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Integrating Management Accounting Cost Control for Cross-Border E-commerce Tourism Products with STEM Education

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Abstract

Against the backdrop of the convergence of the digital economy and the experience economy, the market for cross-border e-commerce tourism products is growing rapidly, and its dynamic, multi-faceted cost structure presents new challenges for management accounting. Traditional cost control methods and corresponding talent development models struggle to meet the industry's demand for data-driven, agile, and multi-skilled professionals. This study focuses on this practical issue, exploring feasible pathways for integrating STEM educational principles into management accounting teaching. It constructs a four-dimensional competency framework centred on science, technology, engineering, and mathematics and further designs an integrated teaching implementation system covering curriculum restructuring, faculty development and resource coordination, aiming to provide a systematic reference for alleviating the structural mismatch between talent supply and demand. In the future, this teaching model can be continuously refined through deepening case development, optimising simulation environments, and improving long-term evaluation mechanisms, thereby better serving the industry's high-quality development.

Keywords

Cross-Border E-Commerce; Tourism Products; Management Accounting; STEM Education; Cost Control

1. Introduction

Driven by digital economic development strategies, the experience economy has flourished, with the market for cross-border e-commerce tourism products—represented by local experiences, tickets, and package deals—experiencing rapid growth. However, their operations involve diverse aspects such as digital marketing, cross-platform commissions, service fulfilment, and exchange rate risks, resulting in an increasingly dynamic and complex cost

structure. Traditional management accounting methods focus on static accounting and ex-post analysis, yet they have revealed clear limitations when addressing scenarios such as dynamic pricing, personalised marketing, and global supply chain coordination, making it difficult to support enterprises in achieving lean cost control and agile decision-making.

Against this backdrop, there is an increasingly urgent demand within the industry for versatile professionals who are proficient in management accounting tools and capable of integrating data analysis and technological applications to resolve practical cost issues. However, current management accounting education still leans heavily towards the cost accounting paradigms of traditional manufacturing. Teaching methods are disconnected from real-world business scenarios, resulting in a significant disconnect between the skills developed and the agile, data-driven characteristics required in the cross-border e-commerce and tourism sectors. Consequently, how to reform the existing training system and bridge this skills gap has become a key issue in driving high-quality development within the industry[1].

2. Cost Control Requirements and Talent Development Challenges in Cross-Border E-commerce Tourism Products

2.1. The practical need for cost control in cross-border e-commerce tourism products

In service-oriented cross-border transaction scenarios, such as online travel distribution, products are characterised by their intangibility and immediacy. The core resources and costs are largely concentrated in external interfaces within the platform ecosystem, such as supplier procurement, system interconnectivity, customer acquisition campaigns, and order fulfilment interfaces. Unlike traditional material, labour, and overhead costs, the cost structure is characterised by multiple contributing factors, including information system development and maintenance costs, marketing and customer acquisition costs, and transaction management costs. Furthermore, effective cost control relies heavily on real-time decision-making and data-driven capabilities. Given that travel products are intangible, time-sensitive, and experience-oriented, their cost management must be a dynamic, forward-looking, and collaborative process. Dynamic pricing requires real-time adjustments in response to market supply and demand; the return on marketing investment must be analysed and evaluated immediately; and responses to supply chain disruptions necessitate rapid simulation of the cost implications of different scenarios. Traditional, lagging cost control models are no longer capable of meeting these complex practical requirements [2].

2.2. The dilemma of the lag in the supply of traditional management accounting education

Traditional management accounting education has shown a clear lag in responding

to emerging business models such as cross-border e-commerce and tourism. In terms of curriculum content, the course structure remains heavily weighted towards traditional theories such as standard costing and budgeting, whilst failing to sufficiently integrate the practical application of data analysis tools such as Python. Consequently, although students grasp the principles of accounting, they struggle to process real-time, multi-source business data. Furthermore, teaching methods largely rely on standardised case studies and static data, lacking simulation and project-based training using authentic cross-border datasets[3]. Students struggle to address unstructured cost issues—such as cross-platform marketing attribution and service fulfilment scheduling—in scenarios that closely resemble real-world practice, thereby hindering the translation of knowledge into practical skills. Faced with the diverse and dynamic cost structures of cross-border e-commerce and tourism products, a training model oriented towards 'static instruction' struggles to cultivate versatile professionals capable of agile responses and intelligent decision-making, thereby exacerbating the structural mismatch between talent supply and demand.

3. Theoretical Framework for Integrating STEM into Accounting Education

3.1. Objectives for STEM-integrated teaching with a focus on dynamic management

Traditional management accounting education focuses on static accounting and ex-post analysis, aiming to cultivate accountants skilled in record-keeping and periodic reporting. However, the diverse cost structures and dynamic management scenarios faced by cross-border e-commerce tourism products place entirely new demands on the capabilities of professionals. This has prompted a shift in cost control from traditional calculation and variance analysis toward proactive management reliant on real-time data, modelling, and forecasting, and system optimisation. The fundamental objective of STEM education is precisely to drive a strategic transformation in talent development from 'accounting and record-keeping' to 'data-driven management'. In terms of knowledge structure, this requires breaking down the boundaries of the accounting discipline to integrate data science, information technology, systems engineering and quantitative analysis methods. This enables students not only to master traditional theories such as cost drivers and cost-volume-profit analysis, but also to utilise Python, visualisation tools, and mathematical models to conduct cost analysis and forecasting, thereby constructing an interdisciplinary knowledge system; At the same time, it focuses on cultivating students' abilities in systematic analysis and modelling to address complex, unstructured cost issues, their proficiency in technical tools, and their capacity for process design and optimisation, equipping them to handle cutting-edge tasks such as dynamic pricing, marketing ROI assessment and service resource

scheduling; in terms of mindset, it guides students to shift from lagging accounting reliant on historical data to dynamic, real-time forecasting, and from localised cost reduction to a systemic approach that considers value and efficiency across the entire process[4].

3.2. Restructuring the Pedagogical Logic of the Four-Dimensional Competency Framework

The STEM Competency Framework systematically redefines the paradigm for training accounting professionals in dynamic cost management through the integration of science, technology, engineering, and mathematics. Centred on competency development, this framework breaks down disciplinary barriers and incorporates multidisciplinary knowledge into accounting education: the scientific dimension focuses on a systematic understanding of economic and management theories; the technological dimension emphasises the practical application of data analysis tools; the engineering dimension emphasises a mindset geared towards process and system optimisation; and the mathematical dimension provides the methodological foundation for quantitative modelling. The resulting competency system encompasses comprehensive skills ranging from data perception and tool mastery to system design and decision support, driving the evolution of the accounting function from mere record-keeping toward forward-looking management. By establishing a progressive competency chain, students are guided from understanding cost drivers towards system design and decision optimisation; simultaneously, an interdisciplinary curriculum matrix is constructed, integrating accounting theory, data analysis, systems engineering and operations research methods to achieve a structured fusion of knowledge[3].

4. Establishing an Integrated Teaching System for Dynamic Cost Control

4.1. The Restructuring and Integration of Interdisciplinary Course Modules

The development of a curriculum ecosystem that fosters collaboration between the accounting discipline and other disciplines occupies a central hub in the path towards interdisciplinary integration; it serves as a key pillar for advancing accounting education from the cultivation of single-skill sets to the development of multifaceted competencies. In the construction of an integrated teaching system geared towards dynamic cost control, the restructuring and integration of interdisciplinary course modules occupy a central and pioneering position. The essence of this lies in breaking down traditional barriers between management accounting and disciplines such as data science, information technology, and systems engineering, whilst undertaking top-level design and systematic re-engineering of the curriculum around the complex, real-world problem domain of

end-to-end cost control in cross-border e-commerce tourism.

This reconstruction follows a problem-oriented logic: taking the composite competencies required for dynamic cost control as the endpoint, it works backwards to derive and integrate the necessary multidisciplinary knowledge components, thereby constructing a new 'Accounting+' curriculum structure that is modular, progressive and ecosystemic. This reconstruction unfolds across three conceptual levels: at the foundational cognitive level, data analysis tools and engineering thinking are embedded within core accounting courses to establish a 'business-finance-data' interdisciplinary mindset. At the comprehensive application level, through interdisciplinary project-based courses, students are guided to integrate multidisciplinary knowledge within simulated scenarios, thereby developing systematic project capabilities to address unstructured cost issues. At the innovation and expansion level, drawing on real-world corporate challenges, students are encouraged to engage in cutting-edge exploration and the design of innovative solutions, thereby completing the transition from learners to practitioners and innovators[5].

4.2. Capacity building for the 'dual-qualified' teaching workforce

The 'dual-qualified' teaching staff constitutes the core driving force and key safeguard for the successful implementation of the integrated teaching system. The fundamental objective of their professional development is to address the challenges faced by traditional accounting lecturers—namely, a narrow knowledge base and a disconnect from industry practice—by systematically cultivating a cohort of multi-skilled educators who are well-versed in management accounting theory and methodology, proficient in data analysis tools, and capable of understanding the business logic and cost structures of cross-border e-commerce. To this end, a professional competency framework for 'dual-qualified' teachers should be established, clearly defining specific dimensions such as professional knowledge, data modelling and analytical skills, proficiency in technical tools, and understanding of industry practices. This framework should serve as a key basis for faculty recruitment, assessment and evaluation, thereby optimising the competence structure of the teaching staff from the outset. Secondly, a systematic capacity-building programme should be implemented to continuously enhance teachers' ability to apply educational technology tools in depth and to innovate in teaching, through measures such as organising specialised workshops and training in cutting-edge technologies. Concurrently, a long-term mechanism for "school-enterprise job rotation" and "practical feedback" should be established. By seconding teachers to practical departments within cross-border e-commerce enterprises or accounting firms, where they participate in core business activities such as real-world cost digitization projects and the development of intelligent financial systems, cutting-edge industry practices, vivid corporate case studies, and

genuine business challenges can be effectively translated into classroom teaching content and practical training project designs [5].

4.3. Industry-Education Collaboration and the Development of Teaching Resource Platforms

The core of industry-education collaboration and the development of teaching resource platforms lies in the structured integration of educational provision and industrial resources through institutionalised, in-depth collaboration, thereby building a smart teaching ecosystem capable of continuous evolution, feeding back into teaching, and linking to practical applications. The first step is to establish a dynamic, iterative knowledge resource system. Teaching resources should not be static archives, but should originate from industrial practice, with a continuous mechanism for dynamic updates and feedback to ensure that teaching content keeps pace with industry developments. Digital platforms should be utilised to provide foundational support for personalised and inquiry-based learning. At the same time, a highly realistic decision-making simulation and comprehensive training environment must be constructed. By systematically integrating key dynamic variables such as market conditions, exchange rates, and supply chains, complex decision-making scenarios that closely approximate reality can be created within the teaching process. By conducting multiple rounds of cost control simulations across diverse scenarios within these virtual environments, students transform static theoretical knowledge into practical capabilities for managing uncertainty, optimising systems, and making forward-looking predictions[3].

5. Conclusions

The interdisciplinary integration of education to cultivate versatile professionals is the inevitable path for contemporary accounting education to respond to industrial transformation. Addressing the practical challenges of dynamic cost control in the cross-border e-commerce tourism sector, this study explores potential pathways for integrating STEM education with management accounting teaching. By establishing a‘four-dimensional competency framework’and a corresponding teaching implementation system, it aims to provide a viable reference model for alleviating the structural mismatch between talent development and industry demands.

In the future, by thoroughly exploring regional resources and industry needs, a rich, diverse, and practical case study system can be developed to enhance the applicability and impact of teaching. Furthermore, the design and application of simulation-based learning environments should be optimised, utilising advanced technological methods to enhance the realism and interactivity of simulations, enabling students to hone their practical skills and innovative thinking within highly realistic scenarios. A long-term evaluation and dynamic adjustment mechanism for integrated courses should be established and refined. Through continuous

monitoring, assessment, and feedback, teaching content and methods can be promptly adjusted, thereby driving the iterative development, optimisation, and maturation of this training model in practice and ensuring its better adaptation to the needs of educational development.

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Public Disclaimer

The authors declare no conflict of interest.

References

[1] Tian L J, Li J, Xu X Z. Objectives and pathways for the development of accounting within the new liberal arts [J]. Commercial Accounting, 2024(1): 127-129.

[2] Chen Y L. Research on cost control of online travel companies based on enterprise value [D]. Zhenjiang: Jiangsu University of Science and Technology, 2017.

[3] Zhang W H, Li Y M, Wang Q. Construction and implementation pathways of a first-class "dual-integration" accounting curriculum based on STEM: A case study of Xidian University [J]. Financial Management Research, 2022(10): 55-61.

[4] Yang H Y, Zhang S Y, Pan L Y. Talent development pathway for intelligent decision-making MPAcc students at Guangxi University based on OBE philosophy [J]. Finance and Accounting, 2025(1): 73-74.

[5] Jiang Y F, Li X Y, Jiang S Y, et al. Reform of accounting talent development under the trend of financial intelligence [J]. Finance and Accounting Monthly, 2022(13): 94-101.