RECONCILING CONTROL, ACCOUNTABILITY, AND SUSTAINABILITY: A CONCEPTUAL SYNTHESIS OF MEDICAL WASTE GOVERNANCE, PERFORMANCE MEASUREMENT SYSTEMS, AND THE LEVERS OF CONTROL IN PUBLIC HOSPITALS

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ABSTRACT

Medical waste management has become an increasingly urgent governance concern for public hospitals, particularly in developing and emerging economies where institutional complexity, fiscal constraints, and regulatory ambiguity persist. Although improper waste handling poses severe public health risks, the persistent failures observed across hospitals cannot be explained through technical or operational lenses alone. This conceptual paper synthesizes three major bodies of literature—medical waste governance, performance measurement systems (PMSs), and Simons' Levers of Control (LoC)—to develop an integrated understanding of how organizational control architectures shape managerial attention, accountability, and environmental performance. The review shows that weak PMS design, fragmented control systems, and inconsistent enactment of control levers collectively contribute to the gap between formal regulatory expectations and actual waste-handling practices. It also highlights empirical anomalies and theoretical tensions within LoC research, particularly its assumptions regarding lever interactions and synergy when applied to resource-constrained, bureaucratic health systems. The Indonesian public-hospital setting illustrates how autonomy and dependence coexist, complicating efforts to institutionalize effective waste governance. By consolidating dispersed insights from multiple disciplines, this paper advances a more comprehensive and context-sensitive explanation of medical waste governance and offers a foundation for future empirical research on the interplay between PMSs, control levers, and environmental stewardship in public healthcare.

Keywords: medical waste governance, performance measurement systems, levers of control, public hospitals, organizational control and accountability

INTRODUCTION

The management of medical waste in hospitals represents a deeply embedded governance challenge that intersects public health protection, organizational capability, and institutional regulation. Although widely acknowledged as essential to patient safety and environmental sustainability, medical waste governance remains structurally underdeveloped in many developing and emerging economies. In contexts such as Indonesia, chronic underinvestment persists despite longstanding evidence that improper waste handling can contribute significantly to hospital-acquired infections and may account for up to 10% of related mortality (Borowy, 2020). Efforts to address these concerns have often relied on technologically rational solutions—most notably, the adoption of incinerators (Ali et al., 2017; Manupati et al., 2021; Puška et al., 2022)—yet these facilities themselves introduce environmental and public-health hazards (Silva et al., 2023). The coexistence of technological ambition and infrastructural limitation reflects a broader tension between idealized models of waste governance and the complex realities of fiscal constraints, regulatory ambiguity, and inconsistent managerial engagement.

These contradictions manifest not only in system-level deficiencies but also in the behaviors of organizational actors. Frontline medical workers commonly demonstrate heightened awareness of the risks associated with improper waste handling (Akkajit et al., 2020), yet their technical competence in waste segregation remains limited (Ayub et al., 2021). Conversely, senior hospital managers and administrative staff—groups with formal authority to allocate resources, enforce compliance, and set organizational priorities—frequently display limited involvement or disengagement from waste management responsibilities (Parida et al., 2019; Ranjbari et al., 2022). This asymmetry suggests that the challenges surrounding medical waste governance are not merely operational or technical but are deeply connected to organizational control processes, managerial cognition, and institutional pressures.

Within this broader landscape, performance measurement systems (PMSs) have emerged as a promising analytical lens for understanding how hospitals structure attention, coordinate compliance, and manage environmental performance. PMSs function not simply as tools for tracking outcomes but as integral components of management control architectures that shape expectations, stabilize priorities, and mediate competing institutional demands. Prior studies indicate that failures in Indonesia's medical waste management are rooted in weak organizational control and limited internal accountability (Kodir et al., 2021; Tseng et al., 2022). From this perspective, the design and use of PMSs are consequential for mobilizing staff, aligning behavior, and integrating environmental and public-health objectives into routine hospital governance (Malmmose, 2019; Bandaso & Ayuningtyas, 2019).

At a conceptual level, the literature on PMSs in public-sector settings is closely intertwined with Simons' (1995) Levers of Control (LoC) framework. LoC theory proposes that managers employ four complementary levers—belief systems, boundary systems, diagnostic controls, and interactive controls—to balance constraint and innovation in steering organizational action. While the framework has gained wide acceptance, the literature reveals persistent conceptual ambiguities and empirical inconsistencies. For example, studies in Indonesian hospitals show that coercive regulatory pressures embedded within boundary systems may spur the use of interactive controls (Sisdyani et al., 2020), contradicting the assumption that these levers represent mutually exclusive modes of control (Albertini, 2019; Kruis et al., 2016; Prayudi et al., 2023). Similarly, although synergy among levers is theorized to support effective strategy implementation (Mundy, 2010; Speklé & Widener, 2020), the mechanisms through which such

synergy arises remain vague, especially in environments characterized by institutional multiplicity, political oversight, and resource scarcity (Fukaya, 2024).

The Indonesian public-hospital sector provides a revealing context for examining these issues. Hospitals operate within a hybrid institutional environment shaped by bureaucratic hierarchy, professional norms, political influence, and community expectations. Although hospitals with Local Public Service Agency (PPK-BLUD) status are granted managerial and financial autonomy (Handayani et al., 2019; Harmadi & Irwandy, 2018), many continue to face structural inefficiencies (Ali et al., 2017), persistent dependence on government funding (Mangindaan et al., 2022), and limited capacity to implement business-like reforms or environmental governance practices (Bawono et al., 2017; Fahlevi, 2016; Mujiono, 2022). This autonomy–dependence paradox shapes the ways PMSs and control levers are enacted, often constraining discretion while simultaneously intensifying external expectations for improved performance.

Taken together, the existing literature reflects fragmented conceptualizations, contradictory empirical insights, and underdeveloped theoretical integration regarding how medical waste management, PMSs, and the LoC framework intersect within public hospitals. These tensions signal the need for a comprehensive narrative literature review that synthesizes prior work, maps conceptual linkages, clarifies ambiguities, and outlines new directions for understanding how management control systems can contribute to safer, more accountable, and more sustainable medical waste governance.

Medical Waste Management in Public Hospitals

Although medical waste management has been increasingly recognized as a key indicator of organizational sustainability and environmental stewardship worldwide (Rodríguez et al., 2021), public and government hospitals across developing Asian countries continue to experience persistent deficiencies in this domain. These shortcomings are rooted in structural, operational, and behavioral factors. Limited funding allocations, inappropriate or insufficient waste-management equipment, and low levels of knowledge, attitudes, and best practices among hospital personnel constitute central barriers to effective waste governance (Ali et al., 2017; Bandaso & Ayuningtyas, 2019). Despite generating relatively high volumes of hazardous medical waste, many public hospitals still fail to conduct systematic waste segregation, allowing infectious waste to be disposed of in open public areas where it mixes with general waste streams (Khan et al., 2019). Such practices heighten environmental and epidemiological risks and reflect broader failures in institutional coordination and managerial oversight.

In Indonesia, the problem is particularly acute. Public hospitals in Java and Bali produce the largest share of medical waste nationally (Marshal et al., 2021), yet they generally exhibit weak managerial capacity, limited supervision mechanisms, and inadequately enforced operational standards (Kodir et al., 2021). Only 2.8% of hospitals possess operational permits for incinerators, despite regulatory requirements (Mangindaan et al., 2022). Nationwide data from the 2022 Indonesian Health Profile indicate that only 38.9% of public hospitals implement medical waste management in accordance with established standards (Kementerian Kesehatan RI, 2023).

Two broad categories of managerial limitations dominate this context. First, weak organizational control systems manifest through the absence of clear policies, inadequate implementation of existing procedures, and the failure to monitor compliance across units (Tseng et al., 2022). Poor control renders formal rules decoupled from everyday practice. Second, low personal awareness among staff and managers

undermines motivation to adhere to established protocols (Kodir et al., 2021). This behavioral dimension signals that compliance failures are not merely a function of resource scarcity but also of managerial cognition, organizational culture, and the absence of targeted accountability mechanisms.

Taken together, this body of literature frames medical waste management in Indonesian public hospitals as an institutionalized problem requiring coordinated managerial attention, organizational control, and strategic alignment—conditions that directly connect to debates on how PMSs and control levers are mobilized within public organizations.

METHOD, DATA, AND ANALYSIS

This paper adopts a conceptual research design, which develops new theoretical insights through the synthesis, interpretation, and integration of existing scholarship rather than through empirical data collection. Conceptual papers play an important role in advancing knowledge by clarifying key constructs, questioning underlying assumptions, and proposing new linkages between established theoretical domains (Jaakkola, 2020). Given that the relationships among medical waste governance, performance measurement systems (PMSs), and Simons' (1995) Levers of Control (LoC) remain theoretically fragmented, a conceptual approach is well suited for building an integrative understanding of these issues.

Approach and Foundations

The development of this conceptual analysis proceeded through two foundations:

1. Review of Key Literatures

   The paper draws on three main bodies of research:

   a. hospital medical waste governance and environmental health management;
   b. PMSs and management control systems in public-sector and healthcare settings;
   c. the LoC framework and its subsequent extensions, critiques, and empirical applications.

   Rather than aiming for exhaustive coverage, the review focuses on studies that offer conceptual clarity, theoretical insight, or empirical findings relevant to understanding how control systems shape medical waste management in public hospitals.

2. Conceptual Integration and Theory Building

   Insights from these literatures were examined to:

   a. identify recurring themes and conceptual tensions,
   b. clarify how PMSs and LoC mechanisms intersect in public-sector hospital environments,
   c. and develop an integrative narrative that positions medical waste governance within a broader framework of organizational control, institutional pressure, and managerial behavior.

   The conceptual contribution emerges from linking these bodies of knowledge in a way not previously articulated in the literature.

Rationale for the Methodological Choice

A conceptual methodology is appropriate for three reasons:

1. Fragmented Knowledge Base

Research on medical waste management is often siloed in public health and environmental studies, whereas PMS and LoC scholarship is rooted in accounting and organizational theory. These streams rarely interact. A conceptual synthesis helps bridge these disciplinary boundaries.

2. Lack of Unified Explanation
   Although individual studies identify failures in hospital waste governance, they seldom situate these failures within a comprehensive management control framework. A conceptual lens enables a deeper exploration of how PMSs and control levers shape organizational attention and behavior.
3. Suitability for Theory Development
   Because the goal is to build a more coherent understanding—rather than test hypotheses—a conceptual paper is the most appropriate approach.

Process of Developing the Conceptual Argument

The construction of the conceptual argument followed three iterative steps:

1. Extraction of Core Concepts
   Key constructs related to waste governance, control systems, PMS use, and institutional pressures were identified.
2. Comparison and Synthesis
   The relationships among these constructs were analyzed to uncover complementarities, contradictions, and theoretical gaps.
3. Argument Construction
   The final conceptual model links medical waste governance challenges to managerial control mechanisms, showing how PMSs and LoC provide a useful lens for understanding public-hospital behavior.

RESULT AND DISCUSSION

The literature reviewed for this conceptual paper paints a complex and multi-layered picture of hospital medical waste governance, revealing persistent failures that are rooted not only in technical deficiencies but in broader patterns of organizational control, institutional constraint, and managerial sensemaking. Across the empirical and conceptual scholarship, three main strands emerge: (1) the chronic and systemic nature of medical waste governance failures; (2) the central but underappreciated role of performance measurement systems (PMSs) in shaping organizational attention and accountability; and (3) the explanatory potential—as well as conceptual tensions—within Simons' Levers of Control (LoC) framework as applied to public hospital settings. The interplay among these strands suggests a deeper theoretical story about how public hospitals navigate institutional pressures, resource dependencies, and managerial obligations when addressing high-risk environmental issues.

Medical Waste Governance as a Systemic Organizational Challenge

The literature consistently highlights that medical waste management in public hospitals is characterized by long-standing and deeply institutionalized deficiencies. This is not a problem of isolated negligence or occasional oversight; rather, it reflects structural patterns that persist even in the presence of regulatory frameworks and heightened public scrutiny.

Underinvestment emerges as a recurrent theme, with studies showing that hospitals in Indonesia and other developing contexts operate under severe fiscal constraints that impede their ability to procure appropriate waste-handling technologies, ensure proper waste segregation, and maintain safe disposal facilities (Lv et al., 2022; Ali et al., 2017). The result is a governance environment in which high-risk wastes—often infectious or hazardous—are frequently mixed with general waste or disposed of in insecure locations (Khan et al., 2019). These practices, far from being exceptional, appear to be routine in many public hospitals, suggesting a normalization of risk and a diffusion of responsibility.

Interestingly, and perhaps counterintuitively, frontline medical personnel rarely constitute the weakest link in this chain of governance. Research reveals that medical staff often possess strong awareness of the dangers associated with poorly managed waste (Akkajit et al., 2020). However, their technical knowledge and operational skills are frequently limited—not necessarily because of indifference, but because they operate in systems lacking proper training, tools, and managerial reinforcement (Ayub et al., 2021).

In contrast, senior hospital managers and administrative staff—actors with formal authority to allocate resources, enforce compliance, and shape organizational priorities—are reported to exhibit fragmented engagement or sometimes outright detachment from waste management responsibilities (Parida et al., 2019; Ranjbari et al., 2022). This managerial disconnect widens the gap between awareness and action within the hospital setting. The literature collectively suggests that the underlying issue is not simply operational weakness but an absence of strong organizational control mechanisms that can translate regulatory mandates and professional norms into consistent, everyday practice.

Taken together, these findings reinforce the idea that medical waste governance is fundamentally an organizational control problem, not merely a public health or environmental management issue. It is a domain where technical infrastructure, managerial cognition, institutional pressures, and cultural norms intersect—and often collide.

Performance Measurement Systems as Structuring Mechanisms of Attention

Performance measurement systems emerge in the literature not merely as passive indicators but as active devices through which organizations define what matters. In public hospitals, PMSs shape managerial attention, influence resource allocation, and generate incentives that condition how waste management is prioritized—or neglected.

A central insight across studies is that weak or fragmented PMSs correspond with low compliance in waste management. Hospitals that lack clear environmental or waste-related indicators often fail to build internal accountability chains, resulting in ad hoc practices and inconsistent implementation of protocols (Tseng et al., 2022). By contrast, institutions that incorporate environmental metrics into their PMSs tend to exhibit stronger alignment between policy and practice, suggesting that PMSs can serve as internal "governance anchors" that stabilize expectations and reinforce norms.

More broadly, PMSs mediate the relationship between external institutional pressures and internal organizational action. Regulatory demands in Indonesia—especially those related to the licensing of incinerators, reporting of hazardous waste, and compliance with environmental standards—create a strong boundary-system environment. Yet without PMSs that translate these external obligations into internal

routines, managers often struggle to maintain consistent oversight or mobilize staff to adopt compliant behaviors.

The literature thus positions PMSs as both organizational sensemaking devices and mechanisms of accountability. They define what is visible, what is measurable, and what is considered legitimate within the hospital. In the context of medical waste governance, the absence of PMS indicators effectively renders the problem "invisible" to organizational actors—even when risks are widely recognized. When PMSs are present but not aligned with environmental concerns, waste governance becomes peripheral and remains overshadowed by clinical, financial, or bureaucratic priorities.

In summary, PMSs are central to shaping how hospitals interpret the importance of waste governance and allocate attention toward it. Their absence, weakness, or misalignment contributes directly to the systemic failures described earlier.

Reassessing the Levers of Control: Tensions and Opportunities

Simons' Levers of Control (LoC) framework is frequently cited as a promising tool for understanding how managers balance constraint, learning, innovation, and accountability. Yet the application of LoC to public hospitals—particularly in developing contexts—reveals several tensions that challenge its canonical assumptions.

One of the most striking findings from the literature is the counterintuitive interplay between boundary systems and interactive controls. In theory, these levers are meant to represent distinct modes of control—boundary systems constrain, while interactive systems enable dialogue and learning. Yet studies in Indonesian hospitals show that coercive regulatory pressures embedded in boundary systems can, paradoxically, stimulate higher levels of interactive engagement (Sisdyani et al., 2020). Managers facing institutional coercion appear to use interactive controls as a way of coping with uncertainty, clarifying responsibilities, or mobilizing cross-functional collaboration around compliance.

This finding challenges the presumed conceptual neatness of the LoC framework and suggests that its relationships may be context contingent—sensitive to institutional arrangements, power dynamics, and resource dependencies. Public hospitals, operating at the nexus of bureaucratic hierarchy, professionalized norms, and political influence, may require more fluid or hybrid patterns of control than private-sector firms, for which the framework was originally conceptualized.

Another unresolved tension concerns the idealized notion of "lever synergy." Although LoC theory emphasizes the importance of balancing belief, boundary, diagnostic, and interactive systems, empirical studies indicate that such synergy is rare in practice—especially in resource-constrained, politically exposed, or bureaucratically rigid environments. In many hospitals, diagnostic and boundary systems dominate due to compliance requirements, while belief and interactive systems remain underdeveloped, resulting in a control architecture that is imbalanced and often more symbolic than substantive.

Thus, the literature invites a reconceptualization of how LoC operates under conditions of institutional multiplicity and managerial constraint—conditions that typify public hospitals in developing economies.

Integrating PMSs and LoC: A Framework for Understanding Waste Governance

One of the major contributions of the literature synthesis lies in revealing how PMSs and LoC jointly shape hospital behavior around medical waste governance. Although these two bodies

of scholarship often develop separately, they naturally converge around issues of organizational attention, accountability, and control.

PMSs provide the structural scaffolding: they define performance variables, set targets, and shape monitoring routines. In contrast, LoC provides the behavioral and cognitive dynamics: how managers interact with those targets, how they balance competing demands, and how they navigate uncertainty.

The literature suggests that effective waste governance emerges not from the mere presence of metrics but from the alignment of metrics (PMS) with control levers (LoC). For example:

1. Where PMS indicators include environmental metrics, interactive controls are more likely to be activated to support learning and cross-unit collaboration.
2. Where PMS indicators are absent, boundary systems dominate, and waste governance remains reactive and compliance-driven.
3. Where belief systems incorporate environmental values, staff motivation is enhanced and diagnostic controls become more developmental rather than punitive.

This integrated understanding reveals why some hospitals, even under resource constraints, demonstrate pockets of effective waste governance, while others remain trapped in cycles of symbolic compliance and chronic failure.

The Indonesian Public Hospital Context: Control Under Institutional Tension

The Indonesian public-hospital environment intensifies the dynamics described above. Hospitals with PPK-BLUD status ostensibly enjoy managerial and financial autonomy. Yet in practice, autonomy exists alongside—and is frequently constrained by—deep financial dependency on government budgets, political oversight, and regulatory demands.

This autonomy–dependence paradox shapes how PMSs and LoC are enacted. Autonomous status allows hospitals to design their own PMSs, but dependency on government funding and compliance audits pushes them toward diagnostic and boundary systems oriented primarily toward satisfying regulators, not toward improving internal governance. As a result, PMSs may be formally adopted but underutilized, interactive controls may be initiated but not sustained, and belief systems may reflect clinical priorities rather than environmental values.

The result is a governance landscape in which medical waste management is recognized as important but consistently marginalized by structural constraints and institutional logics.

Synthesis

Taken together, the literature reveals that medical waste governance failures in public hospitals stem from a complex interplay of organizational, institutional, and behavioral forces. PMSs shape what hospitals pay attention to; LoC shapes how they act upon that attention; and the broader institutional environment shapes the constraints and possibilities for both. Understanding these dynamics requires conceptual integration rather than isolated analyses, and this review highlights the need for more sophisticated, context-sensitive models of control in public healthcare.

CONCLUSION

This conceptual review set out to synthesize fragmented strands of literature on medical waste governance, performance measurement systems (PMSs), and the Levers of Control (LoC) within the context of public hospitals—particularly those operating in developing and institutionally complex environments such as Indonesia. The review demonstrates that persistent failures in medical waste management cannot be understood through technical or operational lenses alone. Instead, they emerge from a deeper constellation of organizational dynamics, including weak accountability structures, fragmented managerial attention, inadequate PMS design and use, and the inconsistent enactment of control levers.

By interpreting these failures through the dual lenses of PMSs and LoC, this review shows that medical waste governance is fundamentally shaped by how hospital's structure what is measurable, how managers direct attention, and how they balance constraint, compliance, learning, and innovation. PMSs provide the formal architecture through which priorities are articulated and performance is signaled; LoC explains the cognitive and behavioral processes through which managers mobilize these systems in practice. Importantly, the review highlights that LoC assumptions—particularly the distinction between boundary and interactive systems or the ideal of lever "synergy"—do not always hold in public-sector or resource-constrained health settings. The Indonesian public-hospital context, marked by a paradox of autonomy and dependency, amplifies these tensions and reveals new complexities in how organizational controls are enacted.

Overall, the review contributes a more integrative and nuanced theoretical understanding of medical waste governance and underscores the need to situate PMS and LoC theories within institutional contexts that differ substantially from those assumed in their original formulations. It advances the argument that improving waste management requires not only technical interventions but also rethinking how control systems are designed, communicated, and operationalized within public hospitals.

IMPLICATION/LIMITATION AND SUGGESTIONS

The synthesis presented in this review carries several important implications for theory, policy, and managerial practice. Conceptually, it demonstrates that medical waste governance cannot be understood solely as a technical or environmental concern but must be situated within the broader architecture of performance measurement and organizational control. The interplay between PMSs and LoC helps illuminate how managerial attention is shaped, how compliance becomes institutionalized, and why certain governance failures persist despite awareness of risk. For policymakers and hospital leaders, the findings underscore the need for PMS designs that integrate environmental indicators and encourage the activation of belief and interactive control systems to support learning, engagement, and institutional responsiveness. Strengthening these systems can help bridge the prevalent gap between staff awareness and managerial action, thus placing medical waste management more firmly within the domain of strategic hospital governance.

Notwithstanding these contributions, the review has several limitations inherent to conceptual scholarship. The analysis draws primarily on secondary literature; as such, it is contingent on the breadth and quality of existing studies, which are uneven across regions and research traditions. The review focuses particularly on Indonesia and comparable emerging-economy contexts, which may limit broader

generalizability while still offering valuable insight into institutional complexity. Moreover, the emphasis on PMSs and LoC—while theoretically fruitful—necessarily excludes other perspectives such as institutional logics, sensemaking, or dynamic capabilities that may also illuminate aspects of medical waste governance.

These limitations point to fertile avenues for future research. Empirical studies—especially qualitative case studies or mixed-methods designs—could further explore how managers interpret and enact control systems in waste governance environments marked by resource constraints and competing institutional demands. Comparative work across hospital types, regions, or administrative regimes could reveal how institutional configurations mediate the effectiveness of PMSs and LoC mechanisms. Additional conceptual development that integrates PMSs and LoC with complementary theories may also enrich understanding of how hospitals balance regulatory compliance, operational demands, and environmental stewardship. Together, these directions can advance both scholarly insight and practical reform in the governance of medical waste.

REFERENCES

Akkajit, P., Romin, H., & Assawadithalerd, M. (2020). Assessment of Knowledge, Attitude, and Practice in respect of Medical Waste Management among Healthcare Workers in Clinics. *Journal of Environmental and Public Health*, *2020*. https://doi.org/10.1155/2020/8745472

Albertini, E. (2019). The Contribution of Management Control Systems to Environmental Capabilities. *Journal of Business Ethics*, *159*(4), 1163–1180. https://doi.org/10.1007/s10551-018-3810-9

Ali, M., Wang, W., Chaudhry, N., & Geng, Y. (2017). Hospital waste management in developing countries: A mini review. *Waste Management and Research*, *35*(6), 581–592. https://doi.org/10.1177/0734242X17691344

Amhalhal, A., Anchor, J., Tipi, N. S., & Elgazzar, S. (2022). The impact of contingency fit on organisational performance: an empirical study. *International Journal of Productivity and Performance Management*, *71*(6), 2214–2234. https://doi.org/10.1108/IJPPM-01-2021-0016

Ananth, A. P., Prashanthini, V., & Visvanathan, C. (2010). Healthcare waste management in Asia. *Waste Management*, *30*(1), 154–161. https://doi.org/10.1016/j.wasman.2009.07.018

Aung, T. S., Luan, S., & Xu, Q. (2019). Application of multi-criteria-decision approach for the analysis of medical waste management systems in Myanmar. *Journal of Cleaner Production*, *222*, 733–745. https://doi.org/10.1016/j.jclepro.2019.03.049

Ayub, S., Iram, M., & Arif, M. (2021). Doctors' Perception Regar ding Hospital Waste Management at Ghurki Hospital, Lahore. *Pakistan Journal of Medical & Health Sciences*, *15*(4), 695–698.

Bandaso, A., & Ayuningtyas, D. (2019). Management of Medical Waste in Developing Countries: A Systematic Review. *The 6th International Conference on Public Health*, 7–14. https://doi.org/10.26911/the6thicph.01.25

Bawono, I. R., Restianto, Y. E., Tim Sub Direktorat Bimbingan Teknis Keuangan Daerah Periode 2016 dan 2017, & Ferani, N. A. (2017). Pengantar: Mengelola Keuangan BLUD (Badan Layanan Umum Daerah). In *Serial Materi Pelatihan Pengelolaan Keuangan Daerah* (Vol. 4).

Borowy, I. (2020). Medical waste: the dark side of healthcare. *História, Ciências, Saúde– Manguinhos*, *27*, 231–251. https://doi.org/http://dx.doi.org/10.1590/S0104-59702020000300012

Bourne, M., Mills, J., Wilcox, M., Neely, A., & Platts, K. (2000). Designing, implementing and updating performance measurement systems. *International Journal of Operations and Production Management*, *20*(7), 754–771. https://doi.org/10.1108/01443570010330739

Braun, V., & Clarke, V. (2006). Using Thematic Analysis in Psychology. *Qualitative Research in Psychology*, *3*(2), 77–101.

Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches*. Sage Publication, Inc.

Demartini, C., & Trucco, S. (2017). Are performance measurement systems useful? Perceptions from health care. *BMC Health Services Research*, *17*(1), 1–15. https://doi.org/10.1186/s12913-017-2022-9

Elgazzar, S., Tipi, N., & Jones, G. (2019). Key characteristics for designing a supply chain performance measurement system. *International Journal of Productivity and Performance Management*, *68*(2), 296–318. https://doi.org/10.1108/IJPPM-04-2018-0147

Fahlevi, H. (2016). Understanding Why the Role of Accounting is Unchanged in Indonesian Public Hospitals. *Journal of Accounting and Organizational Change*, *12*(2), 203–222. https://doi.org/10.1108/JAOC-03-2014-0020

Fukaya, Y. (2024). The Synergetic Effect of Belief System, Diagnostic Control System, Interactive Control System on Frontline Employee Behavior. *Journal of Strategic Management Studies*, *15*(2), 89–100. https://doi.org/10.24760/iasme.15.2

Handayani, F., Basri, H., & Fahlevi, H. (2019). Does Increasing Public Hospital Financial Autonomy Improve Performance? A Study of Indonesian Public Hospitals. *Management and Economic Review*, *6*(1), 1–13. https://doi.org/10.24818/mer/2019.06-01

Harmadi, S., & Irwandy, I. (2018). Technical Efficiency of Public Service Hospitals in Indonesia: A Data Envelopment Analysis (DEA). *Asian Social Science*, *14*(6), 81. https://doi.org/10.5539/ass.v14n6p81

Henri, J.-F. (2006). Management control systems and strategy: A resource-based perspective. *Accounting, Organizations and Society*, *31*(6), 529–558. https://doi.org/10.1016/j.aos.2005.07.001

Henri, J. (2009). Taxonomy of performance measurement systems. *Advances in Management Accounting*, *17*, 247–288. https://doi.org/10.1016/S1474-7871(08)17009-5

Kastberg, G., & Siverbo, S. (2013). The Design and Use of Management Accounting Systems in Process Oriented Health Care – An Explorative Study. *Financial Accountability and Management*, *29*(3), 246–270. https://doi.org/10.1111/faam.12014

Kementerian Kesehatan Republik Indonesia. (2023). *Profil Kesehatan Indonesia 2022*.

Khan, B. A., Cheng, L., Khan, A. A., & Ahmed, H. (2019). Healthcare waste management in Asian developing countries: A mini review. *Waste Management & Research*, *37*(9), 863–875.

Kodir, A., Tanjung, A., Rosyendra, M., & Saputra, M. (2021). Challenges of Covid-19 Medical Waste Management in Indonesia: A Multi-stakeholder Perspective. *Waste Forum*, 49–114.

Kruis, A. M., Speklé, R. F., & Widener, S. K. (2016). The Levers of Control Framework: An exploratory analysis of balance. *Management Accounting Research*, *32*, 27–44. https://doi.org/10.1016/j.mar.2015.12.002

Lv, Y., Ma, G., & Ding, J. (2022). Evolutionary Game Analysis of Medical Waste Disposal in China under Different Reward and Penalty Models. *Sustainability (Switzerland)*, *14*(8), 1–19. https://doi.org/10.3390/su14084658

Malmmose, M. (2019). Accounting research on health care – Trends and gaps. *Financial Accountability and Management*, *35*(1), 90–114. https://doi.org/10.1111/faam.12183

Mangindaan, D., Adib, A., Febrianta, H., & Hutabarat, D. J. C. (2022). Systematic Literature Review and Bibliometric Study of Waste Management in Indonesia in the COVID-19 Pandemic Era. *Sustainability (Switzerland)*, *14*(5). https://doi.org/10.3390/su14052556

Manupati, V. K., Ramkumar, M., Baba, V., & Agarwal, A. (2021). Selection of the best healthcare waste disposal techniques during and post COVID-19 pandemic era. *Journal of Cleaner Production*, *281*, 125175. https://doi.org/10.1016/j.jclepro.2020.125175

Marshal, M., Sunaryo, N. C., Kurniawan, S. J., Herwendanasari, D., Hariyanto, E., & Andarini, S. (2021). Green Hospital Implementation in Indonesia: a Literature Review. *Journal of Community Health and Preventive Medicine*, *1*(2), 32–41. https://doi.org/10.21776/ub.jochapm.2021.001.02.5

Martyn, P., Sweeney, B., & Curtis, E. (2016). Strategy and control: 25 years of empirical use of Simons' Levers of Control framework. *Journal of Accounting and Organizational Change*, *12*(3), 281–324. https://doi.org/10.1108/JAOC-03-2015-0027

Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative Data Analysis: A Methods Sourcebook* (3th ed.). SAGE Publications, Inc.

Mujiono, S. E. L. (2022). Analisis Penerapan Green Accounting atas Pengelolaan Limbah Medis pada Rumah Sakit Umum Daerah Dr. Haryoto Lumajang. *Jurnal Akuntansi Dan Keuangan*, *27*(2), 102–112. https://doi.org/10.23960/jak.v27i2.391

Mundy, J. (2010). Creating dynamic tensions through a balanced use of management control systems. *Accounting, Organizations and Society*, *35*(5), 499–523. https://doi.org/10.1016/j.aos.2009.10.005

Neuman, W. L. (2014). *Social Research Methods: Qualitative and Quantitative Approaches* (7th Revise). Pearson Education Limited.

Nudurupati, S. S., Bititci, U. S., Kumar, V., & Chan, F. T. S. (2011). State of the Art Literature Review on Performance Measurement. *Computers and Industrial Engineering*, *60*(2), 279–290. https://doi.org/10.1016/j.cie.2010.11.010

Parida, A., Capoor, M. R., & Bhowmik, K. T. (2019). Knowledge, attitude, and practices of Bio-medical Waste Management (principle) rules, 2016; Bio-medical Waste Management (amendment) rules, 2018; and Solid Waste Rules, 2016, among health-care workers in a tertiary care setup. *Journal of Laboratory Physicians*, *11*(4), 292–299. https://doi.org/10.4103/JLP.JLP

Prayudi, M. A., Nurkholis, N., Saraswati, E., & Rusydi, M. (2024). Top Management Characteristics, Performance Measurement Systems Design and Strategic Change of Reformed Public Hospitals in

Indonesia. *Australasian Business, Accounting and Finance Journal*, *18*(1), 44–60. https://doi.org/10.14453/aabfj.v18i1.04

Prayudi, M. A., Nurkholis, N., Saraswati, E., & Rusydi, M. K. (2023). Do Vision and Mission Really Matter? The Management Control Experiences of Reformed Public Hospitals in Indonesia. *International Journal of Professional Business Review*, *8*(3), e01092.

Puška, A., Stević, Ž., & Pamučar, D. (2022). Evaluation and selection of healthcare waste incinerators using extended sustainability criteria and multi-criteria analysis methods. In *Environment, Development and Sustainability* (Vol. 24, Issue 9). Springer Netherlands. https://doi.org/10.1007/s10668-021-01902-2

Ranjbari, M., Shams Esfandabadi, Z., Shevchenko, T., Chassagnon-Haned, N., Peng, W., Tabatabaei, M., & Aghbashlo, M. (2022). Mapping healthcare waste management research: Past evolution, current challenges, and future perspectives towards a circular economy transition. *Journal of Hazardous Materials*, *422*, 126724. https://doi.org/10.1016/j.jhazmat.2021.126724

Republik Indonesia. (2015). *Peraturan Presiden Republik Indonesia Nomor 77 Tahun 2015 Tentang Pedoman Organisasi Rumah Sakit*.

Rodríguez, R., Svensson, G., & Ferro, C. (2021). Assessing the future direction of sustainable development in public hospitals: Time-horizon, path and action. *Health Policy*, *125*(4), 526–534. https://doi.org/10.1016/j.healthpol.2020.10.012

Saldana, J. (2011). *Fundamentals of Qualitative Research.* Oxford University Press.

Silva, A. R. M. V. e., Iwata, B. de F., dos Santos, M. do S. F., & Neto, J. M. M. (2023). Impacts and Regulations of Healthcare Solid Waste Management during the COVID-19 Pandemic: A Systematic Review. *Sustainability (Switzerland)*, *15*(19). https://doi.org/10.3390/su151914462

Simons, R. (1995). *Levers of Control: How Managers Use Innovative Control Systems to Drive Strategic Renewal*. Harvard Business School Press.

Sisdyani, E. A., Subroto, B., Saraswati, E., & Baridwan, Z. (2020). Levers of eco-control and green behavior in medical waste management. *International Journal of Energy Economics and Policy*, *10*(4), 194–204. https://doi.org/10.32479/ijeep.9342

Spanò, R., Cicellin, M., & Scuotto, A. (2018). Performance measurement design: a contingency perspective from the Italian regional healthcare services. *Journal of Economic and Administrative Sciences*, *35*(1), 16–27. https://doi.org/10.1108/jeas-06-2018-0076

Speklé, R. F., & Widener, S. K. (2020). Insights on the use of surveys to study management control systems. *Accounting, Organizations and Society*, *86*(xxxx). https://doi.org/10.1016/j.aos.2020.101184

Tseng, M. L., Ardaniah, V., Bui, T. D., Tseng (Aaron), J. W., Lim, M. K., & Ali, M. H. (2022). Sustainable waste management in the Indonesian medical and health-care industry: technological performance on environmental impacts and occupational safety. *Management of Environmental Quality: An International Journal*, *33*(2), 549–569. https://doi.org/10.1108/MEQ-07-2021-0160

Widener, S. K. (2007). An empirical analysis of the levers of control framework. *Accounting, Organizations and Society*, *32*(7–8), 757–788. https://doi.org/10.1016/j.aos.2007.01.001

Wouters, M., & Sportel, M. (2005). The role of existing measures in developing and implementing performance measurement systems. *International Journal of Operations and Production Management*, *25*(11), 1062–1082. https://doi.org/10.1108/01443570510626899

Yin, R. K. (2003). Applications of Case Study Research. In *Applied Social Research Methods Series Volume 34* (2nd ed.). Sage Publications, Inc.

Yin, R. K. (2018). *Case Study Research and Applications: Design and Methods* (6th ed.). SAGE Publications, Inc.