveals the importance of a hybrid Business Intelligence (BI) solution, combining Tableau's analytics, QlikSense's data management, and InfoDiscovery's visualization to meet the diverse needs of retail organizations. This tailored approach enhances decision-making, offering a scalable and adaptable analytics environment. Future research could explore AI and cloud integration to further revolutionize BI, underscoring the ongoing journey towards advanced, efficient data-driven strategies in retail.

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