Research on Enterprise Cost Management Decision-Making Information System Based on BI Intelligent Information Flow

Jiangzhi Yu*, Junmin Wu, Jianbo Cui

Economics and Management School, Jiangsu University of Science & Technology, Jiangsu Zhenjiang
Yujz0118@163.com, wujunmin824@163.com, 22866323@qq.com*

ABSTRACT

To address the shortcomings of current enterprise cost management, this paper innovatively proposes an enterprise cost management decision-making system based on BI intelligent information flow, gives the corresponding implementation steps, combines the attribute reduction algorithm, extracts important enterprise cost information, combines Servlet and JSP technology together, uses JSP to display dynamic real-time cost information, in order to provide reference for enterprise cost management decision-making.

Keywords: *BI intelligence information fiow, attribute reduction algorithm, cost management*

1. INTRODUCTION

In 2019~2021, the costs (expenses) per hundred yuan of revenue of the above-standard industrial enterprises accounted for 84.08 yuan (8.97 yuan), 83.89 yuan (9.17 yuan) and 83.74 yuan (8.59 yuan) respectively, with a revenue margin of only 5.86%, 6.08% and 6.81%. At the same time, in recent years, China has introduced a number of cost-cutting policies and measures in an effort to provide relief to enterprises, in an attempt to reduce their burden, enhance market vitality, promote quality and efficiency, and help transform and upgrade the economy. It is imperative for enterprises to reduce costs in a high-quality manner. This paper discusses the feasibility of applying BI intelligent information flow in enterprise cost management.

2. LITERATURE REVIEW

BI is a data processing, information analysis and visualization solution that helps companies in scientific decision making and management through efficient data processing methods, integrated information system tools and flexible data visualization methods (Elbashiretal, 2008) [1], which consists of data warehouses (or data marts), query reports, data analysis, data mining, etc. (Mohamadina et al., 2012) [2], is an effective way to analyse and manage unstructured data (Baars et al., 2008) [3]. BI gains competitive advantage and improves competitiveness through effective decision making (Puklavec, 2018) [4], and is seen by CIOs and business leaders as a strategic tool to drive company performance (Watson et al., 2007) [5]. The seminal literature on empirical BIresearch identifies information content, access and access quality as key influences on BIsystems (Popovič, 2018) [6]. Factors such as system quality, information quality, management quality and service quality in BI systems can have a significant impact on business decision making and management (Božič et al. 2019) [7].

Throughout the literature, it can be seen that it has become common for BI to empower many areas of business operation and management, but there are fewer heavy applications in the area of cost management, especially for framework and theoretical guidance on business intelligence-enabled enterprise cost management, which is more rarely available.

3. CURRENT STATU AND DEFICIENCIE IN ENTERPRISE COST MANAGEMENT

Lu (2014) The survey found that 35.3%, 18.6% and 16.6% of enterprises in China applied the target cost method, the operational cost method and the standard cost method respectively, and 141 (78.3%) and 39 (21.6%) enterprises implemented single or multiple cost management methods respectively.

S. A. R. Khan et al. (Eds.): ICMSSE 2022, AHCS 12, pp. 726–730, 2023.
https://doi.org/10.2991/978-94-6463-056-5_105

Table1 The integration of various cost management methods in Chinese enterprises

	Target costing	ABC	Standard costing
Target costing	-	32.4%	15.2%
ABC	17.2%	-	24.2%
Standard costing	7.1%	21.6%	-

3.1 Cost management characteristics

On the one hand, the quality of cost information presents a lag, not completely full life cycle agile follow-up of the project process, the integration of industry and finance is not high; on the other hand, the cost management function is biased towards the post-facto accounting type, the analysis of the cost, the prior forecast bias is not high, and the cost accounting in enterprises are mostly single staff, professionalism is strong.

3.2 The quality of accounting information is not high

Cost information timeliness and relevance is lacking, and cost information reliability is incomplete and understandable. This is reflected in the fact that cost information is reflected in the accounts and accounts of accounting, but the visual presentation is not sufficient, and managers cannot obtain cost information in a timely and reliable manner, and thus advance the decision-making process.

The next specific elaboration of BIto enable enterprise cost management logic, the general idea is machine learning combined with natural language processing, time series analysis to measure target costs, standard costs, budget costs, planned costs, etc., classification analysis to divide fixed costs, variable costs, divide resources, operations, costs, cluster analysis, the formation of new fixed costs, variable costs, the formation of new resources, operations, costs. Regression analysis, correlation analysis, sequence analysis, revealing the linkage between resources, operations and costs, revealing the dependency between sales volume, costs and profits, reinforcing learning, figuring out from scratch the optimal product production mix strategy that can minimise total production costs. Natural language processing to quickly identify the cost management objectives of a company.

4. MECHANISMS OF COST MANAGEMENT FOR THE ROLE OF BI IN IMPROVING THE QUALITY OF ACCOUNTING INFORMATION

4.1 The impact of BI key functions on the quality of accounting information

Firstly, sophisticated data warehouse management functions, including ETL, data cleansing, data integration and efficient storage, are used to improve the reliability and timeliness of cost information. Secondly, powerful data mining and data analysis functions, such as OLAP tools and data mining tools, which can be used to improve the relevance of cost information. Thirdly, knowledge discovery functions to extract implicit, useful information to enhance the relevance of cost information, and convenient information presentation functions: reports, diagrams, visualisation to enhance comprehensibility.

4.2 Cost information revealed by key techniques and methods for implementing BIfunctions

Multi-source data, multi-dimensional databases, data warehouses to help decision makers know what costs have been incurred, fixed reports & dashboards, live queries & OLAP, self-service BIto help decision makers know what costs are being incurred on specific current projects, agile visualisation to help decision makers know why costs are being incurred, analytics, mining (predictive analytics, predictive modelling) to help decision makers know what costs will be incurred.

5. COST MANAGEMENT BISOLUTION VISION—KIMBALL LIFECYCLE APPROACH

5.1 Program/Project Planning and Management

Initiation of program projects, including scope, justification and staffing, lifecycle from start to finish, ensuring that ongoing program and project management tasks remain on track and on track.

5.2 Cost Management Objectives

Explained in four areas: target cost, standard cost, variable cost and job cost. The target cost is achieved, the whole process of cost management from raw materials to product shipment; the whole process of product life cycle cost and the whole staff management, standard cost management, the cost standard is accurate, stable and fluctuating update; reveal and analyse the difference between standard cost and actual cost; correct the unfavourable difference to improve the product cost,

variable cost management, the accurate analysis of cost attitude, distinguish fixed cost and variable cost; analyse various Product profitability analysis for correct business decisions; reveal the dependencies between sales volume, costs and profits, job cost management, providing full-calibre, multi-dimensional cost information; reveal the linkages between resources, jobs and costs. Collecting detailed objectives for the first iteration of DW/BI system development, three parallel lifecycle trajectories follow the objectives to define. Focus on what cost managers are currently trying to do, or want to do in the future, to discover cost management needs and identify key factors that affect cost management.

5.3 Technology trajectory

The starting point is set as the overall architecture of the system, with a detailed list of purchases required for the project, clear attribution of capabilities, and multiple heterogeneous implementations of metadata, technology and storage integration based on the selection and installation of products required to meet the overall architecture.

5.4 Data trajectory

To meet cost management requirements, start with the design of the target dimensional model, while considering the underlying data status. rolap, molap, holap are analysed, compared and selected to address two parallel objectives with the dimensional model: ease of use from the user perspective and fast query performance. Instantiation in relational databases, i.e. star schemas or multidimensional databases, OLAP multidimensional datasets to discover, uncover relationships, rules and patterns that exist in cost data and predict future cost trends.

5.5 BI Tracks

This step requires full attention to the needs of non-specialist cost accountants, multiple three-dimensional visual presentations of real-time data when user-facing, standardised data queries, dashboards, scorecards, analytical models and data mining applications, and better data-based reporting when approached by relevant users.

5.6 Deployment, maintenance and development

The initial deployment of the project integrates technology, big data and business intelligence, and the three-track system empowers the enterprise cost management trajectory. When it enters the maintenance phase, iterative cascading applications, rolling dynamic running procedures, move to the development of the next cost management project, and then articulate into the next project deployment to form cycle.

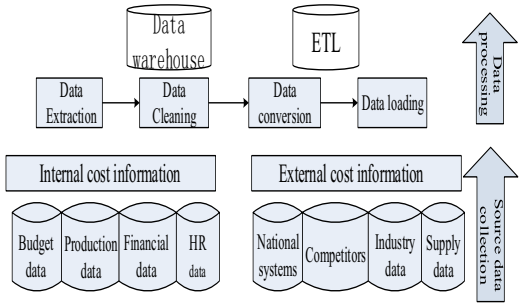

Figure1 Cost Management BI Intelligence Information Data Logical Flow

6. BI CORE SYSTEM DESIGN—DATA FLOW PLANNING LOGIC

6.1 Data collection

"Three extensions" for data collection: from accounting data to business data; from internal to external data; from structured to unstructured data. Integrate the above data and establish a unified data management platform.

Data processing and handling. Through data warehouse technology to resolve the differences in the conceptual, logical and physical structure of data, extract, clean, transform and load (Extract-Transform-Load, ETL) cost-related data, process and load them into the data warehouse to achieve information integration and the fusion of multi-source heterogeneous data. Relational and multi-dimensional databases, a combination of top-down and bottom-up methods, ETL tools and hand-written data transfer procedures are used for data integration to build a data model that meets cost management objectives.

6.2 Thematic domain classification of data

Cost management objectives are divided into thematic domains and cost data is categorised according to the needs of managers. Taking into account the company's own characteristics, cost management tool objectives and decision-making needs, we propose a thematic domain division scheme and establish corresponding thematic domains, covering topics such as production technology, cost management (tools), budget planning, statistical analysis, inventory management, management performance, human resources, contract management.

6.3 Data Mining

Using the OLAP-KDD (knowledge discovery of database) concurrent model, hidden predictive information is extracted based on predefined models and methods. Create a public method base and public model base solution suitable for data mining, as well as an enterprise specific domain knowledge base required for cost data mining. Build a data mining knowledge base to form a more complete repository of data mining models and methods, and continuously expand it in line with developments in cost management science, decision support methods and enterprise domain expertise.

6.4 Business Analytics

Create a management cockpit, providing diverse, self-service visual display tools, presenting cost composition, sources, KPI and other data in the form of charts to managers at all levels, and completing monitoring of key indicators, dynamic query of reports, early warning of cost conditions and comprehensive evaluation. Using mobile business intelligence, data drill-down, graphical display, trend analysis and performance monitoring, cost information is available everywhere, with interactive, real-time action.

7. EXPERIMENTAL PLATFORM

7.1 Extraction of cost information

An information entropy-based attribute reduction algorithm was used to extract key cost information for subsequent decision making based on the principle of importance, with the following algorithmic process:

Input: Cost Decision Information System S={U A V F}, A=C∩D, where C is the conditional attribute and D is the decision attribute.

Ouput: Cost Decision Information System S={U A V F}'s Simple B.

Step1: Calculating information entropy H(A)

Step2: initialize B(B≠0)

Step3: Find the kernel property core(A) of the decision information system. For any∈A, if H({a}|(A-{a})) > 0, then B=B∪{a}, and the B obtained after traversal is core(A).

Step4: Determine whether H(A) and H(B) are equal, if not, turn to Step5; if equal, then B is the requested simplification, output B and the algorithm ends.

Step5: For any a∈(A-B), calculate the importance of a relative to B according to the formula sig (a, B; A) = H(B∪{a})-H(B) such that B = B∪{a}, turn Step4.

7.2 Operational processes

For the study of a cost management decision system based on intelligent information flow, the Java language was used. Java language, with code language and Eclipse as the development tool for the backend. Eclipse as a development tool. Sending data requests to the Servlet controller. Create JSP through Servletlogic, which only performs simple searches, injects the constructs created by the Servlet injected into a predefined template and ultimately returned to the user.

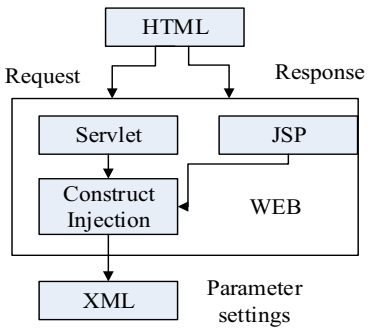

Figure2 Experimental platform test chart

8. CONCLUSION

(1)This paper discusses the current status of enterprise cost management, and on the basis of pointing out its shortcomings, innovatively puts forward the idea of BIand big data empowering enterprise cost management, proposing to further improve the quality of accounting and cost information from BIand big data, improve enterprise cost management, and ultimately achieve the process of cost reduction, the empowerment of technology makes the lowering of the threshold of application of the cost effectiveness principle, and leapfrogging the scientific management level of cost issues and the ability to make wise decisions.

(2) Explore the use of BIfunctions to improve the quality of accounting information and enhance the relevance, reliability, timeliness and understandability of cost information; attempt to reduce the incompleteness and asymmetry of cost information; and work to improve the efficiency of scientific and rational design and execution of cost management contracts to alleviate agency problems.

REFERENCES

[1] ELBASHIRMZ, COLLIERPA, DAVERNMJ. Measuring the effects of business intelligence systems: There lationship between business process and organizational performance[J]. International Journal of Accounting Information Systems, 2008, 9(3): 135-153.

[2] Mohamadina A A, Ghazali M, Ibrahim M, et al. Business intelligence: Concepts, issues and current systems [C]. In International Conference on Advanced Computer Science Applications and Technologies. New York: IEEE. 2012.

[3] BAARS H, KEMPER H, 2008. Management support with structured and unstructured data: An integrated BIframework [J]. Information Systems Management, 25(2): 132-148.

[4] PUKLAVEC B, OLIVEIRA T, POPOVIČ A. Understanding the determinants of business intelligence system adoption stages: an empirical study of SMEs[J]. Industrial Management & Data Systems, 2018, 118(1): 236-261.

[5] WATSON H J, WIXOM B H. The current state of business intelligence[J]. Computer, 2007, 40(9): 96-99.

[6] PUKLAVEC B, OLIVEIRA T, POPOVIČ A. Understanding the determinants of business intelligence system adoption stages: an empirical study of SMEs[J]. Industrial Management & Data Systems, 2018, 118(1): 236-261.

[7] BOŽIČ K, DIMOVSKI V, 2019. Business intelligence and analytics use, innovation ambidexterity, and firm performance: A dynamic capabilities perspective[J]. The Journal of Strategic Information Systems, 28(4): 1-20.