

Comprehensive Analysis of Core Banking Operation

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Abstract- In today's data-driven financial landscape, efficient and accurate data consolidation is crucial for informed decision-making. This research focuses on the development of an automated, dynamic dashboard using Microsoft Excel—leveraging tools like Power Query and Pivot Tables—to streamline the processing of financial records, such as customer credit scores, loan statuses, and transaction histories. The proposed system eliminates the need for manual data entry by automatically merging Excel files stored in a designated folder and refreshing insights in real time. Through data transformation, visualization, and automation, the dashboard offers a cost-effective solution for small and medium-sized enterprises (SMEs) to monitor key financial metrics with minimal technical expertise. This study demonstrates how widely available tools can be effectively utilized to build intelligent, self-updating dashboards, ultimately improving operational efficiency and the reliability of financial analysis.

Keywords-Automated Dashboard, Power Query, Financial Data Visualization, Excel Automation, Pivot Tables, Business Intelligence, Data Integration, Self-Service BI, Real-Time Reporting, Excel Dashboarding

INTRODUCTION

In the digital age, the volume of data generated by organizations has reached unprecedented levels. Particularly in the financial sector, institutions deal with vast and complex datasets originating from various sources—customer transactions, loan applications, credit histories, and account balances, among others. Traditionally, analyzing such data required manual efforts like copying, pasting, and consolidating from multiple spreadsheets, which is not only time-consuming but also prone to human errors.

Microsoft Excel, one of the most widely used tools for data analysis, has evolved significantly over the years. What was once used for simple tabulations can now handle more sophisticated data processing tasks through features like Power Query, Power Pivot, and Pivot

Charts. These features allow users to connect multiple data sources, clean and transform data, and create dynamic, interactive dashboards that offer real-time insights.

As organizations shift towards data-driven decision-making, the need for automated dashboards becomes increasingly crucial. Dashboards provide a centralized platform to visualize key performance indicators, track business metrics, and facilitate quick, informed decision-making. However, creating and maintaining these dashboards manually limits their effectiveness. Automation helps in reducing redundancy, minimizing errors, and ensuring that data visualizations always reflect the latest information.

This study focuses on leveraging the advanced features of Microsoft Excel to create an automated dashboard system capable of dynamically merging multiple Excel files, transforming and cleaning data, and displaying the insights in a user-friendly format. The system is especially beneficial for small to medium-sized financial institutions that handle large datasets but may not have access to expensive Business Intelligence platforms.

Problem Statement

In many financial institutions, especially small and medium-sized enterprises (SMEs), the process of consolidating financial records such as customer account balances, loan information, credit scores, and transaction histories is often carried out manually. This involves gathering data from multiple Excel files, each representing different time periods or data sources, and compiling them into a single view for analysis. Such a manual process is not only labor-

intensive and time-consuming but also prone to human error, leading to inaccurate insights and poor decision-making. The lack of automation in merging and visualizing financial data results in inefficiencies, particularly when updates are frequent and data volumes are high. Furthermore, any inconsistency in data formatting across files (e.g., different date formats or column arrangements) adds another layer of complexity. With increasing demand for real-time analytics and data-driven decisions, businesses require solutions that can automatically process incoming data and reflect the latest information without constant manual intervention. Existing enterprise-level business intelligence tools may offer such functionality, but they are often costly and complex to implement for smaller organizations. Hence, there is a clear need for a low-cost, automated solution that can dynamically integrate, clean, and visualize financial data stored in multiple Excel files—using tools already available to most organizations, such as Microsoft Excel.

Significance of the Study

This study holds significant value in the realm of self-service business intelligence (BI), particularly for organizations that rely heavily on Microsoft Excel for their day-to-day data operations. While many advanced BI tools exist, they often require substantial financial investment and technical expertise, making them inaccessible for small to medium-sized enterprises (SMEs). This research demonstrates how readily available tools, such as Power Query, Pivot Tables, and Pivot Charts within Excel, can be leveraged to build a fully automated, scalable, and efficient dashboard system.

By automating the data import, transformation, and visualization process, the proposed solution:

- Reduces dependency on manual operations, which are time-consuming and error-prone.
- Ensures data consistency and accuracy, which are critical for financial analysis and decision-making.
- Empowers non-technical users to manage and analyze large volumes of data without programming knowledge.
- Improves organizational efficiency by enabling timely access to updated financial insights.

Moreover, the study contributes to academic and practical knowledge by offering a cost-effective approach to BI that can be replicated or adapted across

industries beyond banking. It bridges the gap between traditional spreadsheet usage and modern data automation, fostering a culture of innovation and digital transformation at the grassroots level.

Methodology

The approach taken in this study is both applied and descriptive. The primary aim is to design and develop a practical solution—a dynamic, automated Excel dashboard capable of merging data from multiple Excel files. This solution will be tested using real-world data from financial records to validate its effectiveness. The methodology combines data integration, automated reporting, and data visualization techniques, utilizing widely available tools like Power Query and Excel Pivot Tables.

The dashboard is designed to meet the following requirements:

1. **Dynamic Data Import:** The system automatically imports new data when files are added to a specified folder. This process is made possible by Excel's Power Query feature, which allows data from multiple Excel files to be combined and transformed seamlessly.
2. **Data Transformation and Cleaning:** The incoming data is processed to ensure consistency across all fields (e.g., date formats, numerical data types). Power Query's built-in functions will be used to clean and standardize data, removing any discrepancies that may arise from different data formats or file structures.
3. **Data Visualization:** Once the data is consolidated, it is loaded into the dashboard for visualization. The system uses Pivot Tables to summarize the data and Pivot Charts to present the results visually. Key metrics include:
 - Loan status distribution
 - Credit score analysis
 - Monthly payment trends
 - Account balances over time

Automation: The dashboard is designed to refresh automatically, ensuring the latest data is always displayed. This process requires no manual input other than the addition of new files to the folder. When the user clicks "Refresh All", Power Query automatically detects any new files in the folder, merges them with the existing dataset, and updates the visualizations.

Data Collection

The data used in this study consists of customer financial records, which include:

- Account Numbers
- Account Holders
- Credit Scores
- Loan Amounts
- Loan Status (Approved, Pending, Closed, etc.)
- Last Payment Date
- Payment Amount
- Online Transaction Amount
- Transaction Date
- Total Balance

These records are stored in multiple Excel files, each representing a month's worth of financial data. The files are stored in a designated folder, and when a new file is added, the dashboard automatically incorporates the new data into its visualizations.

TOOLS AND TECHNOLOGIES

The development of the automated bank dashboard leverages widely available and cost-effective tools, making the solution accessible to a broad range of users, especially small and medium-sized enterprises. At the core of the project is Microsoft Excel (2019 or later), which serves as the primary platform for building and deploying the dashboard. Excel's advanced features, particularly Power Query and Pivot Tables, play a pivotal role in data integration, transformation, and visualization.

Power Query is utilized to automate the process of importing data from multiple Excel files located in a designated folder. It allows for seamless data consolidation, cleaning, and standardization, significantly reducing manual effort and the risk of inconsistencies. This tool enables dynamic connectivity to the source files, ensuring that the dashboard reflects the most current data each time a refresh is triggered.

For summarizing and analyzing the data, Excel Pivot Tables and Pivot Charts are employed. These tools

provide interactive capabilities for exploring financial metrics such as loan amounts, credit scores, payment histories, and account balances. The visualizations generated through Pivot Charts enhance the interpretability of the data and support informed decision-making.

To further enrich the dashboard, conditional formatting is applied. This allows key trends, risk factors, and anomalies—such as overdue payments or accounts with low credit scores—to be highlighted automatically, drawing immediate attention to critical insights. Additionally, while not mandatory, Excel VBA can be optionally integrated for advanced automation needs, such as triggering data refreshes or custom interactions via buttons within the dashboard.

Together, these technologies form a robust and user-friendly environment for automated data analysis and reporting, showcasing the potential of Excel as a business intelligence tool when combined with modern data-handling capabilities.

CONCLUSION

This research has successfully demonstrated the design and implementation of an automated bank dashboard using Microsoft Excel, providing a practical and accessible solution for managing and analyzing financial data. The system effectively addresses the challenges associated with manual data consolidation by automating the integration and visualization of key metrics, such as loan status, credit scores, payment trends, and account balances.

By leveraging powerful yet user-friendly tools like Power Query, Pivot Tables, and Pivot Charts, the dashboard ensures real-time data updates and significantly reduces the risk of human error. The automated nature of the system not only streamlines the data workflow but also enhances the accuracy and efficiency of financial analysis, which is critical for timely and informed decision-making in the banking sector.

The study highlights the potential of widely available software to deliver business intelligence capabilities without the need for

expensive enterprise solutions. This makes the approach particularly suitable for small to medium-sized institutions that seek to improve their data handling processes without incurring high costs.

Ultimately, this project underscores the value of automation in data management and the relevance of Excel as a viable platform for dynamic dashboard creation. Future enhancements could explore scalability, integration with cloud services, and the use of AI-driven insights to further elevate the dashboard's capabilities.

EXPLANATION OF COMPONENTS

1. **Multiple Excel Files:** The system begins with a collection of monthly financial data stored as separate Excel files. These files include customer records such as loan details, credit scores, transaction amounts, and balances.
2. **Designated Folder:** All input Excel files are placed into a specific folder that acts as the data source. When new files in the same format are added to this folder, they are automatically detected and included in the data refresh.
3. **Power Query – Data Import & Merge:** Power Query acts as the data pipeline engine. It connects to the folder, imports all Excel files, and merges them into a single structured dataset. This eliminates the need for manual consolidation and ensures that data from all months is available in one place.
4. **Data Cleaning & Transformation:** Within Power Query, the imported data undergoes cleaning and transformation. This step ensures consistency in date formats, numerical values, and field naming across all source files. Unnecessary columns are removed, and relevant columns are standardized.
5. **Excel Pivot Tables & Charts:** The cleaned dataset is loaded into Pivot Tables, which are then used to create dynamic Pivot Charts. These provide summarized views of key metrics, such as credit score trends, loan approval statuses, and transaction summaries.
6. **Automated Dashboard Visualization:** The final component is a live dashboard that updates automatically whenever new data is added. The user simply clicks "Refresh All", and all visualizations are updated in real time. This enables continuous monitoring without manual updates.

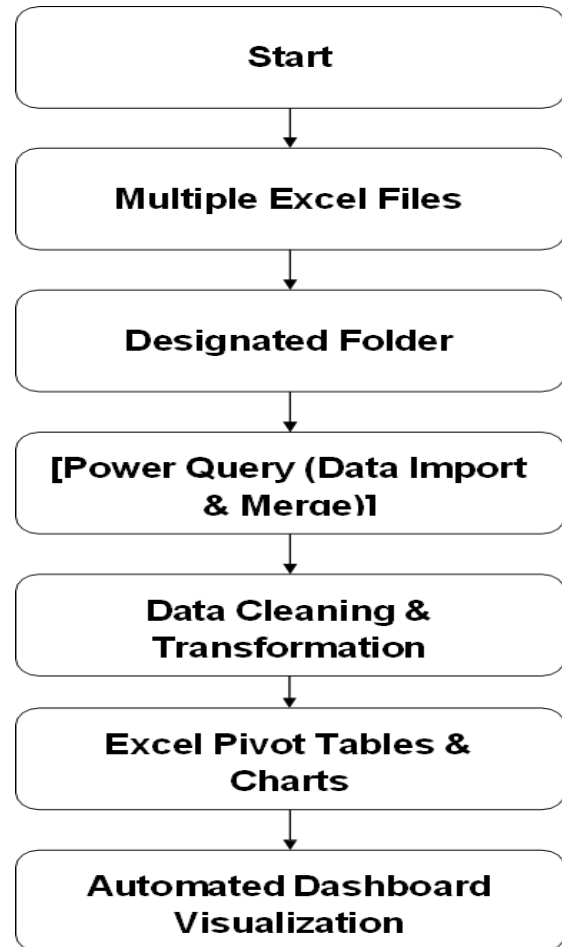
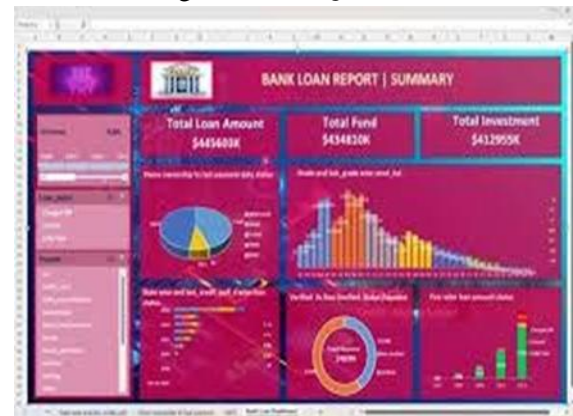


Fig 1 Block Diagram



Expected results

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