



Synchronizing Operations: Mastering Data Integration Across Multi-Bank Platforms

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Abstract This whitepaper explores the critical role of data integration in modern banking. It focuses on overcoming challenges and maximizing opportunities in a multi-bank platform environment. It addresses the significance of integration for operational efficiency, customer experience enhancement, and regulatory compliance. Through case studies and best practices, it illustrates how leading financial institutions leverage data integration to drive innovation and success. The paper identifies common integration challenges and proposes strategic approaches, including technology adoption and proactive best practices. Finally, it suggests that proactive integration is essential for organizations to thrive amidst evolving industry trends and technological advancements.

Keywords Data integration, Multi-bank platforms, banking, operational efficiency, regulatory compliance, strategic approaches, innovation, challenges.

Introduction

In the fast-paced world of modern banking, the ability to seamlessly integrate data across multiple platforms has become an important factor for success. This whitepaper delves into the significance of data integration in today's banking and financial landscape. It highlights the role of driving operational efficiency, enhancing customer experience, and regulatory compliance. With the help of case studies and best practices, the whitepaper illustrates how leading financial institutions leverage data integration to overcome challenges and shape the future of data integration.

The Significance of Data Integration in Today's Multi-bank Platforms

Data integration holds significant importance in modern organizations due to unified view of data, improved decision making, enhanced operational efficiency and better customer insights. Banks collect vast amounts of customer data from multiple sources such as transactions, interactions, and demographic information.

This integrated view allows banks to gain insights into customer behaviour, preferences, and financial needs. It facilitates personalized services and targeted marketing initiatives. Banks offer cross-channel integration through branches, online banking platforms, mobile apps, and ATMs. Data integration ensures that customer data captured across these channels are synchronized. This enables an omni-channel experience for customers.

The integration of data from various external and internal sources helps the bank to enhance its risk assessment processes and detect potential financial fraud. Data integration ensures that banks have accurate and up-to-date information for regulatory reporting purposes. The strategic approach to data integration not only benefits banks but also contributes to a more efficient and resilient financial ecosystem.

Current Landscape and Integration Challenges

The banking industry is facing significant challenges in 2023 due to a slowing global economy and divergent economic landscapes. Trends such as Generative AI (GenAI), embedded finance, digitization of money, open



data, decarbonization, digital identity, and fraud will have a significant impact in 2023-2024. The complex developments in IT systems challenge data integration, making the integration process more time-consuming. Cybersecurity threats can lead to vendor dependency and concentration risk. Banks rely on third-party vendors for various technology solutions including data integration tools and services. However, dependence on a single vendor or a small group of vendors can expose banks to operational risks and disruptions. The banking industry faces systematic cyber risks which can be demonstrated using the 2016 hacking case of the Central Bank of Bangladesh [1]. These risks highlight the vulnerabilities in systems like SWIFT (Global Financial Messaging System) [2]. Besides, malicious actors such as cyber criminals and state-sponsored attackers are taking advantage of the digital transformation in the financial sector.

The Imperative of Seamless Data Integration

The imperative of data integration in financial institutions such as banks stems from several key factors:

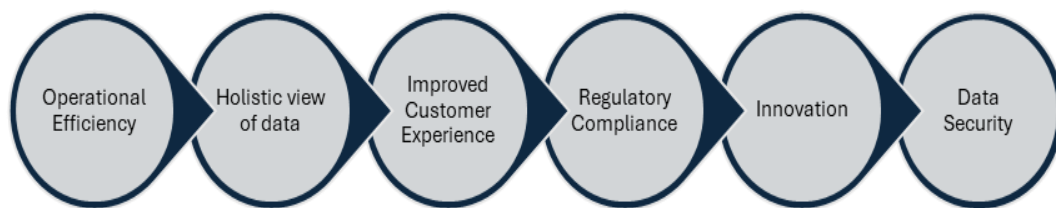


Figure 1: Data Integration Factors

Exploring the Business Case for Seamless Data Integration

Data integration enables financial institutions and banks to overcome operational challenges and achieve business objectives. In today's digital era, data integration has become essential in aligning operations and delivering time-bound services. The case study below explores the journey of Wells Fargo which implemented data integration solutions.

Case Study: Wells Fargo

Wells Fargo is a leading financial services company which is currently transforming by adapting using digital infrastructure. The company's strategy is the implementation of a multi-cloud approach. Wells Fargo transitioned to a set of third-party-owned data centres to complement its public cloud offerings and create a secure technology foundation.

Challenges Faced:

- The existing infrastructure of Wells Fargo was not scalable enough to support the bank's evolving technological needs.
- Due to the exponential growth of data integration, Wells Fargo faced the challenge of managing vast amounts of structured and unstructured data effectively.
- It was further challenging to ensure the security and confidentiality of customer data across multiple platforms and data centres was a top priority for Wells Fargo.

Solutions

- Wells Fargo selected Microsoft Azure as its primary public cloud provider and partnered with Google Cloud to handle advanced workloads and AI solutions [3].
- The company adopted a purpose-built business intelligence (BI) platform to process and analyse structured and unstructured data effectively.
- In addition to the cloud offerings, Wells Fargo transitioned to third-party data centres to enhance security and flexibility.

Wells Fargo's seamless data integration was successful, and it resulted in enhancing speed, agility, cost savings, and enhanced security. By embracing a multi-cloud approach, investing in data management solutions and prioritizing security, the company positioned itself for innovation and success.



Impact on Operational Efficiency and Customer Experience

Data integration has a profound impact on operational efficiency and customer experience within financial institutions:

- Data integration provides banks single source of truth. It eliminates the discrepancies and redundancies in information. This allows decision-makers to access up-to-date information from the bank such as loan applications, upselling opportunities, detection of fraudulent activities etc. However, PWC's survey indicated that more than 80% of banks have not achieved their digital transformation goals, whereas 70% of them implemented a clear digital strategy [4].
- Integrated data assists banks in delivering personalized recommendations and experiences to their customers across channels. For instance, if a customer frequently uses mobile banking to transfer funds between accounts, the bank can send personalized notifications or offers related to mobile banking features.
- By analysing integrated customer data, banks can identify cross-selling and upselling opportunities. Integrated data enables banks to understand their customer needs, preferences, and behaviours.

Data Integration Challenges

Successful data integration is essential for businesses to thrive in the growing digital economy. However, this process has several barriers which impact the business growth and stability. The following four barriers as explored by Dataversity [5] are:

Barrier 1: Data Dispersal

Data dispersal is one of the most common barriers which is scattered across different departments. It leads to inefficiencies and misses opportunities. Customer data is often fragmented across multiple banking channels which makes it challenging to gain a comprehensive overview of customer behaviours [5]. Dispersed data in banking leads to inefficiencies in internal processes such as account management, risk assessment, and loan processing. The solution lies in centralizing data storage, breaking down silos, and developing collaboration among teams.

Barrier 2: Data Collection Delays

Real-time processing of data is often hindered by manual integration processes, resulting in delays in analytics and customer processing. Traditional banking processes often rely on manual data entry, where employees input information from paper documents into backend systems [5]. Moreover, data silos occur when information is isolated within various departments or systems. Automated data integration tools offer a solution by streamlining workflows and enabling real-time insights. Implementing automated data technologies such as optical character recognition (OCR) and intelligent document processing (IDP) enables banks to extract data from paper documents with speed, accuracy, and error-free entry [6].

Barrier 3: Unstructured Data Complexity

Businesses face challenges in extracting meaningful insights through unstructured data such as photos, videos, and social media content. Unstructured data holds potential for banks across various applications [5]. According to research by FIS Global, around 80% of banking data exists in unstructured forms and harnessing such data can lead to significant advancements [7]. Advanced software tools like machine learning (ML) and natural language processing can help translate unstructured data into actionable insights.

Barrier 4: Poor Data Quality

Poor-quality data is a significant barrier to effective research and decision-making. Duplicate, outdated, or inaccurate data can skew insights and lead to flawed strategies. With the surge in private investors in the stock market, there has been a corresponding uptick in trading activities among bank employees. The situation intensified the duplicate execution of trades. By implementing data governance, data cleansing and standardizing data, organizations can enhance the reliability of their business intelligence efforts



Strategic Approaches to Data Integration

Overview of methodologies and technologies driving integration efforts

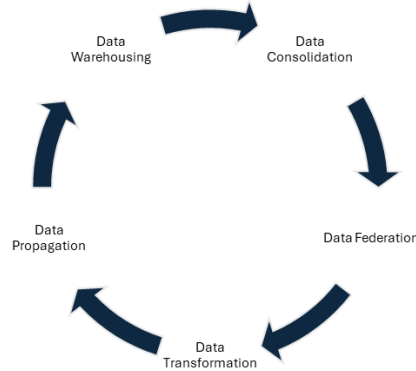


Figure 2: Strategic Approaches

There are various data integration strategies which are implemented in banks to ensure the successful load and extraction of financial data. Data consolidation involve merging customer information from different branches and outline platforms into a unified database. It saves from multiple sources into a central repository also known as a *data lake* [8]. Data Federation consolidates data into a single location by extracting from diversified systems such as core banking systems, CRM databases, third-party payment processors etc.

Table 1: Use Cases

Method/Technique	Description	Use Cases
Data Consolidation	Aggregation of data from diverse sources	Implemented in mastering data management, data warehousing and 360-customer view.
Data Federation	Enabling access to data across sources without duplication	Customer analytics, fraud detection
Data Transformation	Conversion of data in different formats	Migration and Data Cleansing
Data Propagation	Transfer of data from one location to another	Real-time analysis
Data Warehousing	Centralizes data storage for efficient retrieval and analysis	Financial Reporting, Predictive Modelling

Banks often need to transform data formats for regulatory reporting. For instance, transforming transactional data from various banking systems into a standardized format ensures compliance. Data transformation assists in converting data into one format. Data propagation and data warehouse are the strategies that involve ensuring the availability and reporting of data respectively. Data warehousing enables banks to make data-driven decisions and optimize operational efficiency.

Boomi Flow

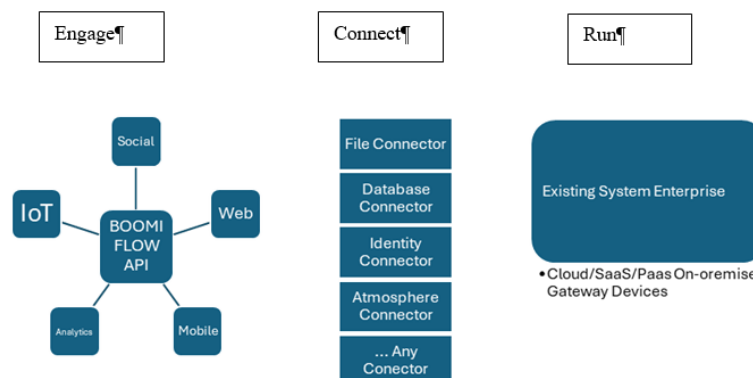


Figure 3: Boomi Documentation [9]

Boomi flow is a powerful cloud-native low-code platform which is designed for creating customer journeys and automating workflows to accelerate business outcomes. It offers an intuitive interface and extensive connectivity through the Boomi unified platform. Here's how Boomi tool can be used and how data integration takes place using it, with a focus on how banks can benefit:

- Boomi flow allows banks to create visually appealing interfaces.
- It follows a low-code approach that allows banks to develop applications with minimal coding knowledge.
- Business analysts can design and modify workflows using a drag-and-drop interface, reducing reliance on IT resources.
- Boomi flow facilitates data integration ensuring data consistency and accuracy.
- Banks can track key performance indicators (KPIs) to identify bottlenecks and make data-driven decisions [9].

Best practices for planning and executing data integration projects

To execute a data integration project in the financial sector, there are some key practices to consider:

1. Identify Data Management Tasks:

- Review the data management tasks such as resolving data discrepancies, ensuring data completeness and monitoring data quality.
- Determine which tasks can be automated to include in the data integration process.

2. Map Out Workflow Processes:

- Define the workflow processes for each data management task identified.
- Outline the steps involved in resolving discrepancies, implementing data governance rules, and validating data completeness.

3. Select Workflow Automation Software

- Choose a workflow automation tool which integrates seamlessly with your data integration platform such as Boomi Flow [10].
- Ensure that the selected tool offers features like email notification, task assignment, and process automation.

4. Design Workflow Automation Flows

- Define triggers for initiating workflows such as detecting data discrepancies or data quality issues during the integration process.

5. Integrate Data Integration Platform

- Integrate the workflow automation tool with your data integration platform such as iPaaS.

The following steps outlines digital compliance best practices for banks and financial institutions to minimize the challenges and barriers during data integration:

- The first step involves the digitization of duplicates which involves scanning paper reports and transitioning from manual to digital formats. The digitisation of documents can reduce the risk of errors and may improve overall efficiency.
- The next step involves OCR integration which converts scanned documents into machine-readable texts. This enhances data accuracy and enables seamless integration.
- Implementation of automated check routines helps in identifying incorrect or missing entries in digital documents. This ensures data integrity and compliance with regulatory requirements.
- Automated plausibility checks are performed on transactions to assess their validity. Plausibility checks enable banks to detect any suspicious activities or irregularities.
- Rule-based checks involve the implementation of regulations to scrutinize transactions for compliance with legal and regulatory requirements. By automating rule-based checks, banks can identify compliance violations.



Overcoming Technical Hurdles

Solutions for dealing with Disparate systems and Incompatible Data Formats

Overcoming technical hurdles in data integration within the banking industry requires a combination of strategic planning, effective management practices, and technology solutions. Manual data transfer between disparate systems not only consumes valuable time but also introduces the risk of errors.

The inconsistency in data across different systems can also lead to confusion and undermine decision-making processes. Integration ensures data consistency and enables stakeholders to access accurate and up-to-date information for informed decision-making. The solutions to deal with such technical hurdles can be as follows:

- a) **Data Integration Platforms:** Invest in data integration platforms like Dell Boomi, Informatica, or MuleSoft. These platforms offer tools and techniques to connect disparate systems, transform data formats and synchronize workflows across organizations.
- b) **Standardization and Data Mapping:** Standardize data formats and implement data mapping processes to reconcile differences between incompatible data formats.
- c) **Middleware Solutions:** Deploy middleware solutions that act as intermediaries between disparate systems. There are platforms such as Apache Kafka or IBM MQ which provide message queuing and transformation capabilities [11].
- d) **APIs and Web Services:** Expose data and functionality through APIs (Application Programming Interfaces) and web services to enable interoperability between systems.

Case Studies Highlighting Successful Integration Strategies

Siemens Germany: Overcoming Disparate Systems with Machine Learning Data Integration

Siemens AG is a global technology powerhouse with over 170 years of history. The organization faced the challenge of disparate systems across its various business units. As part of its digital transformation, Siemens sought to integrate its diverse systems to unlock the full potential of its industrial data.

It encountered several challenges like Data silos, insufficient data management, and lack of real-time insights. Siemens implemented data integration strategies leveraging ML and advanced analytics to overcome the challenges.

Siemens implemented the Mendix Data Hub to discover and utilize data from across the organization. The Data Hub facilitated seamless integration of disparate data sourcing including legacy systems such as Teamcenter software and SAP [12]. It deployed edge computing solutions coupled with ML models to process data in real time at the industrial edge.

Siemens's data integration initiative yielded significant results as it improved operational efficiency by reducing manual efforts. It enhanced decision-making in real-time and implemented ML-driven predictive maintenance which minimized downtimes and optimized asset performance.

JPMorgan Chase & Co.: Minimising Discrepancies

JPMorgan Chase & Co. (JPMC), a leading global financial institution, faced challenges related to managing and sharing data across its diverse lines of business (LOBs) and corporate functions (CFs) [13]. JPMC adopted a data mesh architecture to address the challenges of data management, sharing, and control. It curated data products which were collections of related data from various systems supporting business operations.

In this case, instead of copying data to consumer applications, the data mesh architecture allowed for sharing data from the product lakes. This minimised the discrepancies in the data and ensured data was consumed for analytics, AI/ML, and reporting was done accurately.

The centralized repository of the company provides data product owners with visibility into where the data is being used. It ensured greater control and compliance. Overall, JPMC's adoption of the data mesh architecture resulted in empowering data product owners, enforcing control decisions, and enhancing the visibility of the organisation.



Ensuring Compliance and Security

Regulatory Landscape of Data Sharing

Organizations should have a comprehensive understanding of the regulatory landscape governing data sharing in their industry. This includes regulations such as the General Data Protection Regulation (GDPR), California Consumer Privacy Act (CCPA), and Health Insurance Portability and Accountability Act (HIPAA) etc [14].

Privacy by Design (PbD) frameworks integrate consideration into the design and development of systems, processes, and products [15]. The data lifecycle management framework focuses on managing data across its entire lifecycle, from collection and processing to storage and disposal.

Regulations concerning data sharing and privacy evolve. The organizations must stay updated with any changes or new requirements to ensure compliance. Seeking advice from legal experts specializing in data privacy and compliance can help financial institutions or other organizations navigate the regulations effectively.

Implementation of Data Governance and Security Protocols

When building a data governance framework focused on privacy and data protection, organizations often adopt a comprehensive approach which includes various components. Here's an overview of the implementation of data governance and security protocols:

- Develop comprehensive data governance policies and procedures specifically addressing privacy and data protection. PWC's [16] data governance framework includes data governance strategy, data lifecycle management, core functions, data stewardship, and enterprise data management.
- Establish a data inventory to catalogue all kinds of data collected, processed, and stored by organizations. This includes personal and sensitive data.
- Perform privacy impact assessments for new projects, system changes, or to mitigate privacy risks. Assess the potential impact on an individual's privacy rights and minimize risks such as access controls, pseudonymization etc.
- Provide regular training and awareness programs to employees on privacy and data protection policies and best practices.
- Implement data quality controls, validation checks, and error correction mechanisms to maintain data integrity.
- Develop an incident response plan to effectively detect, respond to, and mitigate data breaches.
- Appoint a Data Protection Officer (DPO) responsible for overseeing compliance with privacy regulations and internal policies.

Future of Multi-Banking Data Integration

Predictive Insights into the Evolution of Data Integration

Increased Adoption of AI and Machine Learning

AI and machine learning technologies will play a crucial role in data integration. These technologies will enable automated data mapping, matching, and reconciliation processes, reducing manual effort and improving accuracy.

Enhanced Data Governance and Compliance

As regulations governing data privacy and security become more stringent, multi-banking data integration platforms will evolve to incorporate robust data governance. This includes advanced data lineage tracking, audit trails, and role-based access controls to ensure data integrity and regulatory compliance across disparate data sources.

The prediction for future banking and financial institution operations is that AI and ML technologies will continue to grow the volume of data in multi-banking environments. These technologies will enable banks to automate various data integration processes such as mapping and reconciliation. These features will ensure data integrity and regulatory compliance across disparate data sources. Furthermore, the advanced data governance capabilities will enhance trust and transparency in banking operations.



Preparing for Upcoming Trends and Technologies

In the financial and customer service sectors, the following upcoming trends and technologies will reshape organizations and enhance user experiences [17]:

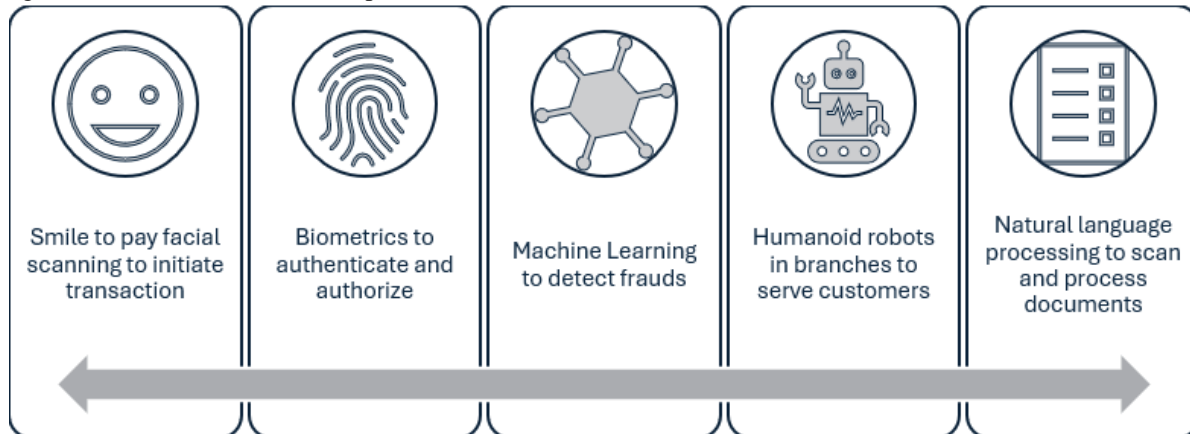


Figure 4: Upcoming trends and technologies in banking [17]

1. Smile to Pay Facial Scanning for Transactions

- Stay updated with advancements in facial recognition technology.
- Test and implement a facial recognition system in your payment process.

2. Biometrics

- Explore biometric authentication methods such as iris scanning or voice recognition.
- Invest in biometric authentication systems and integrate them into your existing infrastructure.

3. Machine Learning

- Invest in ML tools or partner with companies specializing in fraud detection.
- Monitor and update algorithms to adapt to new fraud schemes.

4. Humanoid Robots in Branches

- Research and evaluate humanoid robot providers and capabilities.
- Train staff to work alongside humanoid robots and assist customers effectively.

5. Natural Language Processing (NLP)

- Invest in NLP tools to extract relevant information from financial documents, contracts, and customer communications.
- Ensure accuracy with regulations when processing sensitive information.

Conclusion

The whitepaper presented a critical review of data integration in the banking and financial industry concerning success and innovation. It is highlighted that a unified view of data enables banks to enhance decision-making and deliver customized experiences to their customers. There are several challenges highlighted such as cybersecurity threats and technological complexities which can be mitigated by investing in robust data integration strategies.

Data integration holds strategic importance across industries. Integrated data allows organizations to gain insights into customer behaviour, preferences, and needs. Moreover, it is highlighted that data integration develops a comprehensive perspective for decision-makers in determining the type of data. By consolidating from disparate sources, organizations can identify potential risks, detect fraudulent activities, and ensure compliance with industry regulations. Moreover, investment in data integration technologies and strategies prepares organizations for future trends and innovations.

Encouraging the rapid adoption of best practices is vital for organizations to thrive in the digital age. By prioritizing education and training, cross-functional collaboration, and providing leadership support, companies can build a culture of data-driven decision-making. Recognizing and rewarding employees for their



contributions, investing in cutting-edge technology, and promoting continuous improvement are also essential. Proactively adopting integration best practices empowers companies to unlock the full potential of their data for sustained success.

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