

International Reference and Management Model for the Integration of Budget and Performance Management in Universities

Wei Tang^{1,2,a,*}, Qingwei Song^{1,2,b}, Xiaoli Huang^{1,2,c}

¹*School of Accounting and Finance, Shaanxi Business College, Xi'an, Shaanxi, China*

²*School of Accounting and Finance, The Open University of Shaanxi, Xi'an, Shaanxi, China*

^a*tangwei070504@126.com*, ^b*songqingwei6512@163.com*, ^c*453827450@qq.com*

**Corresponding author*

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Abstract: The integration of budget and performance management in colleges and universities is a management model that closely combines budget preparation with performance goal setting, implementation monitoring and result evaluation. It requires that the expected performance targets be clearly defined in the preparation of the budget, and the performance is tracked and monitored during the implementation process. At the same time, according to the results of performance evaluation, the subsequent budget arrangement is adjusted and optimized to achieve reasonable allocation and efficient use of resources, and promote the development of various undertakings in colleges and universities. Based on this, this paper reviews the typical experience of the integration of budget and performance management in foreign universities, and determines the deep integration of budget and performance management in universities.

1. Introduction

The integration of university budget and performance management is an innovative and efficient management model, whose core lies in the deep and close integration of budget preparation with performance goal setting, implementation monitoring and result evaluation. In practice, it clearly stipulates that the expected performance targets must be clearly established at the time of budget preparation, and the performance status must be strictly tracked and monitored continuously throughout the entire process of budget implementation [1-3]. For example, through advanced real-time data monitoring methods, budget implementation that deviates from performance targets can be accurately detected and effectively adjusted. At the same time, according to the results of

scientific and reasonable performance evaluation, the subsequent budget arrangement will be adjusted and optimized, so as to achieve reasonable allocation and efficient use of resources, and strongly promote the vigorous development of various undertakings such as teaching and scientific research in colleges and universities. Based on this important premise, this paper comprehensively and deeply reviews the typical experience of the integration of budget and performance management in foreign universities, and then accurately determines the target positioning of the deep integration of budget and performance management in universities [4-6].

2. Literature Review

The integration of budget and performance management is not only an important reform goal for the full implementation of budget performance management, but also the key to the success of budget performance, and the necessary means to promote the scientific, standardized and informationized budget management. In recent years, many foreign scholars have conducted a large number of studies on the integration of budget and performance management and other related issues. The following will review the literature from the two dimensions of the integration of budget and performance management in developed economies and the practical exploration of the reform of the integration of budget and performance management in China [7-9].

2.1. Evolution of Integrated Budget and Performance Management Practices in Advanced Economies

In the process of the development of budget performance in developed economies, the integration of budget and performance management has become a key move for the success of budget performance, and gradually formed an integrated development context of "before and after - whole process - forward-looking" (Robinson & Last, 2009; Wu Xun and Zhang Xiaolan, 2008). (1) Traditional performance budgeting period in which budget and performance are separated. The main characteristics of traditional performance budgeting period are: separation of budget and performance, lack of clear goal setting, difficult to understand budget data, and difficult to realize the integration of budget and performance management (Williams, 2006). There are problems such as information overload, too strong professionalism, low management efficiency, and limited reference value for policy making (Nguyen, 2007; Ma Caichen and Zhu Xuyang, 2019). (2) Focus on the period of integrated budget and performance management before and after the event. The reform at this stage reflects the "goal-oriented" budgeting method, focusing on the setting of performance objectives in advance, performance evaluation after the event and the preparation of performance reports, which is the focus of the integrated reform of budget and performance management at this stage. It mainly includes: Countries represented by the United States use multi-year strategic goals as a guide to prepare annual performance targets, and then guide annual budget preparation and implementation (Wu Xun and Sun Meng, 2016); In countries represented by the United Kingdom, contract management is introduced to further determine departmental performance targets (Shea, 2008). Countries represented by Denmark and Australia require the submission of annual performance reports and publication of performance evaluation results (Ma Caichen and Zhao Di, 2022). (3) Pursue the whole process and forward-looking budget and performance management integration period. In this period, more attention was paid to the

integration of budget and performance in the whole process, and the leading role of performance in budget decision-making. Among them, countries represented by the United States improve project performance and improve financial resource allocation pattern through multi-process operations such as performance planning and goal setting, output and cost accounting, and performance evaluation (Gou Yannan, 2011; Lu Yuying, 2016); Countries represented by the United Kingdom, New Zealand and Canada, through continuous exploration of periodic performance tracking reports, recommend the use of management information systems for data collection and analysis, in order to shorten the time interval between performance monitoring and reporting as much as possible (Wang Xiaohong, 2019; GFOA, 2021). On this basis, OECD (2019) divides performance budgeting into presentation performance budgeting, informed performance budgeting and direct performance budgeting according to the application of performance information in budget decision-making. However, at present, direct performance budgeting is difficult to achieve. Most countries choose to "refer" performance information in budget decision-making, but the performance information of many countries is separated from the budget documents, making it difficult to judge whether some countries have truly realized the integration of budget and performance management (Ma Caichen and Miao Shan, 2019; Wu Xun and Qin Junbo, 2023).

2.2. Practical Exploration of Integrated Reform of Budget and Performance Management in China

Since the reform goal of "integration of budget and performance management" was put forward in China, the whole process budget and performance integration system with performance goal as the core has achieved certain results. To further promote the integration process of budget and performance management, which is both procedural and forward-looking, and form an integrated system of institutionalization, whole process, multi-subject and technicalization, has become the top priority in the development of budget performance management in China (Wu Xun, 2016; Li Shining, 2019). (1) The initial exploration stage of integrating performance into budget management. This stage is mainly reflected as follows: the integration of budget and performance management is gradually expanding from simple post-event to pre-event and post-event. In the early stage of reform, the integration of performance and budget management is mainly reflected in the performance evaluation stage, that is, the post-evaluation stage, which has the characteristics of post-integration (Li Shining, 2004; Han Xiaoming, 2018). Performance evaluation is explored, documents are issued, requirements are made, and performance evaluation of key projects is carried out (China Development Research Foundation, 2020). Subsequently, on the basis of the post-integration of budget and performance management, the setting and approval of performance objectives gradually become the focus of budget performance management, and the integration process is promoted to the pre-integration stage (Han Junshi and Xu Juan, 2019; Wang Lu et al., 2020). (2) The integration of budget and performance management has been promoted to the whole process in depth. The key goal of the reform in this period is to integrate performance into the whole process of budget preparation, implementation and supervision, and form an integrated operation mechanism of the whole process including pre-performance evaluation, in-process performance monitoring and post-performance evaluation (Wang Xiaohong, 2014; Han Junshi, 2016; Zhang Xuejun et al., 2022). The whole process performance management, represented by

Huangpu District of Shanghai, will further promote the integration of budget and performance management from the perspective of project evaluation management in budget decision-making, full coverage of performance objectives in budget preparation, performance monitoring in budget implementation, multidimensional evaluation in final accounts and multi-link application of evaluation results (Han Junshi and Xu Juan, 2020; Lu Yuying, 2020). (3) Multi-system and multi-platform coordination to assist the integration stage of budget and performance management. The main performance of this stage is as follows: in order to promote the integration of budget and performance management, local governments not only issued relevant guidance documents, but also strengthened the construction of management information systems, and built comprehensive financial information systems to support the centralized deployment of financial data through docking, upgrading and upgrading information platforms to monitor performance targets and the implementation of budget funds in real time (Li Shining, 2007; Ma Caichen and Zhao Di, 2022).

2.3. General Review.

Based on the above literature review, relevant studies have the following shortcomings: First, from the perspective of research, there are few studies on the integration of budget and performance management at the university level. Most of the literatures are limited to analyzing the integration of budget and performance management at the national or regional level, and the studies are too macro, which is not conducive to the formulation of policies on the integration of budget and performance management in universities [10-12]. Second, in terms of research content, most relevant foreign studies focus on the dynamic mechanism, operation logic and top-level design of the integration of budget and performance management, and few studies on the management mode and optimization strategy of the integration of budget and performance management, and most of them are case studies. To reveal the management mode and optimization strategy of the integration of budget and performance management in universities will be an important direction of future research. Third, in terms of research methods, most literatures use qualitative research, while quantitative research is rare and lacking in comprehensiveness. Therefore, it is particularly urgent to study the integration of university budget and performance management from a comprehensive and multi-method approach [13-15].

3. Comparative Research and Experience of Integration of Budget Performance Management in Typical Foreign Universities

3.1. The History and Characteristics of the Integrated Development of Budget Performance Management in American Universities

In the long-term development process, the integration of budget performance management in American universities has formed a relatively mature system, which has mainly experienced three stages: early stage, standardized preparation and development. In the early stage, American universities began to pay attention to budget management, and gradually set up a special budget management organization, such as the budget office, responsible for the management of school budget resources. In the normative preparation stage, colleges and universities have formulated strict budgeting and control procedures. Usually, the budget year begins to be prepared one year in

advance, is reported after examination and demonstration at various levels, and is finally determined by relevant departments. In order to control the budget, there is also a special control office, and each unit on campus has a budget officer. In the development and improvement stage, departments and employees are encouraged to participate in the budget formulation process to improve the participation in budget preparation. Some schools even set up relevant committees to recommend key projects and budget plans. At the same time, the use of reasonable budget analysis methods, the budget as an economic lever to control resources, according to the needs and prospects of the project to adjust the budget flexibly [16-18].

3.2. The Development Process and Characteristics of Integrated Budget Performance Management in British Universities

The development process of the integration of budget performance management in British universities has mainly experienced three stages: preliminary exploration, reform promotion and system improvement. In the initial exploration stage, the budget management of British universities is relatively simple, mainly relying on government appropriations, and paying little attention to the efficiency and performance of funds. In the reform promotion stage, with the shortage of education funds and the improvement of the quality requirements of colleges and universities, Britain began to promote the reform of college budget management. The government has gradually reduced direct funding and introduced market mechanisms, requiring universities to pay more attention to the effective use of resources and the improvement of performance. In the stage of system improvement, British universities have established a relatively complete budget performance management system, which continuously optimizes the budget management process by setting clear performance objectives, establishing strict evaluation mechanisms, and closely linking performance results with resource allocation [19-21].

3.3. The Development Process and Characteristics of Integrated Budget Performance Management in German Universities

The development process of the integration of budget performance management in German universities has mainly experienced four stages: traditional mode, reform bud, gradual development and deepening improvement. In the traditional mode stage, the budget of German universities is mainly allocated by the government according to certain standards and formulas, and the independent budget management and performance consciousness of universities are relatively weak. In the embryonic stage of reform, with the expansion of the scale of higher education and the improvement of education quality requirements, the government began to pay attention to the efficiency of the use of university resources, and universities themselves gradually realized the need to optimize budget management. In the stage of gradual development, the German government reformed the allocation mechanism of universities and introduced performance factors. At the same time, universities also began to establish corresponding budget performance management mechanisms, such as setting performance objectives and conducting performance evaluation. In the deepening and improvement stage, German universities continue to improve the budget performance management system, strengthen the cooperation with the government, enterprises and other external institutions, in order to obtain more resources, and improve the utilization efficiency

of resources and education quality through performance management [22-23].

3.4. The Integrated Development Process and Characteristics of Budget Performance Management in Australian Universities

The development process of budget performance management integration in Australian universities mainly includes two stages from the 1980s to the first half of the 1990s and the late 1990s. During the 1980s and first half of the 1990s, Hawke led the Labor Party to power in 1983 in the face of a much larger than expected government deficit and signs of recession. To this end, Prime Minister Hawke, together with the Ministers of Treasury and Finance, has promoted a broad programme of financial management improvement. Reforms during this period included tightening spending controls to reduce the fiscal deficit, such as the re-establishment of the Government Expenditure Review Board to control the growth of government spending; Set up efficiency monitoring groups to reduce wasteful use of funds; Medium-term rolling budgets will be issued to curb the spending impulse of various departments. Strengthen budget management with the performance of fund use as the center, implement departmental budgets, and give ministers the power to freely allocate resources within the established scope of resources; Implement project budgets and promote departments to identify project structures to achieve optimal policy results; Carry out project evaluation, help judge the rationality of project investment, etc., and form a new pattern of budget management covering the whole process of budget, implementation, evaluation and even feedback improvement. After Keating became the new Prime Minister in 1991, he followed the Hawke government's fiscal reform ideas, further strengthening expenditure control and strengthening project management. In the late 1990s, in 1996, the Liberal National Party coalition won the general election, and John Howard became Prime Minister of Australia. Howard appointed members of the National Audit Commission to examine the management and financial activities of the federal government and make recommendations for reform, followed by a series of legislative and administrative reforms that laid the foundation for the current basic structure of performance budgeting management. Major reforms include the enactment of the Fiscal Management and Accountability Act, the Federal Agencies and Federal Enterprises Act, the Budget Statement Integrity Act, and the Public Service Act. These laws have eliminated the detailed mandatory requirements and instructions on the use of funds by various spending departments, given greater discretion to department heads, promoted the reform of the accrual basis of government accounting system, and clarified the discretion of various spending departments, laying a legal foundation for improving the efficiency and effectiveness of public services [24-25].

4. Determine the Target Positioning of the Deep Integration of University Budget and Performance Management

4.1. Overcome the Difficulties in the Design of Evaluation Indicators and Improve the Design of University Performance Indicators

In the determination of the deep integration target positioning of university budget and performance management, it is essential to overcome the challenges in evaluation index design and enhance the design of university performance index. The diversity and complexity of university

activities, including teaching, research, and social service, demand indicators that accurately reflect these different aspects. Differences among disciplines further complicate index design. Balancing long-term and short-term performance is also a difficulty. To overcome these, the application of the balanced scorecard in the comprehensive budget performance management system is effective. This system, a strategic one with four assessment dimensions, achieves multiple balances and is widely used in public management. The design considers the comprehensiveness, importance, and feasibility of the index, covering various dimensions like finance, customer, internal process, and learning and growth. Such a design can balance the requirements, address the design challenges, and improve performance management.

4.2. Strengthen the Feedback and Application of Performance Information and Improve the Performance Management Mechanism of Colleges and Universities

In determining the target positioning of the deep integration of university budget and performance management, strengthening the feedback application of performance information is crucial for perfecting the university performance management mechanism. Timely collection and sorting of performance information is fundamental. Universities need to establish a comprehensive information collection system covering various fields. This includes both quantitative and qualitative data. Effective feedback channels are essential. A bottom-up mechanism allows grassroots to convey problems, while top-down ensures clear communication. Collected information should be deeply analyzed to identify underlying issues. Feedback results should be applied in decision-making, and a disclosure mechanism should be set up. It promotes transparency and inter-departmental cooperation. Performance information can be used for forecasting and early warning. Deming Ring theory, a four-step method including plan, do, check, and action, can enhance feedback application and performance process management. Its application in university budget performance management helps in each stage. In short, combining Deming Ring's application forms a continuous improvement mechanism, improving the performance management system and promoting high-quality development of universities.

4.3. Meet the Management Requirements of Budget Performance and Promote the Implementation of the Management System

In the target positioning of the deep integration of budget and performance management in universities, meeting the management requirements of budget performance is key to promoting the effective implementation of the management system. Understanding and grasping these requirements, clarifying budget fund use and expected effects, and ensuring clear and measurable objectives for each budget arrangement are necessary. For instance, in teaching equipment procurement, details like type, quantity, and impact on teaching quality should be clear. Establishing a sound management system and process is fundamental, with detailed guidelines, norms, mechanisms, and standards. Responsibilities and authority of each department should be defined. The whole process of budget performance management needs strengthening. In the preparation stage, demonstrate project necessity and feasibility. During implementation, monitor fund use. Regular performance evaluation should be conducted to detect deviations and take corrective measures. To promote the management system's implementation, the combined application of

Deming ring and balanced scorecard is important. Deming ring enhances feedback application of evaluation results. The four-step method implements the management process. For example, in the planning stage, use the balanced scorecard to set reasonable indicators. In the implementation stage, follow the plan and monitor. In the inspection stage, evaluate and analyze. In the feedback stage, summarize for the next stage. This combined application meets comprehensive management requirements, improves management quality and efficiency. Additionally, training and advocacy efforts should increase. Let all understand the importance and requirements, improve participation and ability. Use information means to enhance efficiency and transparency. Establish an information system for data collection, analysis, and sharing. Focus on result application and incentive and constraint mechanisms. Link evaluation results to assessment, rewards, and punishments. This stimulates active participation. In short, meeting requirements, improving the system, training, using means, and combining applications can promote the system's implementation, achieve resource allocation optimization, and ensure sustainable development.

5. Conclusions

This paper deeply discusses the relevant contents of the integration of university budget and performance management. By combing the relevant literature at home and abroad, the shortcomings of the current research are clarified. This paper compares the development history and characteristics of the integration of budget performance management in typical universities in the United States, the United Kingdom, Germany and Australia, and obtains the experience that Chinese universities can use for reference. On this basis, the goal positioning of the deep integration of budget and performance management in Chinese universities is determined. In the aspect of overcoming the difficulty of evaluation index design, the balanced scorecard is used to improve the design of university performance index and achieve multi-dimensional balance. Strengthen the feedback and application of performance information, form a closed-loop management mechanism of continuous improvement through Deming ring, and improve the performance management mechanism of colleges and universities. Meet the management requirements of budget performance, combined with Deming ring and balanced scorecard, promote the implementation of the management system. In short, the integration of university budget and performance management is an important way to promote the sustainable development of universities and optimize the allocation of resources. Chinese universities should draw on the international experience and improve their budget and performance management system constantly.

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References

- [1] Xu B. *Integrated Budget Management and University Project Performance Management Research*. *Accounting, Auditing and Finance*, 2024, 5 (2).
- [2] Delon M, Fourniols P, Pastou S A, et al. [Evaluation of healthcare product supply chain expenses in institutional studies - A case study at Toulouse's university hospital center]. *Therapie*, 2024.
- [3] Agency Information Collection Activities; Submission to the Office of Management and Budget for Review and Approval; Comment Request; The College Assistance Migrant Program (CAMP) Annual Performance Report (APR). *The Federal Register / FIND*, 2024, 89 (092).
- [4] Teng Y, Fang C. *Research on the Implementation Problems and Countermeasures of the Integrated System of University Budget Management*. *Journal of Management and Social Development*, 2024, 1 (3).
- [5] Tang W, Song Q, Huang X. *The Open University Comprehensive Budget Performance Management Research*

- Integrating Quality Management Cycle and Balanced Scorecard. Accounting, Auditing and Finance, 2024, 5 (1).*
- [6] Zhao W, Li X, Zhou L. *Research on performance evaluation and optimization of college budget management under the background of big data. Applied Mathematics and Nonlinear Sciences, 2024, 9 (1).*
- [7] Shan J. *Improvement of the financial management supervision system of universities in the context of big data. Applied Mathematics and Nonlinear Sciences, 2024, 9 (1).*
- [8] Soojin Y, Choungryeol L, Nader N, et al. *A real option budget framework for asset management funding models in higher education institutions. Journal of Building Engineering, 2023, 80.*
- [9] Wang M, Ding C, Yang H, et al. *Thinking and Innovative Research on Budget Performance Management in the Contemporary Higher Vocational Colleges. Accounting and Corporate Management, 2023, 5 (12).*
- [10] Hu S. *Research on Comprehensive Budget Performance Management in Universities under the Background of Smart Finance. Accounting and Corporate Management, 2023, 5 (11).*
- [11] Liling D, Keyuraphan L, Sutheniran N, et al. *Guidelines for Improving the Budget Performance Management of Public Universities in Guangdong. International Journal of Higher Education, 2023, 12 (5).*
- [12] Alms N. *What will the federal government do with generative AI?. Nextgov.com (Online), 2023.*
- [13] Wang H. *The Optimization of Overall Budget Management and Internal Control in Colleges and Universities. Accounting and Corporate Management, 2022, 4 (6).*
- [14] Wang H. *Exploration on the Organic Integration of Asset Management and Budget Management in Colleges and Universities. International Journal of New Developments in Engineering and Society, 2022, 6.0 (1.0).*
- [15] Zhang Y. *Research on Performance Management of Project Expenditure Budget in Colleges and Universities. Financial Engineering and Risk Management, 2022, 5 (1).*
- [16] Huwei L, Yanlin G. *Performance Management of University Financial Budget Execution Relying on Comprehensive Budget Management Strengthening Model. Advances in Multimedia, 2022, 2022.*
- [17] Yi C. *The information association model of college students' archives based on a cloud computing management platform. International Journal of Information Technology and Management, 2022, 21 (1).*
- [18] J. W H, Marissa L, A. I S, et al. *Influence of landscape management practices on urban greenhouse gas budgets. Carbon Balance and Management, 2021, 16 (1).*
- [19] Xiaojie Z. *Tracking and Analysis of Management Measures of Budget Implementation Progress in Higher Vocational Colleges. Academic Journal of Business & Management, 2020, 2.0 (8.0).*
- [20] Javier S S, Joaquín G S, Hipólito Z V. *X-ray of Spanish universities: management, structure, educational programmes and budgets (;). Culture and Education, 2020, 32 (4).*
- [21] *Veterinary Medicine; Reports Summarize Veterinary Medicine Findings from Wuhan Donghu University (Problems and Countermeasures of Salary Budget Management in Pig Breeding Enterprises). Veterinary Week, 2020.*
- [22] Capucao N J, Palaoag T, Sierra S. *Web-based System for State Universities and Colleges Budget Office Management. IOP Conference Series Materials Science and Engineering, 2020, 803 (1).*
- [23] *Environment - Environmental Management; Studies from Beijing Normal University in the Area of Environmental Management Described (Uncertainty-based Metal Budget Assessment at the Watershed Scale: Implications for Environmental Management Practices). Energy & Ecology, 2020.*
- [24] *Bacterial Infections and Mycoses - Abscess; Studies from Hospital Center University of Nantes in the Area of Abscess Described (Hospital care pathway of women treated for Bartholin's gland abscess and budget impact analysis of outpatient management: A national hospital database analysis). Computer Technology Journal, 2020.*
- [25] *Climate Change; Researchers from University of Maryland Report New Studies and Findings in the Area of Climate Change (Quantifying Nutrient Budgets for Sustainable Nutrient Management). Agriculture Week, 2020.*