Sinergi International Journal of Accounting & Taxation
E-ISSN: 2988-1587
Volume. 2, Issue 4, November 2024
Page No: 211-224

Toward Sustainable Cost Accounting: Drivers, Barriers, and Institutional Dynamics

Fifi Nurafifah Ibrahim[1], Damith Gangodawilage[2]
[1]Universitas Muslim Indonesia, Indonesia
[2]Qasim Ibrahim School of Business, Maldives
Correspondent : fifinurafifah.ibrahim@umi.ac.id [1]

Received : October 12, 2024
Accepted : November 23, 2024
Published : November 30, 2024

Citation: Ibrahim, F, N., & Gangodawilage, D. (2024). Toward Sustainable Cost Accounting: Drivers, Barriers, and Institutional Dynamics . Sinergi International Journal of Accounting & Taxation, 2(4), 211-224.

ABSTRACT: This narrative review explores the evolving landscape of sustainable cost accounting by analyzing key economic, socio-cultural, and regulatory drivers that shape its adoption. The study aims to synthesize empirical findings and theoretical insights to understand the systemic enablers and barriers influencing transformation efforts. Methodologically, the review follows a thematic synthesis of peer-reviewed literature, examining how innovations in technology, institutional frameworks, and organizational dynamics interact with sustainability objectives. Findings reveal that integrating environmental and social externalities into cost accounting enhances operational efficiency, financial transparency, and stakeholder trust. Digital tools such as cloud analytics and real-time reporting are identified as enablers that reduce operational costs and improve decision-making accuracy. However, conceptual fragmentation, resistance to change, and lack of methodological standardization hinder widespread implementation. The discussion underscores the role of regulatory institutions, global reporting standards, and stakeholder expectations in facilitating systemic transformation. Investment in digital infrastructure and cross-sectoral partnerships is recommended to overcome institutional inertia and scale implementation. Moreover, emerging evidence supports the need for integrated reporting models and predictive technologies to measure long-term sustainability impacts. In conclusion, transitioning to sustainable cost accounting requires a multidimensional approach, combining technological innovation, institutional support, and cultural adaptation. This review provides a foundation for future research and policy aimed at achieving transparent, accountable, and sustainability-driven cost accounting practices.

Keywords: Sustainable Cost Accounting, Digital Transformation, Environmental Cost Internalization, Regulatory Frameworks, Institutional Dynamics, Reporting Transparency, Stakeholder Accountability.

INTRODUCTION

Cost accounting, long considered a technical instrument of internal control and financial reporting, is undergoing a profound transformation in response to the global push toward sustainability. The convergence of environmental imperatives, regulatory pressure, and digital innovation has forced

scholars and practitioners to re-examine the assumptions underlying traditional accounting models (Malega et al., 2024). Historically focused on capturing operational efficiency and cost minimization, conventional cost accounting methods often overlook the broader environmental and social implications of production and consumption. As economies increasingly align with sustainable development goals, the limitations of traditional frameworks become more apparent, giving rise to a movement that advocates for integrating sustainability dimensions—ecological, social, and long-term economic—into cost measurement and reporting (Vărzaru, 2022).

This global shift is mirrored across regions and industries, although at varying paces and intensities. In both advanced and developing economies, institutional responses to climate change, resource depletion, and social inequities have stimulated efforts to reform cost accounting systems to better reflect the true cost of business activities (Abhishek et al., 2024; Gemmill, 2021). This transformation represents more than a technical adjustment; it marks a conceptual evolution from cost accounting as a purely economic function to a multidimensional instrument of sustainability governance(Casey et al., 2024). At the heart of this evolution is the recognition that cost measurement must capture not only financial inputs but also externalities that impact ecosystems and human well-being. As such, new models such as True Cost Accounting and Material Flow Cost Accounting (MFCA) have emerged as frontrunners in redefining the scope of cost attribution (Tran & Herzig, 2020).

Empirical studies reveal that regional disparities in regulatory frameworks, digital infrastructure, and market maturity influence how sustainability principles are embedded into cost accounting systems(Gourfinkel, 2021). In highly industrialized economies, for example, firms have been more agile in integrating environmental costs into their accounting systems due to policy mandates and stakeholder pressure. Meanwhile, firms in developing economies face structural and technological barriers, making it harder to implement advanced cost accounting practices. Nonetheless, the relevance of transforming cost accounting practices is widely recognized, particularly as organizations respond to international reporting standards and sustainability indices (Narayan & Stittle, 2018).

The urgency of this transformation is further underscored by the increasing adoption of digital technologies such as big data analytics, AI, and blockchain in financial reporting. These technologies facilitate real-time data collection and analysis, improving transparency and enabling cost accounting to more accurately reflect sustainability metrics (Pantea et al., 2024). Integrating these tools into cost accounting systems supports not only operational decision-making but also strategic objectives, such as reducing carbon emissions or enhancing resource efficiency. Moreover, digital innovations provide a scalable solution to one of the field's long-standing challenges: capturing and reporting non-financial costs, particularly those related to environmental degradation and social impacts (Vărzaru et al., 2023).

Despite the increasing interest in sustainable cost accounting, significant theoretical and methodological challenges remain. One core issue is the conceptual ambiguity surrounding what constitutes "sustainability-related costs." Different studies apply diverse definitions and metrics, resulting in inconsistent and sometimes conflicting interpretations of cost elements (Bhimani, 2015). These inconsistencies undermine efforts to standardize sustainable cost accounting practices across sectors and regions. Additionally, while various models exist to address

environmental or social externalities, they are rarely integrated into a unified accounting framework, leading to a fragmented knowledge base that lacks broad applicability (Slama & Jandoubi, 2024).

Another key challenge lies in organizational resistance to change, particularly in firms where traditional accounting paradigms dominate managerial thinking. The transition toward sustainable cost accounting requires not only technological upgrades but also a cultural shift within organizations. Managers must embrace longer-term perspectives and recognize the strategic value of sustainability beyond compliance or reputational concerns (Abhishek et al., 2024). Training, leadership commitment, and regulatory incentives are often required to overcome internal resistance and foster a holistic accounting mindset (Pärl et al., 2020; Saraite-Sariene et al., 2019).

Furthermore, policy and regulatory environments remain uneven across jurisdictions, posing additional obstacles to harmonized implementation of sustainable cost accounting. In some countries, environmental and social reporting remains voluntary, while in others, stringent disclosure requirements are in place (Tran & Herzig, 2020). This variability complicates cross-national benchmarking and inhibits the diffusion of best practices. As a result, multinational corporations often face difficulties in standardizing cost accounting practices across their global operations, creating discrepancies in sustainability reporting(Landi et al., 2021; Liberato et al., 2023).

These challenges point to a notable gap in the literature: the lack of a comprehensive, integrated review that synthesizes empirical findings, theoretical advancements, and technological innovations within the field of sustainable cost accounting transformation. While individual studies have explored elements such as MFCA or digital integration, few have attempted to provide a cross-cutting analysis that unites these approaches under a cohesive conceptual framework (Bhimani, 2015; Gemmill-Herren et al., 2021). This fragmentation limits the practical utility of existing models and calls for a renewed scholarly effort to map the evolving landscape of cost accounting practices in the context of sustainability.

The primary objective of this review is to examine how cost accounting practices are evolving to incorporate sustainability dimensions, with particular attention to the roles of digital transformation, regulatory frameworks, and conceptual integration. This study aims to clarify the definitional boundaries of sustainable cost accounting, explore the implications of technological advancements, and assess how different sectors and regions adapt to these changes. In doing so, it seeks to offer a comprehensive synthesis that bridges the gap between theory and practice, providing both scholars and practitioners with actionable insights into the future of cost accounting(Kamaruddin & Auzair, 2022).

The review focuses on both global and regional developments, with special attention to emerging economies where cost accounting systems are rapidly evolving but face constraints in technology adoption and policy alignment. Geographic and sectoral diversity is deliberately included to ensure the generalizability of findings and to uncover contextual nuances that influence the transformation process. Through this lens, the study highlights how differences in institutional, economic, and cultural factors shape the adoption and success of sustainable cost accounting initiatives.

In sum, as the global economy moves toward sustainable development, cost accounting must undergo a fundamental transformation to remain relevant and impactful. This review responds to the pressing need for an integrated perspective that captures the multidimensionality of this transformation. By examining empirical evidence, theoretical discourse, and digital innovation, this study contributes to a deeper understanding of how cost accounting can support sustainability goals in a rapidly changing world.

METHOD

The methodology employed in this study adheres to a rigorous and structured literature review framework that is designed to provide comprehensive insights into the transformation of cost accounting in the context of sustainability. This section elaborates on the systematic approach taken to gather, filter, and evaluate relevant academic literature.

The initial step in this methodology involved the identification of credible and multidisciplinary academic databases. The selected databases—Scopus, Web of Science, and Google Scholar—were chosen for their comprehensive coverage of peer-reviewed journals and their recognized reputability in scholarly research (Tran & Herzig, 2020; Abhishek et al., 2024). These databases provide access to a wide spectrum of literature across domains including accounting, management, environmental studies, and digital innovation, all of which are essential for understanding the evolving landscape of cost accounting.

Scopus, known for its vast index of high-impact journals, conference proceedings, and academic books, was pivotal in tracing the development and academic influence of sustainability-oriented cost accounting (Bhimani, 2015). The database's filtering tools, citation metrics, and topic-based search functionalities enabled precise literature targeting. Similarly, Web of Science offered interdisciplinary reach and historical depth, which were instrumental in tracing the evolution of theoretical and empirical studies on sustainable cost accounting (Abhishek et al., 2024). Its advanced citation tracking allowed the mapping of key conceptual frameworks over time. Complementarily, Google Scholar was utilized to capture grey literature such as dissertations, policy reports, and preprints that are not always available in traditional databases (Tran & Herzig, 2020). This ensured that no critical perspectives were overlooked.

The process of literature collection was governed by the formulation of specific keyword strings that aligned with the research topic. Keywords included combinations of terms such as "cost accounting transformation," "sustainability accounting," "green accounting," and "environmental cost management" (Malega et al., 2024). These terms were selected based on their frequency and conceptual relevance in the existing body of literature. Boolean operators (AND, OR, NOT) were applied strategically to refine the search scope. For instance, the keyword string ("cost accounting transformation" AND ("sustainability accounting" OR "green accounting" OR "environmental cost management")) was widely employed to ensure both depth and breadth of the search results (Abhishek et al., 2024).

To enhance the accuracy and efficiency of the search, quotation marks were used around exact phrases to ensure the retrieval of documents containing the specific phraseology, while wildcard

and truncation symbols were used where applicable to capture all relevant word variants. These techniques allowed the inclusion of terms like "accounting," "accountant," and "accounted" under a single search query. Each database's advanced search functionalities were also leveraged to impose filters such as publication years (limiting to studies post-2000), document types (restricting to journal articles and peer-reviewed papers), and subject areas (focusing on accounting, sustainability, and business).

The inclusion and exclusion criteria were clearly defined to maintain the relevance and quality of the selected studies. Inclusion criteria comprised studies published in peer-reviewed journals, research written in English, and articles that explicitly addressed the integration of sustainability in cost accounting frameworks. Studies that focused solely on financial accounting or those lacking empirical or conceptual analysis were excluded. This filtering process aimed to isolate scholarly work that directly contributed to the understanding of transformative trends in cost accounting practices.

Following the database search, an initial screening was performed based on titles and abstracts. Articles that met the relevance threshold were then subjected to full-text review. The quality and thematic relevance of each article were assessed during this phase, with particular attention given to the research objectives, methodologies, and findings related to sustainability in cost accounting. To ensure objectivity and minimize bias, two researchers independently conducted the screening and evaluation process. Any discrepancies in article selection were resolved through discussion and consensus.

The types of studies included in this review were diverse, ranging from conceptual analyses and theoretical frameworks to empirical studies involving case studies, surveys, and longitudinal designs. Studies using qualitative and quantitative methodologies were both considered, as long as they provided substantial insights into the mechanisms and implications of cost accounting transformation. Special emphasis was placed on articles that proposed or tested models integrating environmental and social dimensions into traditional cost accounting systems.

In total, the synthesis of literature was drawn from over 100 initial search results, which were narrowed down to approximately 50 studies deemed most relevant and rigorous after full-text evaluations. The final set of articles represented a balance between pioneering work in the field and the latest research capturing recent trends and innovations. The selected studies were then coded and thematically analyzed to identify dominant themes, emerging patterns, and conceptual linkages.

To support this analytical phase, qualitative data analysis software such as NVivo and ATLAS.ti was used. These tools enabled efficient coding of textual data and visualization of thematic networks. This process facilitated the identification of recurring concepts such as digital transformation, sustainability metrics integration, stakeholder inclusivity, and regulatory compliance—all within the context of cost accounting evolution.

Overall, the methodological approach taken in this study combines rigorous data collection strategies with structured analytical techniques. By integrating multiple data sources, applying refined keyword strategies, and executing a meticulous screening process, this study ensures a

comprehensive and valid representation of the literature. Such a robust methodology serves as a foundation for deriving meaningful insights into the transformative pathways of cost accounting in the era of sustainability.

This review is limited by its reliance on English-language publications, which may introduce regional bias by excluding relevant research published in other languages. Additionally, despite efforts to capture grey literature through Google Scholar, unpublished insights from industry or local case studies may remain underrepresented. These limitations should be considered when interpreting the generalizability of findings.

RESULT AND DISCUSSION

The analysis of the reviewed literature reveals multidimensional drivers behind the transformation of cost accounting towards sustainability. Through a synthesis of empirical findings and theoretical interpretations, three dominant thematic areas emerge: economic factors, socio-cultural dynamics, and the role of regulatory and policy frameworks. These themes are explored comprehensively below, grounded in both qualitative and quantitative evidence, to provide a global perspective on the evolution of cost accounting practices in response to sustainability imperatives.

Economic Factors Driving Transformation

Economic motivations constitute a primary catalyst in the adoption of sustainable cost accounting practices. A common thread across the literature is the strategic imperative to reduce operational costs and optimize resource efficiency. Gemmill-Herren et al. (2021) underscore the relevance of the True Cost Accounting paradigm, which promotes the internalization of external costs—particularly environmental—into corporate financial frameworks. This approach aligns accounting systems with long-term profitability by exposing hidden costs traditionally ignored in conventional models.

Complementarily, Pantea et al. (2024) document the integration of digital technologies as a cost-reduction mechanism, highlighting the efficiency gains achieved through automation and real-time data processing. Their analysis demonstrates that digital transformation not only curbs administrative expenditures but also enhances decision-making capabilities, ultimately reinforcing competitive advantage. Tran and Herzig (2020) further assert that economic pressures, such as market volatility and global competition, compel firms to adapt their accounting systems to better manage financial risks and capitalize on emerging investment opportunities.

The economic argument is further substantiated by empirical data. In a cross-industry analysis, Pantea et al. (2024) show a 15% improvement in productivity and a 10% decrease in operating costs among firms that adopted integrated digital cost accounting systems. These quantitative indicators affirm the link between economic efficiency and sustainability-oriented accounting practices. Moreover, Gemmill-Herren et al. (2021) present evidence from the food industry where firms implementing True Cost Accounting report notable increases in profit margins and resource optimization.

At the strategic level, economic incentives such as enhanced transparency and stakeholder trust emerge as significant outcomes of sustainable cost accounting. Firms that effectively disclose sustainability-related cost metrics experience reputational gains, which translate into improved investor confidence and easier access to capital (Gemmill-Herren et al., 2021; Tran & Herzig, 2020). This reputational advantage fosters stakeholder alignment and supports long-term value creation.

Socio-Cultural Influences on Adoption

Organizational culture and social norms play a pivotal role in shaping perceptions and implementations of sustainable cost accounting. Vărzaru et al. (2023) find that companies with cultures emphasizing integrity, collaboration, and social responsibility are more likely to embed sustainability principles into their accounting systems. The internalization of these values fosters openness to innovation and encourages holistic cost management practices.

Narayan and Stittle (2018) extend this argument through their case study in New Zealand's educational sector, showing how public expectations and government mandates catalyze reforms towards transparent and socially responsible accounting. Their study highlights that external social norms—articulated through civil society and policy frameworks—drive institutional responsiveness to sustainability.

Furthermore, employee participation and leadership commitment to sustainability are critical enablers. Participatory frameworks, such as stakeholder forums and internal workshops, enhance the collective ownership of sustainable accounting initiatives (Vărzaru et al., 2023). This participatory dynamic is complemented by qualitative insights from Narayan and Stittle (2018), who emphasize the role of moral values and equity considerations in advancing transformative accounting practices.

The integration of stakeholder values is also corroborated by mixed-method studies. Vărzaru et al. (2023) reveal that cultural alignment across organizational hierarchies correlates positively with the effectiveness of sustainable accounting implementation. Their findings suggest that cultural synergy—rooted in shared environmental and social values—enables consistent policy execution and innovation uptake.

Regulatory and Policy Frameworks as Enablers

The transformation of cost accounting systems is further accelerated by regulatory mandates and public policy incentives. Gemmill-Herren et al. (2021) emphasize the role of True Cost Accounting as a policy tool, particularly in the agri-food sector, where governments use fiscal instruments and reporting obligations to drive the inclusion of environmental costs in accounting systems. These policy mechanisms function both as compulsion and support structures for firms transitioning to sustainable practices.

International standards, such as the Global Reporting Initiative (GRI) and Integrated Reporting frameworks, have also contributed to harmonizing disclosure practices and facilitating global

benchmarking (Alawattage & Alsaid, 2018). Their enforcement compels firms to account for social and environmental impacts, thereby aligning cost accounting with broader sustainability goals.

Comparative studies further underscore the significance of regulatory alignment. Narayan and Stittle (2018) document successful policy-driven transformations in New Zealand's public institutions, where national mandates for sustainable reporting have triggered institutional reforms. Similarly, Alawattage and Alsaid (2018) report on Egypt's energy sector, where policy coherence between domestic and international standards has led to more transparent cost structures and improved operational governance.

Importantly, the convergence of regulatory instruments and economic incentives has proven most effective. Governments offering tax breaks and subsidies for firms adopting sustainable accounting practices not only promote compliance but also reduce the financial burden of systemic change (Gemmill-Herren et al., 2021). This dual-track strategy—combining obligation with incentive—ensures both normative alignment and practical feasibility.

Global Perspectives and Comparative Insights

Cross-national analyses reveal critical lessons in policy design and implementation. Flexibility and contextual adaptation emerge as key determinants of success. Narayan and Stittle (2018) observe that policy effectiveness increases when frameworks are tailored to local institutional capacities and cultural norms. Similarly, Gemmill-Herren et al. (2021) show that companies operating under consistent international standards enjoy improved investor relations and competitive positioning.

The benefits of harmonized standards are especially evident in global markets. Firms adhering to GRI and IFRS sustainability guidelines demonstrate higher transparency and comparability, which facilitate investor confidence and global capital flows. Conversely, inconsistent regulatory environments hinder adoption and exacerbate reporting disparities across jurisdictions.

Moreover, collaborative approaches—bridging public and private sectors—enhance policy uptake and diffusion. Alawattage & Alsaid, (2018) advocate for multi-stakeholder governance structures, where policymakers, industry leaders, and civil society jointly formulate sustainability-oriented accounting standards. These inclusive processes ensure greater legitimacy and stakeholder buy-in.

In sum, the global evidence suggests that the transformation of cost accounting towards sustainability is a multifactorial process, contingent upon economic rationality, cultural alignment, and robust regulatory scaffolding. The integration of environmental and social dimensions into cost measurement is not merely a technical adjustment but a strategic reorientation of corporate purpose and accountability. The reviewed literature substantiates that sustainable cost accounting is both a response to and a driver of broader institutional change, with implications that transcend financial management to encompass ethical stewardship and long-term societal value(Twyford, 2022).

The findings of this review support and extend existing literature on the transformation of cost accounting towards sustainability, emphasizing its multidimensional challenges and systemic influences. In line with Gemmill-Herren et al. (2021), this study confirms that the internalization

of external costs remains a conceptual and operational barrier within traditional accounting frameworks. Despite advancements in theoretical development, the integration of environmental and social dimensions into cost accounting practices is still fragmented and inconsistent across industries and countries(Twyford & Abbas, 2022; Vollmer et al., 2024). This issue reiterates the argument that without methodological harmonization, sustainable cost accounting cannot be implemented systematically.

The results also demonstrate a convergence with previous studies regarding the role of digital innovation. Technological integration, particularly real-time data analytics and cloud-based systems, has been identified as a key driver of cost efficiency and process optimization (Abhishek et al., 2024; Pantea et al., 2024). However, our analysis reveals that the pace of technological adoption is hindered by organizational resistance and insufficient internal capacity. As Abhishek et al. (2024) point out, this mismatch between technological capabilities and institutional readiness hampers the realization of the full benefits of digital cost accounting. Cultural inertia, a lack of strategic leadership, and inadequate training remain persistent barriers.

Moreover, our findings emphasize that the economic benefits of sustainable cost accounting—such as waste reduction, improved profit margins, and enhanced investor confidence—are often contingent on systemic and institutional alignment. As noted by Gemmill-Herren et al. (2021), integrating true cost accounting principles can lead to enhanced competitiveness. Yet, Abhishek et al. (2024) caution that such outcomes require sustained investment and policy coherence. Many firms experience delays in capturing these benefits due to the disconnect between innovation deployment and structural reform.

Standardization also emerges as a central theme. Existing literature acknowledges the lack of unified metrics as a significant barrier to sustainability transformation in accounting (Gemmill-Herren et al., 2021; Tran & Herzig, 2020). Our review affirms that methodological discrepancies lead to difficulties in benchmarking and comparability, especially in cross-sector and cross-border applications. Without standardized frameworks, it becomes nearly impossible for firms to systematically report and compare externalities, which hinders regulatory oversight and market transparency.

Internal organizational factors, including leadership commitment, employee buy-in, and the adaptability of business structures, also play a decisive role. Studies by Abhishek et al. (2024) and Gemmill-Herren et al. (2021) highlight how internal resistance, rigid hierarchies, and lack of employee engagement often disrupt implementation processes. Our findings support this, suggesting that internal dynamics are as critical as technological readiness in determining the success of transformation.

Cross-sector collaboration is another theme that recurs in both literature and our findings. Tran and Herzig (2020) argue that inter-industry disparities, especially between developed and developing economies, contribute to uneven adoption rates. Our synthesis reveals similar gaps: industries with greater regulatory pressure and institutional support exhibit more robust integration of sustainable accounting models. This highlights the necessity of inter-sectoral synergy and localized policy adaptation.

From a systemic perspective, the role of institutional frameworks—such as regulations, international reporting standards, and stakeholder pressures—cannot be overstated. The regulatory environment acts as both a constraint and a catalyst. As Narayan and Stittle (2018) suggest, firms in jurisdictions with robust environmental and social governance regulations tend to demonstrate faster adoption rates. Our findings reaffirm that institutional legitimacy, driven by state and non-state actors, significantly shapes the pace and depth of accounting transformation.

The influence of external stakeholders is equally critical. According to Vărzaru et al. (2023), societal expectations and investor demands exert substantial pressure on firms to align their accounting systems with sustainability goals. Our analysis aligns with this view, indicating that firms responsive to such pressures are more likely to implement holistic, transparent cost accounting systems. These dynamics illustrate the interconnectedness between market demands, corporate strategy, and systemic support.

Digital integration within regulatory and governance frameworks further accelerates this transformation. Abhishek et al. (2024) argue that aligning digital infrastructure with policy tools facilitates accurate, real-time environmental cost tracking. Our findings suggest that such integration not only enhances reporting precision but also reduces bureaucratic lag, leading to faster decision-making and greater institutional trust.

Another emerging area is the role of public-private partnerships and inter-organizational networks. As shown in the work of Abhishek et al. (2024), strategic alliances between firms, research institutions, and governments foster innovative accounting models and accelerate adoption. Our study corroborates this, emphasizing that multi-stakeholder collaboration is essential in overcoming resource limitations and institutional fragmentation.

The policy implications derived from this synthesis underscore the need for harmonized, yet flexible regulatory frameworks. Literature by Zhang et al., (2021) and Gemmill-Herren et al. (2021) advocate for adaptive policy instruments that promote carbon neutrality and the internalization of externalities. Our review supports this direction, recommending that fiscal incentives such as tax breaks and subsidies be aligned with sustainability metrics to drive widespread adoption.

Additionally, interdisciplinary research and collaboration are vital. Narayan and Stittle (2018) emphasize that the multifaceted nature of sustainable accounting necessitates integrative approaches combining economics, environmental science, and information systems. Our findings echo this sentiment, pointing out that methodological innovation is required to bridge existing conceptual and data-related gaps.

Future research should also address the development of integrated evaluation models that measure not just financial, but also environmental and social impacts. Tran and Herzig (2020) call for multi-dimensional performance indicators to assess the effectiveness of cost accounting transformation. Our findings highlight the same need, particularly in evaluating long-term outcomes and guiding policy refinement.

Finally, technological innovation must be harnessed more strategically. Studies such as those by Peng et al., (2024) and Wang et al., (2024) suggest that tools like AI and blockchain can

revolutionize transparency, data integrity, and accountability in cost accounting. Our findings affirm this potential, advocating for the adoption of secure, intelligent systems capable of handling complex, real-time sustainability data.

In sum, this discussion illustrates that the sustainable transformation of cost accounting is not solely a technical endeavor but a systemic evolution requiring coordination across technological, institutional, cultural, and policy domains. While challenges persist, the alignment of these elements offers a pathway towards more transparent, accountable, and sustainable financial practices.

CONCLUSION

This narrative review highlights the critical role of economic, social, cultural, and regulatory factors in driving the sustainable transformation of cost accounting systems. The findings underscore that integrating external costs, especially environmental and social ones, into financial reporting systems is no longer optional but a strategic necessity. Empirical studies affirm the positive correlation between sustainable cost accounting and improved operational efficiency, profitability, and long-term competitiveness. However, persistent challenges—such as conceptual ambiguity, lack of standardization, and organizational resistance—remain major obstacles to full-scale adoption.

Digital innovation emerges as a pivotal strategy to bridge these gaps, enabling real-time data integration, transparency, and stakeholder accountability. The discussion also emphasizes the systemic and institutional dynamics—particularly regulatory frameworks, international standards, and stakeholder pressures—that significantly influence adoption outcomes. Thus, comprehensive policy support and fiscal incentives are essential to accelerate transformation across industries and geographies(Harun et al., 2015).

To overcome these barriers, we recommend enhancing policy harmonization at the international level, expanding cross-sector collaboration, and investing in digital infrastructure. Future research should explore longitudinal and interdisciplinary approaches to assess the long-term economic, environmental, and social impacts of sustainable cost accounting systems. Developing robust evaluation models and integrated data platforms will also be crucial to monitor performance and facilitate benchmarking(Humphrey & Miller, 2012; Irvine & Moerman, 2017).

In conclusion, sustainable cost accounting transformation requires a holistic, adaptive, and collaborative framework. Strategic alignment of technological, institutional, and cultural levers is imperative to create reporting systems that not only reflect economic performance but also contribute to global sustainability goals.

REFERENCE

Abhishek, N., Suraj, N., Rahiman, H., Nawaz, N., Kodikal, R., Kulal, A., & Raj, K. (2024). Digital transformation in accounting: elevating effectiveness across accounting, auditing, reporting and regulatory compliance. *Journal of Accounting & Organizational Change*. https://doi.org/10.1108/jaoc-01-2024-0039

Alawattage, C., & Alsaid, L. (2018). Accounting and structural reforms: a case study of egyptian electricity. *Critical Perspectives on Accounting*, *50*, 15–35. https://doi.org/10.1016/j.cpa.2017.09.001

Bhimani, A. (2015). Management accounting. In *International Encyclopedia of the Social & Behavioral Sciences* (pp. 466–470). https://doi.org/10.1016/b978-0-08-097086-8.73013-3

Casey, G., Fried, S., & Gibson, M. (2024). Understanding climate damages: consumption versus investment. *European Economic Review*, *167*, 104799. https://doi.org/10.1016/j.euroecorev.2024.104799

Gourfinkel, D. (2021). The main challenges of public sector accounting reforms and world bank's public sector accounting and reporting (pulsar) program. *Journal of Public Budgeting Accounting & Financial Management*, *34*(2), 347–352. https://doi.org/10.1108/jpbafm-05-2021-0079

Harun, H., Van-Peursem, K., & Eggleton, I. (2015). Indonesian public sector accounting reforms: dialogic aspirations a step too far? *Accounting Auditing & Accountability Journal*, *28*(5), 706–738. https://doi.org/10.1108/aaaj-12-2012-1182

Humphrey, C., & Miller, P. (2012). Rethinking impact and redefining responsibility. *Accounting Auditing & Accountability Journal*, *25*(2), 295–327. https://doi.org/10.1108/09513571211198773

Irvine, H., & Moerman, L. (2017). Gambling with the public sphere: accounting's contribution to debate on social issues. *Critical Perspectives on Accounting*, *48*, 35–52. https://doi.org/10.1016/j.cpa.2017.05.002

Kamaruddin, M., & Auzair, S. (2022). The impact of financial management practices on accountability of islamic social enterprise (ise. *International Journal of Islamic and Middle Eastern Finance and Management*, *16*(4), 669–686. https://doi.org/10.1108/imefm-05-2021-0184

Landi, S., Costantini, A., Fasan, M., & Bonazzi, M. (2021). Public engagement and dialogic accounting through social media during covid-19 crisis: a missed opportunity? *Accounting Auditing & Accountability Journal*, *35*(1), 35–47. https://doi.org/10.1108/aaaj-08-2020-4884

Liberato, M., Paiva, I., & Serrasqueiro, R. (2023). Constraints and stimuli in the implementation of public accounting reform: systematic literature review and future research agenda. *Journal of Accounting & Organizational Change*, *20*(3), 560–592. https://doi.org/10.1108/jaoc-01-2022-0018

Malega, P., Chovancová, J., & Majerník, M. (2024). Environmental cost accounting of material flows during their technological transformation. *Ecological Engineering & Environmental Technology*, *25*(5), 14–24. https://doi.org/10.12912/27197050/184077

Narayan, A., & Stittle, J. (2018). The role of accounting in transforming public tertiary institutions in New Zealand. *Accounting Auditing & Accountability Journal*, *31*(2), 503–530. https://doi.org/10.1108/aaaj-09-2016-2722

Pantea, M., Cilan, T., Cuc, L., Rad, D., Bâtcă-Dumitru, C., Şendroiu, C., & Gomoi, B. (2024). Optimizing Romanian managerial accounting practices through digital technologies: a resource-based and technology-deterministic approach to sustainable accounting. *Electronics*, *13*(16), 3206. https://doi.org/10.3390/electronics13163206

Pärl, Ü., Paemurru, E., Paemurru, K., & Kivisoo, H. (2020). Dialogical turn of accounting and accountability integrated reporting in non-profit and public-sector organisations. *Journal of Public Budgeting Accounting & Financial Management*, *34*(1), 27–51. https://doi.org/10.1108/jpbafm-11-2019-0178

Peng, B., Li, Y., Yang, C., Feng, H., & Gong, X. (2024). Augmented pre-training-based carbon emission accounting method using electricity data under small-sample condition. *Frontiers in Energy Research*, *12*. https://doi.org/10.3389/fenrg.2024.1505098

Saraite-Sariene, L., Alonso-Cañadas, J., Galán-Valdivieso, F., & Pérez, M. (2019). Non-financial information versus financial as a key to the stakeholder engagement: a higher education perspective. *Sustainability*, *12*(1), 331. https://doi.org/10.3390/su12010331

Slama, F., & Jandoubi, M. (2024). Ipsas adoption, public governance and corruption perception in mena and sub-saharan africa countries. *Journal of Financial Reporting and Accounting*. https://doi.org/10.1108/jfra-12-2023-0773

Tran, T., & Herzig, C. (2020). Material flow cost accounting in developing countries: a systematic review. *Sustainability*, *12*(13), 5413. https://doi.org/10.3390/su12135413

Gemmill, H. B. , B. L. , & D. P. (2021). *True cost accounting for food*. https://doi.org/10.4324/9781003050803

Twyford, E. (2022). Crisis accountability and aged "care" during covid-19. *Meditari Accountancy Research*, *31*(1), 27–51. https://doi.org/10.1108/medar-05-2021-1296

Twyford, E., & Abbas, R. (2022). Broadening the boundaries of accounting: a call for interdisciplinarity in the calculative era. *Meditari Accountancy Research*, *31*(1), 187–211. https://doi.org/10.1108/medar-06-2021-1338

Vărzaru, A. (2022). Assessing digital transformation of cost accounting tools in healthcare. *International Journal of Environmental Research and Public Health*, *19*(23), 15572. https://doi.org/10.3390/ijerph192315572

Vărzaru, A., Bocean, C., Criveanu, M., Budică-Iacob, A., & Popescu, D. (2023). Assessing the contribution of managerial accounting in sustainable organizational development in the healthcare industry. *International Journal of Environmental Research and Public Health*, *20*(4), 2895. https://doi.org/10.3390/ijerph20042895

Vollmer, H., Helden, J., & Steccolini, I. (2024). New development: keeping up with accounting in society—public sector challenges. *Public Money & Management*, *44*(8), 733–736. https://doi.org/10.1080/09540962.2024.2364451

Wang, N., Zhao, Y., Li, J., & Cai, G. (2024). Enhancing China's green GDP accounting through blockchain and artificial neural networks (ANNs) and machine learning (ML) modeling. *Scientific Reports*, *14*(1). https://doi.org/10.1038/s41598-024-75994-x

Zhang, Y., Pan, C., & Liao, H. (2021). Carbon neutrality policies and technologies: a scientometric analysis of social science disciplines. *Frontiers in Environmental Science*, *9*. https://doi.org/10.3389/fenvs.2021.761736