

Power BI Empowers Digital Transformation of SMEs — From the Perspective of Financial Analysis and Business Decision Optimization

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Abstract. Against the backdrop of iterative artificial intelligence development and the digitalization initiatives under the 14th Five-Year Plan, small and medium-sized enterprises (SMEs) urgently require financial digital transformation. However, due to limitations in talent, technology, and costs, the traditional FSSC financial shared services model requires high investment and heavy operation and maintenance, making it difficult to adapt to SME development. Existing studies predominantly focus on large enterprises, leaving significant research gaps in SME financial digitalization. This paper uses the literature research method, employs Power BI as a tool, leverages Power Query and DAX language, and combines DuPont analysis with an ROI system to build a lightweight financial shared service and dynamic financial analysis model. This solution enables business-finance integration, in-depth report drill-through analysis, cost control and cash flow forecasting, addressing the one-sidedness, time lag and business disconnection inherent in traditional financial analysis. It promotes a shift in financial work from post-event accounting to pre-event forecasting and in-process management, providing a reference for low-cost digital transformation for SMEs.

Keywords: Power BI, Small and Medium-sized Enterprises, Financial Digital Transformation, Business Decision-making Optimization

1. Introduction

The rapid iteration of artificial intelligence has driven development across various industries. Against this backdrop, small and medium-sized enterprises (SMEs) still encounter multiple hurdles in digital transformation, including technological constraints, talent shortages and technical bottlenecks [1-3].

During the 14th Five-Year Plan period, the digital transformation of small and medium-sized enterprises (SMEs) became a policy focus. However, due to the high investment, long cycle, and heavy maintenance characteristics of the traditional Financial Shared Service Center (FSSC) model, it is difficult to widely implement it in SMEs. Therefore, SMEs urgently need a low-cost, easy-to-deploy, and fast-response financial shared service model [4]. Most existing studies center on large corporations, while research into SME financial digital transformation remains insufficient. Therefore, this paper constructs a lightweight financial shared service model suitable for SMEs

based on Power BI. Leveraging Power BI's advantages of low investment, fast deployment, light maintenance, and relatively quick results, it completes multi-source operational and financial data cleaning and governance through Power Query, standardizes financial metric calculation using DAX language, and builds a dynamic financial analysis model by combining DuPont analysis and ROI investment return analysis system. It achieves data centralization, model reuse, and results sharing through a visualized dashboard.

This paper adopts the literature research method to explore the application pathways of Power BI in SME financial data governance, multi-dimensional financial analysis, cost control, cash flow monitoring and operational decision optimization. It aims to address the issues of traditional financial analysis being one-dimensional, the disconnect between finance and operations, and delayed decision-making, promoting the transformation of SME financial management from traditional post-event accounting to dynamic in-process control and proactive pre-event forecasting, providing a reference for SMEs to achieve low-cost, high-efficiency digital financial transformation.

2. Technical architecture and core competencies of Power BI financial analysis

2.1. Core components and technical advantages of Power BI

Applicability to Accounting Data Processing: Power BI is a business intelligence tool developed by Microsoft. It enables data analysis and visualization, improves financial transparency, and facilitates decision-making and information sharing. In the data collection stage, it can conveniently connect to a variety of data sources, including financial databases, accounting reports in various formats, and business system data, achieving rapid data aggregation and greatly improving data acquisition efficiency. In terms of data cleaning, PowerBI, with its built-in rich algorithms and tools, can accurately identify and correct errors, duplicates, and missing values in accounting data, ensuring data quality [5]. Its data transformation capabilities are even more powerful, allowing flexible classification, summarization, and calculation of data based on accounting rules and analytical needs. In addition, PowerBI supports real-time data updates, ensuring that accountants can always analyze based on the latest financial data, providing timely and accurate data support for corporate financial decisions, closely aligning with the timeliness and accuracy requirements of accounting data processing [6].

Power Query is responsible for capturing and organizing data. It supports source data extraction from nearly all mainstream formats and restructures data to match user-specified standards. Using Power Query, you can easily complete data grouping, pivoting and unpivoting, as well as merging of multiple datasets, and you only need to perform the operation once. Afterwards, as long as you click the 'Refresh' button, the data can be automatically updated without manually organizing it again [7].

Using Power BI's 'Get Data' feature, you can connect to various data sources such as Excel financial statements, accounting set data, expense details, and PDF industry analysis materials. Through the Power Query editor, you can clean the raw data, handle missing values and duplicates, unify date and accounting subject formats, and convert text-based amounts into numerical data, laying the data foundation for subsequent financial analysis [8, 9].

Implement complex business logic calculations through DAX functions, use Power BI data modeling capabilities to build multidimensional analysis models, and quickly complete complex scenario analyses such as product profitability matrix analysis. In this way, finance staff no longer need to spend excessive time crafting complex formulas, greatly boosting analysis efficiency.

2.2. Financial data governance and indicator system construction based on Power BI

The standardized management and model building of financial data are the foundation for achieving intelligent financial analysis. This article realizes standardized financial data integration for small and medium-sized enterprises via financial statement collation and multidimensional modeling system development.

In the data preparation stage, collect core financial data such as the company's balance sheets, income statements, and detailed expense reports. We use Excel and Power Query to preprocess raw data, standardize data formats and unify accounting account terminology, converting fragmented raw financial data into structured data sources that are standardized, model-ready and analysis-enabled. At the same time, based on the financial statement system, build multiple analytical dimension tables, including calendar time tables, balance sheet subject hierarchy tables, income statement subject hierarchy tables, and expense hierarchy tables, to unify the accounting standards for the company's revenue, costs, expenses, assets, and liabilities, and construct a standardized financial indicator database. Building on this foundation, we also incorporate business data covering sales, procurement and production, which paves the way for the subsequent integration of financial and business data.

During the data modeling phase, the preprocessed and standardized data is imported into the Power BI model view. Relationships between multiple data tables are established based on key fields to construct a lightweight business-finance dynamic data model. By setting up mappings between financial and business data, we integrate business flows, capital flows and information flows, eliminating the longstanding separation of business and financial data. Through the construction of a multi-level dimensional system, financial data can be linked and integrated, allowing for hierarchical drill-down and full traceability, supporting real-time financial data updates and multi-dimensional drill-through queries. This ultimately delivers a standardized financial data foundation tailored for the lightweight digital transformation of SMEs. The foundation features cross-functional business-finance collaboration, full traceability, data penetrability and real-time data synchronization [10].

3. The application of Power BI in enterprise financial analysis and business decision-making

3.1. Multi-dimensional financial status analysis and visualization display

Based on financial statement analysis theories [11], this paper adopts Power BI to perform drill-through queries and trend analysis on the three core financial statements. Standardized balance sheet, income statement, and cash flow data are imported into the model view. Leveraging visual visuals and hierarchical drill-down features, the system supports account-level drill-through and end-to-end data traceability. The system can automatically generate multi-period comparative trend charts, intuitively showing changes in corporate asset structure, profit fluctuations, and cash flow variations, overcoming the limitations of traditional static report queries, and achieving intelligent analysis of the three major financial statements that is drillable, traceable, and capable of real-time updates.

Relying on Power BI modeling and DAX custom measures, a dynamic financial ratio monitoring system is built. The system can automatically calculate and real-time refresh core indicators of solvency, operational capability and profitability to capture dynamic indicator changes. Through a visual indicator dashboard, routine monitoring of the company's financial status is realized, accurately identifying weaknesses in asset utilization, profitability fluctuations, and debt repayment

risks during operations, achieving a digital, dynamic, and visual analysis of the company's multi-dimensional financial capabilities.

Based on data visualization theories [12], this paper adopts Power BI to build a comprehensive financial health evaluation system for small and medium-sized enterprises. Instead of relying on traditional chart displays, it achieves a systematic presentation of the overall financial situation of enterprises through data integration, indicator association, logical drill-down, and dynamic refresh mechanisms. Power BI, through its multi-data source integration capabilities, unifies and standardizes financial data scattered across different business segments, building a multi-dimensional indicator system covering asset status, profitability, debt-paying ability, and operational efficiency.

In operation, the system conducts correlation calculation and dynamic monitoring based on the internal logical relationships among financial indicators, automatically detects and alerts abnormal fluctuations in key indicators, and enables real-time financial health assessment. At the same time, Power BI supports data drilling and tracing according to business dimensions, accounting periods, and management criteria, allowing for quick identification of the causes of indicator fluctuations and providing managers with structured and traceable decision-making evidence.

With the above digital analysis model, enterprises can break the constraints of traditional static reports, realize dynamic, structured and integrated presentation of financial status, substantially improve financial information transmission efficiency and decision response agility, and provide stable and reliable data support for the digital transformation and operational decision optimization of small and medium-sized enterprises.

3.2. Cost control, cash flow forecasting, and decision support

Power BI features multi-source data integration, lightweight modeling and visual analysis capabilities. It eliminates enterprise internal data silos, unifies and manages fragmented business information, financial data and resource consumption data, thereby enabling efficient integration and standardized configuration of data resources. Relying on data visualization and dynamic calculation functions, enterprises can accurately identify inefficient resource usage, optimize resource allocation and configuration structure, focus limited resources on high-value financial analysis scenarios and key business decision-making processes, and lay a resource foundation and competitive advantage for digital transformation.

Power BI can construct risk monitoring models based on correlations between business and financial data, enabling real-time identification and quantitative evaluation of potential risks, including cost anomalies, cash shortages and operating indicator deviations. Through visual dashboards, it intuitively presents risk levels and impact scope, assisting managers in timely adjustment of business strategies and financial control measures, enhancing internal control compliance and risk resilience during the digital transformation process, and ensuring that business decisions are implemented steadily.

Power BI takes data integration as its core, linking all value chain segments covering procurement, production, sales, finance and management. It promotes the bidirectional integration of business data and financial information, embedding value analysis, cost control, and performance evaluation throughout the entire business process. Via visual analysis and dynamic reviews, it quantifies value contributions across all segments and builds a collaborative mechanism for business value creation, financial value measurement and decision optimization.. It enhances the value-added capability of the entire chain through digital means, supporting high-quality enterprise transformation.

Power BI can construct dynamic cash flow monitoring and forecasting models. It integrates data on capital inflows, outflows, receivables, taxes and expenditures to realize real-time visualization of cash flow conditions. Based on historical data and trend algorithms, it conducts cash flow forecasting to accurately predict funding gaps and idle situations, optimize cash planning and investment-financing decisions, and provide stable financial support for digital business decision-making.

Traditional cost accounting methods adopted by SMEs are relatively rudimentary, featuring distorted cost allocation and unidentifiable inefficient losses, which leads to inaccurate financial analysis and a lack of reliable cost foundations for business decision-making. Relying on Power BI's Power Query data processing and DAX measurement analysis capabilities, costs can be broken down according to business activities, accurately identifying cost drivers at each operational stage, achieving refined cost accounting and multidimensional penetration analysis. This delivers authentic and reliable cost data support for product profitability analysis, optimized budget formulation and business strategy adjustment. It enables the upgrading of financial analysis and business decision-making via refined cost management, thereby accelerating the digital transformation of SMEs.

4. Conclusion

From the perspective of financial analysis and business decision-making optimization, this paper explores the application value and implementation path of Power BI in the digital transformation of finance in small and medium-sized enterprises, addressing the current issues of weak resources, poor adaptability of traditional FSSC models, and insufficient related research. This paper systematically elaborates on Power BI's technical architecture and core capabilities. It adopts Power Query to clean and manage multi-source business and financial data, unifies financial accounting criteria via DAX language, and constructs a lightweight star schema-based business-finance data model and standardized financial indicator system, thereby resolving the problems of fragmented business-finance data and inconsistent data calibration in traditional enterprises.

This article further verifies that Power BI supports three core functions: financial statement drill-down query, dynamic financial ratio monitoring, and visual financial health evaluation, as well as refined cost control, dynamic cash flow forecasting and business risk early warning. It effectively remedies the limitations of traditional financial analysis, namely single-dimensional evaluation and delayed decision-making, and facilitates the transformation and upgrading of financial management models. The study confirms that the lightweight digital solution based on Power BI is low-cost, easy to deploy, and highly adapted to the operational characteristics of small and medium-sized enterprises.

Meanwhile, this study has several limitations: it only carries out theoretical modeling and path analysis, without empirical quantitative verification based on corporate data, and focuses merely on the financial dimension rather than the full business chain. In the future, real data from small and medium-sized enterprises across multiple industries can be introduced to optimize the model, and applications in multiple business scenarios can be expanded to improve the lightweight digital transformation system for SMEs' financial management.

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