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Transforming Banking with Data Lakehouse Architecture: Overcoming Integration Challenges to Enhance Analytics and Decision-Making

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Abstract

The banking sector faces integration challenges with traditional data systems, such as data warehouses and data lakes, which hinder real-time analytics and actionable insights. This review addresses a critical research gap in the adoption of Data Lakehouse architectures within financial institutions. A systematic literature review of empirical studies from five major databases including IEEE Xplore, SpringerLink, ResearchGate, Semantic Scholar, Google Scholar spanning 2015–2024 highlighted that Data Lakehouses can enhance analytics speed by up to 30%, improve data governance by 25%, and reduce operational costs by 20%, compared to legacy systems. By seamlessly integrating structured and unstructured data, while ensuring Atomicity, Consistency, Isolation and Durability (ACID) compliance, Data Lakehouses eliminate data silos and enable real-time decision-making. These improvements directly translate into faster decision-making, more accurate risk assessments, and better customer experiences, giving banks a competitive edge. However, further empirical research, particularly longitudinal case studies, is required to validate these findings and optimize implementation strategies within the banking sector and beyond. This study underscores the strategic value of adopting Data Lakehouse platforms to modernize data infrastructure and enhance operational efficiency in a rapidly evolving market.

Keywords: *Data Lakehouse, Banking, Integration, Analytics, Governance, Decision-Making*