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Does Management Accounting Positively Influence the Performance of Businesses Operating Within the Circular Economy?

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ABSTRACT

The objective of the study is to assess the influence of management accounting (MA) on the performance of businesses operating within the circular economy. The findings are derived from a survey conducted with 244 enterprises in Hanoi, Vietnam, utilizing descriptive statistics and quantitative analysis methods. These methods include the evaluation of research concepts through Cronbach's alpha reliability testing, exploratory factor analysis (EFA), and confirmatory factor analysis (CFA), among others, to test the validity of the research model against the proposed hypotheses. The standardized results from the SEM linear structural model indicate that three hypotheses were accepted: first, the implementation of management accounting positively influences the degree of engagement of enterprises in the circular economy; second, the degree of engagement in the circular economy positively influences the performance of businesses; and third, the implementation of management accounting positively influences the performance of businesses. Nevertheless, the study lacks sufficient evidence to conclusively state that the application of management accounting, mediated by the circular economy, positively impacts the performance of enterprises.

Keywords: Management accounting, Performance, Circular economy, Vietnam.

Introduction

The Circular Economy (CE) has become a globally recognized paradigm, driven by its demonstrated economic, environmental, and social benefits (Liu *et al*., 2022). As highlighted by Kirchherr *et al.* (2023), CE fosters sustainable economic growth, job creation, environmental protection, and contributes to the fulfillment of the Sustainable Development Goals (Thazha *et al*., 2023). Geissdoerfer *et al.* (2017), along with Milanović *et al.* (2019), emphasize CE's multidimensional advantages, which have increasingly attracted attention in policymaking, consultancy, and academia over the past decade (Makhoahle & Gaseitsiwe, 2022).

According to the Ellen MacArthur Foundation (2013), CE is a restorative and regenerative industrial system that replaces the end-of-life concept with restoration, promotes renewable energy use, eliminates hazardous substances, and minimizes waste through advanced product design and circular business models.

In Vietnam, CE has been officially prioritized as a national strategy for the 2021–2030 period (Resolution No. 55-NQ/TW; Decision No. 687/QĐ-TTg). The strategic focus includes extending material durability, reducing waste and emissions, and ecosystem restoration. In this context, management accounting (MA) emerges as a key managerial tool for supporting decision-making and enhancing operational efficiency. As noted by Nguyen and Tran (2018), MA

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plays a critical role in evaluating business performance and aligning accounting information systems with the demands of CE (Dhanasekar *et al*., 2022). It enables enterprises to make strategic decisions, optimize costs, improve cash flows, and enhance resource efficiency, thus contributing to sustainable development objectives.

The 2023 White Paper on Vietnamese Enterprises reports that, as of December 31, 2022, Vietnam had 895,876 active enterprises, with Hanoi hosting 187,007 (21%), making it a major economic hub. As the political, economic, and cultural center of the country, Hanoi fosters a dynamic business ecosystem across diverse sectors. The transition from a linear to a circular economic model particularly in the domain of MA represents a strategic shift to promote green growth, economic modernization, and sustainability.

From a scholarly perspective, CE is increasingly studied in relation to accounting due to its potential to address systemic inefficiencies in resource use across value chains. Yuan *et al.* (2006) were among the first to conceptualize CE in the context of resource efficiency (Graefen *et al*., 2023). More recently, Di Vaio *et al.* (2022) have mapped the intersection of CE and accounting, examining themes such as waste management, sustainability, and digital transformation (Wilhelmy *et al*., 2022). These studies underscore the pivotal role of accounting in generating and transmitting information vital for CE implementation.

In Vietnam, however, the intersection between CE and accounting particularly MA remains underexplored, with a lack of empirical studies and applied frameworks. The shift toward a digital economy and sustainable development has prompted enterprises in Hanoi to adopt new technologies and collaborate with international partners to enhance competitiveness. Nevertheless, challenges persist in institutional infrastructure, implementation capacity, and integration of CE principles within managerial practices. The adoption of CE-oriented MA systems represents a strategic opportunity to address these gaps.

This study seeks to empirically investigate the impact of management accounting on the performance of enterprises engaged in CE practices in Hanoi. Specifically, it aims to examine: (i) the role of MA in enhancing CE engagement; (ii) the influence of CE engagement on enterprise performance; (iii) the direct effect of MA on performance; and (iv) the mediating role of CE engagement in the relationship between MA and performance. The findings are expected to enrich the theoretical understanding of CE-accounting linkages and provide actionable insights for policymakers and business leaders in promoting sustainable, circular development pathways in Vietnam.

The Foundational Theory and Formulation of the Research Hypothesis

The Foundational Theory

The Circular Economy

The conceptual foundation of the circular economy (CE) can be traced back to the seminal work of Kenneth Boulding in 1966, which emphasized the necessity of circular ecological systems for ensuring the long-term viability of human life on Earth (Geisendorf & Pietrulla, 2018). Building upon this notion, the term "circular economy" gained further traction through the contributions of David Pearce and R. Kerry Turner during the late 1980s and early 1990s (Ghisellini *et al*., 2016). A comprehensive review conducted by Kirchherr *et al*. (2023) identified 221 distinct definitions of CE, reflecting the conceptual diversity and evolving nature of the field (Kulkarni *et al*., 2023).

Among the widely accepted definitions, Geissdoerfer *et al*. (2017) characterize CE as a regenerative economic system designed to minimize input of resources, waste, emissions, and energy loss by implementing strategies that decelerate, close, and narrow material and energy loops (Pavlova, 2024). Central to this model is the reconfiguration of traditional linear processes into circular systems in which outputs from one process serve as inputs for another. Effective implementation of CE, therefore, requires a shift from isolated, sectoral approaches to integrated, territorially informed strategies.

Kirchherr Florian *et al*. (2023) articulate the core framework of CE through the 4R model Reduce, Reuse, Recycle, Recover (Ravoori *et al*., 2024).

- *Reduce* focuses on minimizing raw material, energy, and water usage through eco-efficient production, lightweight product design, and the use of recycled inputs.

- *Reuse* promotes the repeated use of products and materials, such as repurposing containers, repairing textiles, and substituting disposable goods with durable alternatives.
- *Recycle* involves the transformation of used materials into new raw inputs, as exemplified in the recycling of paper, plastics, and metals.
- *Recover* entails the extraction of energy or other valuable resources from waste, including composting organic material or converting waste to bioenergy.

This 4R framework serves as a strategic reference point for operationalizing CE, enhancing resource efficiency, reducing environmental burdens, and fostering systemic sustainability.

Management Accounting

Management accounting represents a critical pillar of the accounting information system, primarily tasked with providing decision-relevant financial and non-financial information to organizational managers. As defined by Garrison *et al.* (2021), management accounting constitutes an information infrastructure that supports three essential managerial functions: planning, control, and decision-making (Fernandes *et al*., 2022). By systematically generating and analyzing pertinent data, management accounting enhances organizational responsiveness, cost efficiency, and strategic alignment.

The American Institute of Management Accountants further delineates management accounting as the systematic process of identifying, measuring, analyzing, synthesizing, and communicating both financial and non-financial information to internal stakeholders. This broad definition underscores the integrative nature of management accounting, highlighting its relevance not only for financial stewardship but also for optimizing capital allocation, asset utilization, and performance evaluation. Importantly, the emphasis on non-financial indicators reflects a shift toward a multidimensional approach to decision-making particularly salient in sustainability-oriented paradigms such as the circular economy.

Management Accounting in the Context of the Circular Economy

Management accounting plays a pivotal role in facilitating informed managerial decision-making, overseeing operational performance, and advancing strategic objectives. In the context of the circular economy (CE), its relevance is further magnified, as it transcends traditional cost accounting functions to encompass broader responsibilities in cost identification, benefit analysis, efficiency evaluation, and risk assessment (Shaheen *et al*., 2023).

First, cost identification in CE contexts enables organizations to quantify expenditures associated with waste management, including treatment and disposal, while simultaneously revealing potential cost-saving opportunities through reuse, remanufacturing, and recycling. This allows firms to shift from reactive to preventive cost strategies by embedding circular principles into operational design.

Second, economic benefit analysis supports the appraisal of financial gains derived from CE implementation. Management accounting informs decisions by highlighting reduced production costs, enhanced revenues from secondary products, and intangible benefits such as strengthened brand equity and improved stakeholder perception.

Third, effectiveness evaluation of circular activities such as recycling, repair, and reuse is facilitated through performance metrics developed within management accounting systems. These metrics allow firms to monitor progress, identify inefficiencies, and recalibrate processes to ensure the continual improvement of circular operations.

Finally, risk assessment is essential in identifying and mitigating risks inherent in CE adoption. These include uncertainties related to the quality of recycled inputs, compliance with evolving regulatory frameworks, and market volatility. Management accounting contributes by offering analytical tools to assess these risks and by supporting the development of adaptive strategies.

In sum, management accounting provides a comprehensive analytical infrastructure that is indispensable for operationalizing circular economy principles, enhancing resource efficiency, and ensuring the financial and environmental sustainability of business models.

Performance

Organizational performance reflects the extent to which an entity effectively utilizes its resources human, financial, temporal, and material to achieve predetermined objectives. It encompasses both financial dimensions (e.g., revenue generation, profitability, return on capital) and non-financial aspects (e.g., customer satisfaction, employee engagement, and product quality), as articulated by Henri and Journeault (2010) (Maneea *et al*., 2024). According to Monica *et al.* (2012), organizational performance is assessed through internally and externally disclosed data, integrating both quantitative financial metrics and qualitative non-financial indicators.

Performance measurement, as outlined by Otley (1999), involves the systematic deployment of multidimensional indicators across various organizational levels to evaluate the effectiveness of strategic implementation, the achievement of critical success factors, and alignment with operational plans (AlHussain *et al*., 2022). Its ultimate purpose is to generate actionable insights that satisfy stakeholder expectations by translating organizational activities into verifiable and meaningful outcomes.

Formulation of Research Hypotheses

The influence of management accounting on the performance of businesses in the circular economy.

Hypothesis H1: The implementation of management accounting positively influences the degree of engagement of enterprises in the circular economy.

The circular economy addresses environmental degradation and resource scarcity, with management accounting serving as a key enabler in its enterprise-level implementation (Milanović *et al*., 2019; Malcangi *et al*., 2023). It provides critical data on costs, resource use, and waste, supporting decisions on process redesign, recycled inputs, and supply chain optimization. Studies highlight tools such as Material Flow Cost Accounting and Full Cost Accounting as essential for aligning accounting with circular objectives (Zhou *et al*., 2017; Abou Taleb *et al*., 2021; Bulusu & Cleary, 2023). Management accounting also enhances lifecycle management and resource circularity through data-driven strategies (Jørgensen *et al*., 2023). Collectively, it accelerates circular transitions and fosters sustainable economic development.

Hypothesis H2: The degree of engagement in the circular economy positively influences the performance of businesses.

Research highlights a positive relationship between circular economy implementation and enterprise performance, particularly through circular supply chain design, relationship management, and human resource practices (Del Giudice *et al*., 2020; Dongmo & Tamesse, 2023; Shahzad, 2023). Circular models reduce costs via material substitution, waste minimization, and life-cycle extension, fostering both economic and environmental gains. Operational efficiency is enhanced through closed-loop supply chains and improved resource oversight. These practices also elevate customer satisfaction and corporate reputation through ecological transparency and service innovation. Strategically, circular adoption mitigates supply risks and enhances resilience, driving long-term sustainable competitiveness (Patil, 2022; Di Vaio *et al*., 2023).

Hypothesis H3: The implementation of management accounting positively influences the performance of businesses.

Empirical studies affirm that management accounting positively impacts organizational performance by enhancing innovation, strategic alignment, and operational efficiency (Phornlaphatrachakorn & Na-Kalasindhu, 2020; Zhou & Wei, 2021). In Vietnam, its role is increasingly strategic, influenced by governance quality, competition, and workforce policies (Huong & Cuong, 2022). Research on SMEs in Binh Duong highlights contextual factors such as firm characteristics and employee competencies as key drivers (Huynh & Thao, 2021). Strategic management accounting adoption is shaped by digital infrastructure and strategic orientation (Tran & Lan, 2021). Vietnamese enterprises are progressively using management accounting for forward-looking decision-making and sustainable performance enhancement.

Hypothesis H4: The utilization of management accounting as a facilitator of the circular economy positively influences the performance of businesses.

Management accounting plays a pivotal role in enhancing enterprise performance within the circular economy by providing data for resource stewardship, life-cycle costing, and performance monitoring. It facilitates the evaluation of circular initiatives (e.g., reuse, recycling) and supports emerging business models grounded in circularity. Studies affirm that aligning governance and accounting with circular principles enhances both environmental and economic outcomes. Moreover, management accounting fosters transparency through sustainability disclosures, reinforcing corporate responsibility and stakeholder trust. Collectively, it contributes to improved financial performance indicators such as ROA, ROE, and profitability.

The proposed research model is shown in **Figure 1**.

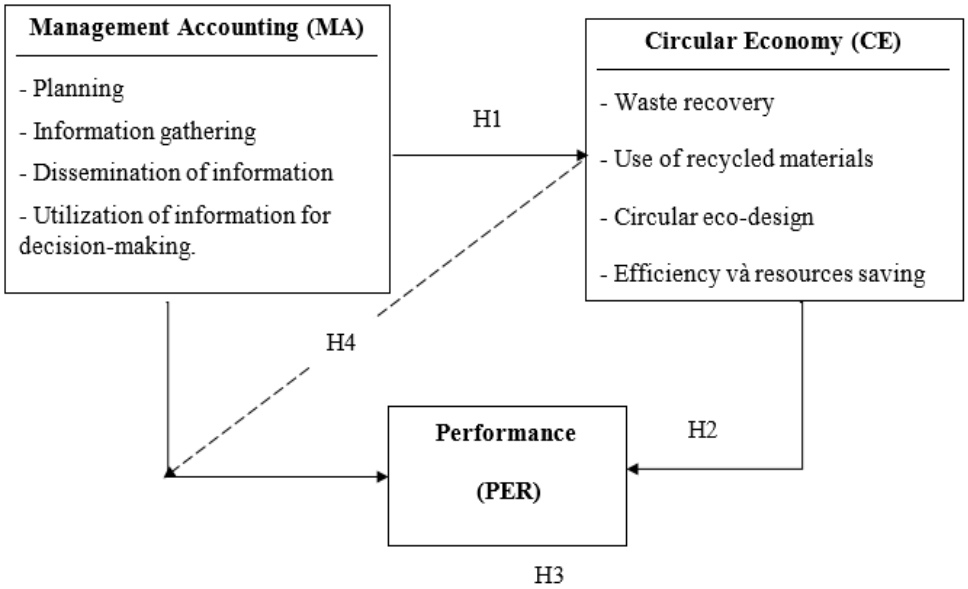

Figure 1. The proposed research model

The conceptual model, as illustrated in **Figure 1**, consists of one dependent variable operational efficiency and four independent variables representing distinct dimensions of management accounting. These include cost and revenue estimation, information collection and processing, information dissemination, and the application of managerial accounting information in decision-making processes. These components are adapted from the framework proposed in the textbook *Managerial Accounting* by Garrison *et al.* (2021), with adjustments to reflect the principles of the circular economy articulated by Kirchherr *et al.* (2023).

The moderating variable enterprise participation in the circular economy is operationalized based on the transition framework toward circular business models developed by Scarpellini *et al.* (2019) and further integrated by Kirchherr *et al*. (2023). This variable captures the degree to which firms adopt circular practices such as reuse, recycling, product-life extension, and resource loop closure.

Performance is assessed using both financial and non-financial indicators. Financial performance is measured through return on assets (ROA), return on equity (ROE), and return on sales (ROS), following empirical precedents set by Scarpellini *et al*. (2019), Sainaghi *et al.* (2017), and Wang *et al.* (2018). Non-financial performance is evaluated through indicators such as competitive advantage in profit and market share, stakeholder recognition of superior management systems, and managerial satisfaction with organizational outcomes, as established in the research of Phornlaphatrachakorn and Na-Kalasindhu (2020), and Joni *et al.* (2019).

This model aims to rigorously examine the influence of management accounting on enterprise engagement in circular economy practices and its subsequent impact on firm performance. Furthermore, it seeks to quantify the moderating role of circular economy adoption in shaping the relationship between management accounting practices and organizational efficiency.

Materials and Methods

The suggested research framework comprises one dependent variable, namely operational efficiency, alongside four independent variables related to management accounting. Additionally, there is one reference variable, which pertains to the degree of engagement of enterprises in the circular economy.

Data Collection and Processing

The implementation process comprises three main phases: data collection, processing, and analysis, conducted as follows.

Step 1, measurement instruments were developed based on the theoretical foundations of management accounting by Garrison *et al.* (2021), and the circular economy engagement framework by Scarpellini *et al.* (2019), later extended by Kirchherr *et al*. (2023). A structured questionnaire was constructed and refined through expert consultations involving business leaders, chief accountants, and academic scholars. The final scale was iteratively revised to ensure conceptual clarity and empirical applicability for the official survey.

Survey Subjects

- The official questionnaire is distributed to businesses in Hanoi City via email and social media platforms, including Zalo and Facebook.
- The participants of the survey consist of business administrators, including General Directors, Directors, and department-level administrators, as well as chief accountants and accountants working in enterprises located in Hanoi City. The selection of these respondents was conducted using a convenient sampling method.

Step 2: A total of 248 votes were collected. Following the processes of encoding and data cleaning, the count of valid votes stands at 244, which will be utilized for the analysis.
Step 3: This study employs SPSS 22 and AMOS to analyze the impact of Management Accounting on enterprise performance within the circular economy context. The methodology includes reliability testing (Cronbach's Alpha), EFA, correlation analysis, CFA, and SEM regression. These analyses aim to validate the proposed hypotheses and model the multivariate relationships among key constructs.
Step 4: Analyze and deliberate on the findings of the research.
Step 5: Conclusions and recommendations.

The research process is described in **Figure 2**.

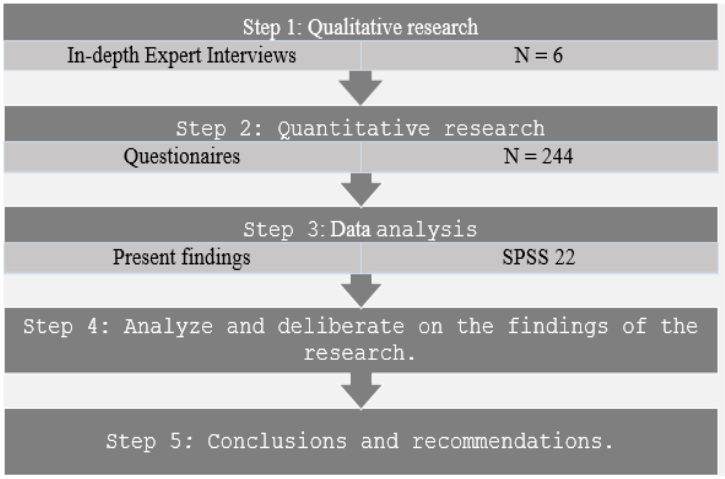

Figure 2. Research Process
(Source: The Authors gathered and organized)

The questionnaire is systematically structured into five distinct sections, aligned with the conceptual research model comprising one dependent variable (operational efficiency), four independent variables reflecting dimensions of management accounting, and one moderating variable representing the extent of enterprise engagement in the circular economy. Specifically:

Section 1, evaluates the level of enterprise engagement in the circular economy, based on the framework by Scarpellini *et al.* (2019), later expanded by Kirchherr *et al.* (2023).

Section 2, develops the construct of management accounting in the circular economy, following Garrison *et al.* (2021), and includes four subdimensions.

Section 3, measures enterprise performance using financial indicators (Return on Assets, Return on Equity, Return on Sales) and non-financial metrics derived from studies by Sainaghi, Baggio, Phillips; Wang, Sarkis, Liu; Joni, Agus, Suharnomo; and Phornlaphatrachakorn, Khajit.

All constructs are grounded in prior literature and adapted to the circular economy context.

Variables are assessed on a standardized five-point Likert scale

Section 4, *Enterprise Characteristics*, collects basic organizational data such as year of establishment, size of workforce, and industry classification.

Section 5, Respondent Profile, gathers demographic and professional information including job position, educational background, and gender. This data serves to assess respondent credibility and facilitate comparative analyses across subgroups based on individual or organizational characteristics.

The complete operationalization of constructs and measurement items is summarized in **Table 1**.

Table 1. Description of the scale

No.	Scale	Encode	N of Items	Source
1	Degree of engagement of enterprises in the circular economy	PCE	10	Scarpellini *et al.* (2019); Kirchherr *et al.* (2023)
2	Management Accounting of Enterprises in the Circular Economy	MA	22	Raymond *et al.* (2021); Scarpellini *et al.* (2019); Kirchherr *et al.* (2023)
a	Cost and income estimation	PLI	07	
b	Information gathering and analysis	DEI	06	
c	Information dissemination	PRI	05	
d	Utilization of information for decision-making	USI	04	
3	Performance	PER	06	Scarpellini *et al.* (2019); Sainaghi *et al.* (2017); Wang *et al.* (2018); Joni *et al.* (2019); Phornlaphatrachakorn and Na-Kalasindhu (2020)

(Source: The authors gathered and organized)

Research Sample

Out of the 244 valid survey responses obtained, medium-sized enterprises, defined as those with 10 to 100 employees, represent the largest segment at 47.1%. Following this, large enterprises, which employ between 100 and 200 individuals, constitute 23.8% of the total. Very large enterprises, with more than 200 employees, account for 14.8%,

which is equivalent to the proportion of small businesses. Small businesses, categorized as having fewer than 10 employees, make up the smallest share at 14.3%.

In terms of the year of establishment, the majority of enterprises, representing 45%, are classified as young enterprises, having been established for less than five years. This is followed by those in the age range of six to ten years, which constitute 28% of the total. Enterprises that have been in operation for eleven to twenty years make up 18%, while those exceeding twenty years account for the smallest segment at just 10%. Regarding sector distribution, the Trade and Services sector leads with a significant 56.6%, indicating its dominance in the market. Following this are Agriculture at 16.8%, Construction at 16.0%, and Industry at 8.6%, with other sectors collectively representing a mere 2.0%. This allocation sample structure, as outlined above, guarantees a diverse representation in terms of scale, age, and industry sector of the enterprise, making it appropriate for conducting analysis.

Results and Discussion

Findings of the Study and Subsequent Discussion

Evaluation of Scale Reliability

The reliability of the scales is evaluated using the Cronbach's Alpha coefficient, which indicates the extent of correlation among the observed variables within the same factor. As presented in **Table 2**, all factors demonstrate reliability, as the Cronbach Alpha coefficients for the groups exceed the threshold of 0.6 (Hair *et al*., 2022). The data collected for each scale are appropriate for conducting exploratory factor analysis.

Table 2. Evaluation of scale reliability

Encode	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Degree of engagement in the circular economy (Cronbach's Alpha 0.939)				
PCE01	29,64	44,676	,741	,933
PCE02	29,79	43,886	,763	,932
PCE03	29,81	43,341	,777	,931
PCE04	29,75	44,367	,761	,932
PCE05	29,58	45,142	,748	,933
PCE06	29,60	44,833	,745	,933
PCE07	29,57	45,407	,735	,933
PCE08	29,54	45,937	,710	,934
PCE09	29,56	44,980	,770	,932
PCE10	29,54	44,785	,770	,931
Degree of execution of estimation (Cronbach's Alpha 0.953)				
PLI01	19,66	29,854	,823	,946
PLI02	19,66	29,574	,824	,946
PLI03	19,58	30,558	,809	,948
PLI04	19,77	29,678	,840	,945
PLI05	19,66	29,088	,874	,942
PLI06	19,67	29,630	,831	,946
PLI07	19,68	28,919	,863	,943
Degree of information gathering and analysis (Cronbach's Alpha 0.960)				
DEI01	16,61	24,872	,835	,956
DEI02	16,61	24,707	,831	,957
DEI03	16,66	24,127	,886	,950

DEI04	16,68	24,531	,888	,950
DEI05	16,66	24,051	,899	,949
DEI06	16,71	23,820	,895	,950
Degree of information dissemination (Cronbach's Alpha 0.947)				
PRI01	14,20	12,221	,822	,940
PRI02	14,18	12,157	,869	,933
PRI03	14,22	11,916	,864	,933
PRI04	14,19	11,638	,861	,934
PRI05	14,17	11,641	,862	,934
Degree of information utilization (Cronbach's Alpha 0.932)				
PRI01	14,20	12,221	,822	,940
PRI02	14,18	12,157	,869	,933
PRI03	14,22	11,916	,864	,933
PRI04	14,19	11,638	,861	,934
PRI05	14,17	11,641	,862	,934
Performance (Cronbach's Alpha 0.933)				
PER01	18,16	12,179	,815	,919
PER02	18,26	12,183	,822	,918
PER03	18,15	12,179	,840	,916
PER04	18,29	12,505	,781	,923
PER05	18,25	12,319	,802	,920
PER06	18,29	12,332	,754	,927

Source: Based on the findings from the survey.

Exploratory Factor Analysis (EFA)

Exploratory factor analysis is conducted to evaluate the convergence and differentiation among factor groups, thereby confirming the structure of the scales. The results of the KMO and Bartlett's test indicate Sig. = 0.000 < 0.05, alongside a high KMO coefficient of 0.935, exceeding the threshold of 0.5. This suggests that the observed variables are interrelated, making the exploratory factor analysis highly pertinent. The Eigenvalues exceed 1, revealing the presence of five factors and a cumulative variance of 70.207%, which is above the satisfactory level of 50%. The findings from the exploratory factor analysis demonstrate that the observed variables are effectively grouped into five factors, aligning with the original model.

Confirmatory Factor Analysis CFA

The purpose of the CFA analysis is to elucidate the parameters and assess the factor model, which is typically employed following the validation of the fundamental structure established by the EFA analysis. A re-evaluation of the scales will be conducted using the composite reliability factor and confirmatory factor analysis (CFA), utilizing data from an official study with a sample size of n=244. The findings from the EFA, five groups of factors incorporated into the research model, specifically management accounting (PLI, DEI, PRI, USI), PCE, and one dependent variable, PER. The results of the KMO and Bartlett's tests indicated a significance level of Sig. = 0.000, which is less than 0.05, alongside a high KMO coefficient of 0.935, exceeding the threshold of 0.5. This outcome suggests that the observed variables are interrelated and align with the CFA factor analysis.

The factor model matrix table comprises five independent variables with observed variables, as indicated in the exploratory factor analysis (EFA), and one dependent variable (PER) associated with six observed variables, ranging from PER01 to PER06. All observed variables exhibit a loading coefficient exceeding 0.5, and the independent variables align with the proposed research model.

The findings from the Confirmatory Factor Analysis (CFA) indicate that, upon accounting for the correlation among the errors of the observed variables, the model possesses 643 degrees of freedom, with a Chi-squared value of

1201.059 (p = 0.000). GFI = 0.802 (GFI > 0.8); TLI = 0.922; CFI = 0.928 (TLI, CFI > 0.9); Chi-square/df =1.868, RMSEA = 0.06 (CMIN/df < 3, RMSEA < 0.08), indicating that all metrics are satisfactory. Therefore, the model aligns well with the data (Hair *et al*., 2022). Following the assessment of the model's fit and its compatibility with the data, an examination of the unidirectionality and convergence values of the scales is warranted. The results reveal that all CFA load weights for the observed variables exceed 0.5, thereby affirming the unidirectionality and convergence validity of the scales employed in the model.

SEM Linear Structure Model Evaluation

The research model under consideration comprises six identified concepts: PLI, DEI, PRI, USI, PCE, and PER. In the course of the analysis, it is recommended that the observed variable PCE03, which exhibits a strong correlation within the group, be excluded to enhance the model's appropriateness. The findings from the SEM model analysis are illustrated in **Figure 3**.

The findings from the SEM linear structure analysis **(Figure 3)** indicate that the model possesses 616 degrees of freedom, accompanied by a Chi-square statistic of 1196.864, p=0.000. Upon adjusting the Chi-square value by the degrees of freedom, the resulting indicator reflects an acceptable level of fit (1.943 < 3). Additional criteria for evaluating the fit of the model are also favorable: GFI = 0.800 (≥0.8); TLI = 0.916 (>0.8), CFI = 0.923 (>0.9), and RMSEA = 0.062 (< 0.08). Therefore, it can be concluded that the research model aligns well with the data obtained.

The research results of the SEM model described in **Figure 3**.

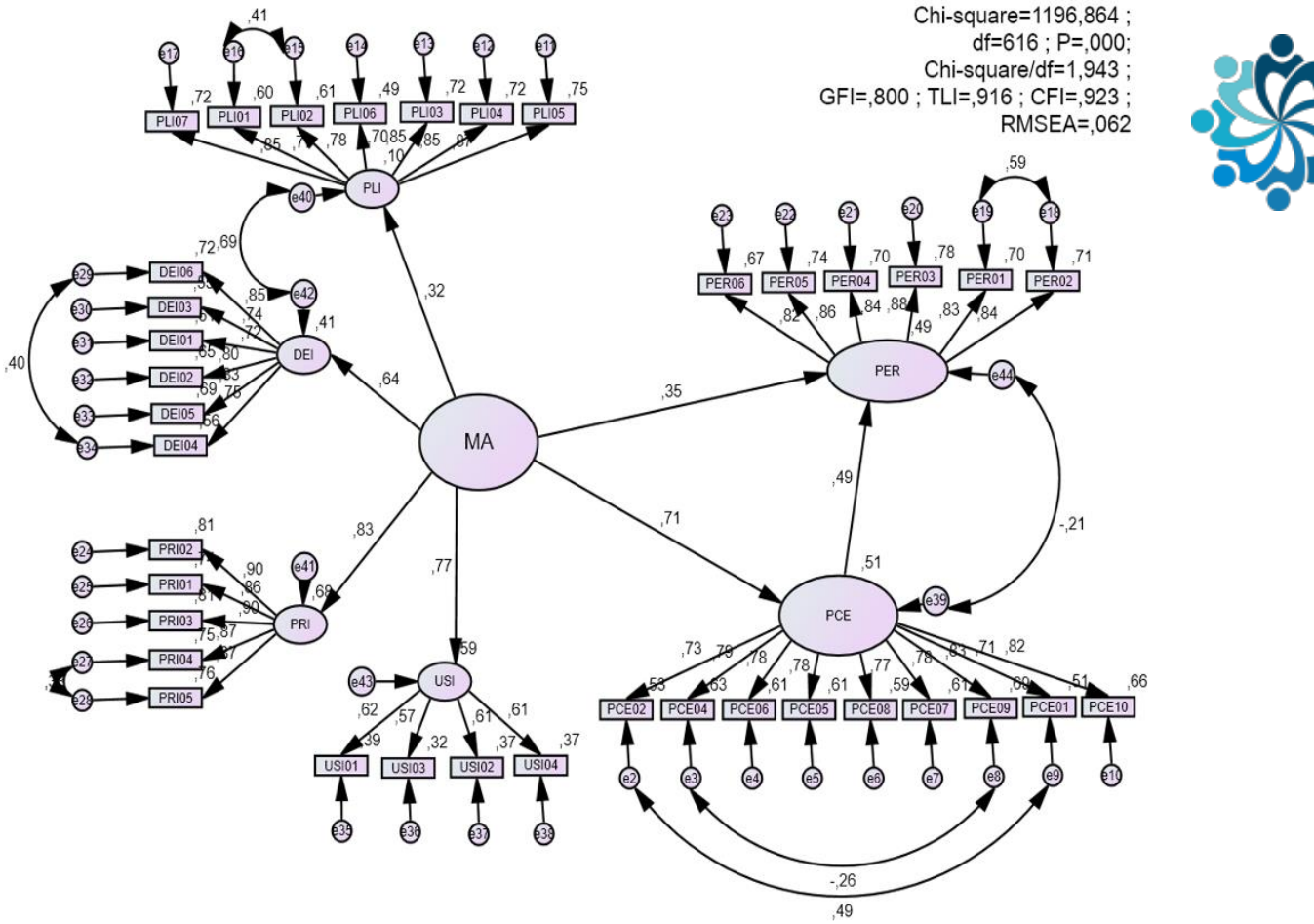

Figure 3. SEM model results
Source: Analysis of survey results from Amos

Table 3. Outcomes of evaluating the causal relationship within the model

Relationship			Direct relationship		Indirect relationship		
			Standardized coefficients.	P	Standardized coefficients.	P	Conclusion
MA	--->	PCE	0,715	***			Accepted
PCE	--->	PER	0,485	***			Accepted
MA	--->	PER	0,347	***			Accepted
MA	---> PCE --->	PER			1	-	Rejected

Source: Analysis of survey results from Amos

The standardized results of the SEM model are represented in **Table 3**. The results confirm the validity of hypotheses H1, H2, and H3. Regarding H4, while the direct relationship between management accounting and enterprise performance is statistically significant, the indirect pathway mediated by the circular economy does not achieve statistical significance and is therefore rejected.

This study integrates management accounting and business performance within a comprehensive research framework grounded in the principles of the circular economy. All proposed relationships are supported, except for the mediating effect of the circular economy on the link between management accounting and operational efficiency. The key findings are summarized as follows:

First, management accounting substantially enhances the degree of enterprise engagement in circular economy initiatives. It provides detailed analyses of costs and benefits associated with circular practices such as recycling, reuse, repair, and product life extension enabling firms to make informed investment decisions. Through systematic cost and profit assessments, organizations can identify the economic value derived from circular strategies, thereby strengthening their commitment to such practices. Management accounting improves resource utilization across physical, financial, and human capital by identifying inefficiencies in the supply chain, optimizing raw material and energy use, and minimizing waste, which collectively lead to improved economic outcomes and reduced environmental impacts.

Moreover, management accounting supports the evaluation of innovation and creativity within the circular economy, including the development of recycled products, sustainable design, and circular business models. Robust monitoring and analytical systems encourage firms to invest in innovative projects that foster circularity. It also establishes a transparent framework for tracking and reporting the performance of circular initiatives, enabling greater stakeholder collaboration along the supply chain. Such collaboration reinforces community values and sustainable development.

These findings are consistent with the research of Svensson *et al.* (2019) and Aureli *et al.* (2023), who emphasize the need to adapt management control systems to support circular business models. Furthermore, the work of Milanović *et al.* (2019) underscores that accounting practices are pivotal for informed decision-making and resource allocation in the transition to a circular economy.

Secondly, the level of enterprise engagement in the circular economy has a positive and statistically significant impact on business performance. Deeper integration into circular economy practices yields tangible benefits such as cost reduction, revenue enhancement, improved corporate image and reputation, and increased attractiveness to investors. These benefits are positively correlated with the extent of participation.

Through recycling and reusing input materials, firms can lower production costs and reduce dependency on virgin resources. Resource efficiency particularly in terms of energy, water, and materials is significantly improved, while waste generation throughout production and operations is minimized. Strategies that emphasize repair and upgrading instead of full replacement extend the lifecycle of assets and reduce capital expenditure. Additionally, the development of environmentally friendly products enhances the firm's appeal to eco-conscious consumer segments, thereby boosting sales revenue.

Adopting circular business models such as leasing, repair services, and recycling optimizes product value and creates new revenue streams through after-sales services, reverse logistics, and product redistribution. Enterprises actively pursuing circular economy initiatives tend to improve firm valuation and gain better access to capital, especially from

investors focused on sustainability. Participation in circular initiatives also enables access to preferential financing for green projects.

These findings align with prior research by Giudice *et al.* (2020), Shahzad (2023), and del Giudice *et al.* (2020), all of whom underscore the pivotal role of circular economy engagement in enhancing operational performance and long-term business value.

Thirdly, the implementation of management accounting has a substantial and statistically significant impact on organizational performance. As a strategic management tool, management accounting provides comprehensive information on costs, revenues, cash flows, and operational efficiency, thereby enabling data-driven decision-making, effective resource allocation, and enhanced corporate governance. It supports the development and execution of operational strategies, facilitates cost control, and identifies inefficiencies that hinder productivity.

By enabling detailed performance analysis and aligning financial data with strategic goals, management accounting enhances the firm's ability to evaluate business effectiveness and adapt to dynamic market conditions. It also ensures optimal utilization of both tangible and intangible assets through accurate monitoring of inventory, fixed assets, and overheads. This comprehensive support framework contributes directly to improving financial outcomes and sustaining competitive advantage.

These findings are consistent with the empirical evidence presented by Phornlaphatrachakorn and Na-Kalasindhu (2020), Zhou and Wei (2021), and Huong and Cuong (2022), who emphasize the critical role of management accounting in improving firm performance through enhanced strategic execution and resource efficiency.

The study lacks sufficient evidence to conclusively state that the implementation of management accounting, facilitated by the intermediary function of the circular economy, positively influences the performance of enterprises. The circular economy serves as a conduit linking management accounting with business performance. This complexity arises from the diverse activities encompassed by the circular economy, ranging from recycling to reuse, with variations in application across different businesses. In contrast, management accounting functions as a decision-making support tool, offering critical information to assist businesses in making informed decisions. To establish a definitive connection between the circular economy, management accounting, and business performance, further evidence is required. Additionally, various factors can influence this relationship, including the role of technology in fostering an efficient circular economy, as well as the impact of governmental financial, tax, and legal support policies on business participation in the circular economy. Furthermore, the knowledge, skills, and positive attitudes of businesses towards the circular economy also play a significant role.

Conclusion

The implementation of management accounting significantly enhances the degree of enterprise participation in the circular economy, achieving statistical significance at a 95% confidence level. The correlation between these two variables is robust, evidenced by a standardized regression coefficient (beta) of 0.715. An increase in the utilization of management accounting is expected to correspond with a higher level of enterprise engagement in the circular economy. Furthermore, the degree of participation in the circular economy positively influences enterprise performance, also demonstrating statistical significance at a 95% confidence level. This indicates a linear relationship between participation in the circular economy and enterprise performance, with a moderate correlation reflected in a standardized regression coefficient (beta) of 0.485. Enhancing engagement in the circular economy is expected to improve business efficiency. The utilization of management accounting significantly influences enterprise performance, with a statistical significance at a 95% confidence level, indicating a linear correlation between management accounting practices and enterprise performance. This correlation is evidenced by a standardized regression coefficient (beta) of 0.347. Therefore, a greater emphasis on management accounting is likely to result in improved operational efficiency within the enterprise.

This research does not establish that the implementation of management accounting, mediated by the principles of the circular economy, positively influences enterprise performance. This implies the existence of additional factors influencing business performance that were not accounted for in the regression model. A standardized regression coefficient (beta) of 1 signifies a perfectly linear relationship between the two variables. The indirect effect of

management accounting on performance is also quantified as 1, indicating that, aside from the direct influence of management accounting, there are no intermediary effects that could impact performance.

Limitations of the Study

The Study Has Successfully Met Its Objectives; However, It Does Have Certain Limitations, Which Are Outlined as Follows: Initially, regarding the subject matter, the CE represents a relatively recent concept that businesses are urged to engage with in support of national sustainable development. The principles of the CE are still in the process of being fully developed during implementation. The research pertaining to management accounting has yet to explore numerous dimensions. Consequently, future studies should aim to identify additional management accounting issues that align with the emerging challenges within the CE of enterprises. Furthermore, it may be necessary for future research to reassess the direct influence of management accounting on enterprise performance as a facilitator of the CE, a conclusion that remains unaddressed in this study.

Secondly, in terms of scope, the study was conducted with a sample of businesses located in Hanoi City, which is notable for its high concentration of enterprises and its leadership in advancing the CE within the nation. Future research could broaden the scope by including other major cities in Vietnam or by conducting surveys across various regions for comparative analysis. This approach would yield a comprehensive understanding of management accounting practices among Vietnamese enterprises in the context of the CE.

Thirdly, regarding the research methods, this study primarily employs quantitative research methods, supplemented by in-depth interviews to refine the measurement scale. Future research should incorporate qualitative methodologies, engaging in detailed discussions with specific enterprises within the circular economy, such as energy extraction companies and manufacturing firms that generate significant waste. This approach will provide a more comprehensive understanding of the current state of management accounting in these organizations while also allowing for the exploration of additional influencing factors. Furthermore, subsequent studies may benefit from gathering a larger dataset or expanding sample sizes to strengthen the research findings and enhance the overall applicability of the results.

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Ethics Statement: The entire research process was conducted in strict adherence to ethical standards for scientific research. Survey data were collected on a voluntary basis with the informed consent of all participants, ensuring anonymity and the confidentiality of personal information. The study did not cause any physical, psychological, or financial harm to the participants. The authors affirm that there was no plagiarism, data fabrication, or manipulation, and that academic integrity was upheld throughout the research and publication process. All referenced materials and citations are properly acknowledged in accordance with academic conventions.

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