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Original Article

Dynamics of Management Control Practices and Green Innovation in Central Java Real Estate

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Abstract: *This study aims to understand the dynamics of Management Control Systems (MCS) practices and green innovation in real estate companies in Central Java within the context of sustainable development. Using a qualitative approach with an interpretive paradigm and phenomenological methods, this study explores the experiences and interpretations of managers and decision-makers regarding sustainability implementation at the organizational level. Data were obtained through in-depth interviews, limited observations, and company document analysis, which were then analyzed thematically. The results indicate that MCS practices are still dominated by a financial orientation and project-based control through budgeting mechanisms, cost monitoring, and margin evaluation. Sustainability aspects have begun to be integrated, but have not yet become key performance indicators and have not been fully institutionalized in all elements of the control system. The implemented green innovations are incremental and pragmatic, such as energy efficiency, natural ventilation design, water management, and construction waste reduction. Innovation decisions are heavily influenced by economic rationality and market price sensitivity. The findings also indicate that the relationship between MCS and green innovation is ambivalent and contextual. On the one hand, the dominance of financial indicators limits radical innovation; on the other hand, cost control encourages creativity in efficient, environmentally friendly solutions. Regulatory factors, leadership, organizational culture, and regional market characteristics also influence these dynamics. This study confirms that the integration of SPM and green innovation in the Central Java real estate sector is a socially negotiated evolutionary process, not an instant strategic transformation*.

Keywords: *Management Control System, Green Innovation, Sustainable Development, Real Estate Industry, Phenomenological Approach.*

I. INTRODUCTION

The issue of environmental degradation is becoming an increasingly pressing global concern. Various studies show that air and water pollution, land degradation, deforestation, and climate change are increasing significantly (Almagtome & Abdlazez, 2022; Campbell-Árvai et al., 2019; Khan & Johl, 2019; Ojha & Schofield, 2022). The 2021 Intergovernmental Panel on Climate Change report states that global temperatures have risen by about 1.1°C since the pre-industrial period, and the 2011–2020 decade was the hottest in recorded climate history. The rise in temperature has led to more extreme weather, polar ice caps melting and changes to rainfall that impact food security and water availability.

This environmental degradation is interlinked with increasing resource exploitation for production and economic growth purposes (Qadir et al., 2021). This condition has given rise to the concept of eco-sustainable development, that is, development that can meet the needs of the present generation but does not undermine the capacity of future generations to meet their own needs (Agustia, 2020; Al-Shetwi, 2022; Bappenas, 2021). The implementation of the 2030 Agenda for Sustainable Development with its 17 Goals and 169 Targets, which is complemented by the commitments taken within it (United Nations General Assembly Declaration of September, Domestic policy declaration/Open harmer) will strengthen this global commitment to sustainable development.

The Indonesian government has imposed several rules to push businesses towards more sustainable practices, such as Law Number 32 of 2009 concerning Environmental Protection & Management, Government Regulation Number 46 of Year about Environmental Economic Instrument and Corporate Performance Rating Program in Environmental Management (PROPER) (Bappenas, 2021). The policy highlights the strategic role of the industrial sector in particular construction and building to so as to enable sustainable development.

The construction and real estate sectors have one of the largest shares of energy consumption, material processing, and carbon emissions. Thus, the development of innovation is essential for enhancing the competitiveness and performance of a firm (Kafetzopoulos et al., 2015; Lichtenthaler, 2016; Love & Roper, 2015). Innovation is not only radical innovation, but it also includes incremental innovation at constant short intervals, improving processes and products (Mulgan, 2006). In the concurrence of sustainability, this innovation changes into green innovation, talking to a commitment to create buyer products and processes which inflict less damage on the surroundings (Yunqi Chen et al., 2022).

Concrete green innovation in this area is the adoption of green buildings. The idea, which emerged in the 1980s, is meant to bring down development's impact on the environment by focusing on energy efficiency and using sustainable materials and waste management (Ahmad, 2023; Chegut et al., 2019; Meena et al., 2022 Patela & Patelb, 2021). The green building investment potential in Indonesia is regarded as very large, considering the residential sector (Sukhdev et al., 2015).

Nevertheless, the adoption of green innovation also faces several obstacles, i.e. high initial investment costs, technical risks and required technological & managerial capabilities (Wu et al., 2018). Management control systems, thus, are crucial to link sustainability strategies and green innovations with operational practices that can be measured and replicated. Management control systems allow companies to set performance targets, measure performance, manage risks and stay compliant with environmental regulations.

Many studies have investigated the link between innovation, managerial practices and firm performance (Begum et al., 2022; Mahmood & Orazalin, 2017; Xie et al., 2019). These studies are mainly done in the manufacturing sector and take a quantitative perspective. Past studies also demonstrate that green innovation increases the competitive advantage and performance of companies (Añón-Higón et al., 2015; Yijia Chen & Hassink, 2022; Nemlioglu & Mallick, 2017). However, the implementation of this kind of system does not come easy in terms of costs and risks, as well as the need for an internal system that can ensure sustainability of the strategy (Wu et al., 2018). On the other hand, studies on the construction and real estate industries in Indonesia, particularly at a regional level, are still scarce. That said, regional aspects play a pivotal role in shaping the performance of any type of green innovation. The digital era and the decades of property growth in Central Java are indeed both an opportunity and a challenge to be balanced by a relentless promotion of economic growth by those who control it. The social context, organizational culture, local market pressures, and regional policies have the potential to shape green innovation and management control practices differently than other regions.

In contrast to previous studies that emphasized quantitative causal relationship testing, this study uses a qualitative approach to explore in depth how management control practices and green innovation are implemented, negotiated, and interpreted by real estate actors in Central Java.

Substantively, this study aims to understand: (1) how management control systems are implemented in real estate companies in Central Java; (2) what forms and characteristics of implemented green innovations are; (3) what are the dynamics of the interaction between management control systems and green innovations in organizational practices; and (4) contextual factors that influence the success or obstacles of their implementation. Therefore, this study is expected to make a practical contribution to real estate industry players in Central Java in designing management control systems that are aligned with sustainability strategies.

The novelty of this research lies in several aspects. First, it uses a qualitative approach to explore the dynamics of management control practices and green innovation in depth, rather than simply testing the relationships between variables. Second, it focuses on the real estate sector, which has received relatively less attention in green innovation studies than the manufacturing sector. Third, the emphasis on the regional context of Central Java allows for a contextual understanding of how sustainability practices are shaped by local characteristics. Thus, this research not only fills an empirical gap but also offers a new perspective in understanding the integration of management control and green innovation in the real estate industry at the regional level.

II. LITERATURE REVIEW

The issue of sustainability is the main normative foundation of this research. The concept of sustainable development emphasizes the balance between economic growth, social responsibility, and environmental protection (Agustia, 2020; Bappenas, 2021). The global commitment to sustainable development, as emphasized by the United Nations through the Sustainable Development Goals, is encouraging industrial sectors to adapt their business strategies to be more environmentally friendly. In the context of the construction and real estate sectors, this pressure is increasingly relevant because development activities contribute significantly to energy consumption, carbon emissions, and the exploitation of natural resources. Thus, sustainability is no longer merely normative but has become a strategic organizational imperative.

In response to these pressures, companies develop green innovations, namely innovations in products, processes and managerial practices that aim to reduce environmental impacts (Ma et al., 2022). Green innovation can be either radical or incremental (Mulgan, 2006) and has been proven to contribute to improving company performance and competitiveness (Nemlioglu & Mallick, 2017). In the real estate sector, green innovation is often realized through the concept of green building, energy efficiency, the use of environmentally friendly materials, and construction waste management (Ahmad, 2023; Chegut et al., 2019). However, its implementation is influenced by regulatory pressures, organizational readiness, and investment cost risks (Wu et al., 2018).

To ensure green innovation doesn't stop at the symbolic level of strategy, companies need internal mechanisms to ensure consistent implementation. In this regard, a management control system (MCS) serves as an instrument that translates strategy into operational actions. An MCS encompasses planning, performance measurement, evaluation systems, and incentive mechanisms that ensure alignment between organizational goals and individual behavior within the company, without the support of an adequate control system, green innovation risks becoming merely a form of external legitimacy without real integration into organizational practices.

Thus, this study views sustainable development as creating external pressures, green innovation as a strategic organizational response, and management control systems as an internal mechanism that mediates and shapes the dynamics of its implementation. The interaction of these three elements does not occur in a vacuum but is influenced by the institutional and regional context, including the socio-economic characteristics of Central Java. Therefore, a qualitative approach was chosen to explore in depth the dynamics of practices, negotiations, and interpretations of organizational actors in integrating management control and green innovation in the real estate sector.

A) Research Questions

The importance of management control systems as a mechanism for translating strategy into operational practice. The literature suggests that without effective control systems, sustainability strategies may not be effectively internalized in a company's activities. However, most previous research has focused on examining the quantitative relationship between managerial systems and company performance (Mahmood & Orazalin, 2017). Therefore, a thorough understanding of how management control systems are actually implemented in real estate companies in Central Java is necessary. Based on this argument, the following conclusions are formulated:
RQ1: How are management control system practices implemented in real estate companies in Central Java?

Based on green innovation literature, which emphasizes that innovation can take the form of product, process, or managerial innovation (Ma et al., 2022).Previous research shows that green innovation contributes to company competitiveness (Nemlioglu & Mallick, 2017), but the concrete form of implementation depends heavily on the characteristics of the industry and the organizational context. In the real estate sector, green innovation can be realized through green building practices, energy efficiency, and sustainable design (Ahmad, 2023; Chegut et al., 2019). Therefore, it is important to identify how green innovation is interpreted and realized in the practices of real estate companies at the regional level. Thus, it is formulated:
RQ2: What are the forms and characteristics of green innovation implemented by real estate companies in Central Java?

The theoretical assumption is that management control systems function not only as administrative tools but also as mechanisms that can encourage or hinder innovation. The implementation of green innovation often faces barriers of cost, risk, and internal resistance (Cuerva et al., 2014; Wu et al., 2018). Therefore, it is necessary to understand how the dynamics of the interaction between management control systems and green innovation take place in organizational practice, including how targets, performance evaluations, and incentive systems influence innovative decisions.

Regulatory pressures, market demands, and regional socio-economic characteristics can shape how companies respond to the sustainability agenda (Cuerva et al., 2014; Wu et al., 2018). Given that this research focuses on the regional context of Central Java, it is important to explore contextual factors that influence the success and barriers to green innovation implementation. Therefore, the following questions are formulated:
RQ3: What are the dynamics of the interaction between management control systems and green innovation in real estate organizational practices in Central Java?
RQ4: What contextual factors influence the success and obstacles of implementing green innovation in Central Java real estate companies?

III. RESULTS AND DISCUSSION

This study uses a qualitative approach with an interpretive paradigm, aiming to understand the subjective meanings and experiences of organizational actors in implementing management control systems and green innovation. In particular, it competed in the phenomenological study because the nature of this study, entitled Exploring sustainable practices in real estate companies (meaning how managers and decision makers interpret sustainability practices), is more descriptive. Instead of measuring the relationships between variables, a phenomenological approach lets researchers understand how people make sense of the organisational practices that they carry out. (Creswell, 2014). Phenomenology in this research context study was used to map how the management control practices and green innovation were understood, negotiated, and internalized into organizational daily life in Central Java.

Data collection consisted of semi-structured interviews, a limited number of observations, and a review of company documents, sustainability reports, standard operating procedures, and performance evaluations. The interviews were semi-structured to provide exploratory flexibility in response to informants' responses, but remained tethered to the research question. Purposive sampling was the chosen method for selecting informants as the criteria were people who have strategic roles related to the decision-making process, project management, or are implementers of green innovation in real estate companies (Creswell, 2014). They utilized this method to gather information pertinent to the research question.

This approach, described byMiles et al., involves stages that are the phases of data reduction, presentation and conclusion drawing; Although the phenomenological approach use horizontalization also, aims to find arbitrary messages (immunities) and to group meanings and produce fields of essential descriptions of complete experiences (2018), (2016)This process seeks to identify core themes that characterize the nature of management control practices and green innovation dynamics. Data were constantly compared and reflected upon as the analysis progressed iteratively, until an in-depth, coherent answer was sought.

This study uses source and method triangulation, member checking and audit trails to establish the trustworthiness of data. (Triangulation was based on the principle of collecting data from various sources to cross-check whether all major information coming from interviews, observations and company documents matches with one another (Lincoln & Guba, 1995). Member checking was performed by seeking confirmation of the interpretations provided by informants, confirming that what the researcher interpreted was representative of their intended experience. The researcher also focused on the transparency and dependability of the research process by systematically documenting our work. Thus, using these procedures, the findings of this research along with can be said to have a sufficient standard of validity, transferability, dependability and confirmability in qualitative research.

A) Management Control System Practices in Real Estate Companies in Central Java (RQ1)

a. Integration of Sustainability Aspects into the Diagnostic Control System

Research findings indicate that management control systems (MSS) in real estate companies in Central Java are still primarily project-based, with a primary focus on budgeting, cost control, and profit margin evaluation. However, environmental aspects are gradually being integrated into project planning and monitoring processes. Our interviewee, an operations director, stated:

"Previously, our primary focus was sales targets and project margins. Now, every new project planning process always includes discussions about energy efficiency and waste management. While they aren't yet primary KPIs, they are included in the evaluation list."

This statement refers to an intermediate phase, where sustainability has not become part of the strategic control system yet, but is integrated into the existing control system.

This practice within the Levers of Control framework (Simons, 1995) reflects superiority by diagnostic control systems, which are formal systems that monitor results and correct the deviation amet from the target. This is, of course, the domain of financial indicators as the principal measures, and environmental indicators are merely auxiliary.

b. Control System as a “Package” (MCS as a Package)

If analyzed using the Management Control Systems as a Package framework fromBedford et al. (2016), the control system in these companies consists of several components:

1. Planning controls: Reflected in annual planning meetings and project feasibility studies.
2. Cybernetic controls: In the form of budget monitoring, cost variance analysis, and project progress evaluation.
3. Administrative controls: Through SOP for material procurement and construction standards.
4. Cultural controls: Emerge through organizational values and leadership narratives.
5. Reward and compensation systems: Still dominated by sales targets and financial achievements.

Interestingly, sustainability aspects have not been formally integrated into incentive and compensation systems. No environmental performance-based reward schemes were found. This indicates that green innovation has not been fully institutionalized across all elements of the management control package. Thus, the management control systems in Central Java real estate companies can be said to be in the evolutionary stage toward sustainability integration, but have not yet reached full alignment.

B) Forms and Characteristics of Green Innovation (RQ2)

a. Dominance of Incremental Innovation

The research results show that the green innovations implemented are incremental, not radical. These innovations include:

- Use of energy-saving LED lamps
- Cross ventilation and natural lighting design
- Infiltration well system and drainage management

- ➢ Material planning to reduce construction waste

Our source, an engineering manager, stated that:

“We haven't reached green building certification yet, but we have started implementing natural lighting and better ventilation.”

This innovation is more oriented towards cost efficiency and increasing sales value rather than large-scale technological transformations such as the widespread use of solar panels.

b. Economic Rationality in Green Innovation

Every innovation decision always goes through a financial feasibility analysis. The feasibility study evaluates the investment's payback period and its impact on the selling price. Therefore, green innovations generally implemented are those that:

- ➢ Does not increase costs significantly
- ➢ Can be communicated as a marketing added value
- ➢ Has long-term efficiency benefits

Thus, green innovation in this context can be understood as a form of “economically rational sustainability.”

C) Dynamics of Interaction between SPM and Green Innovation (RQ3)

a. The Ambivalent Role of Diagnostic Controls

The findings suggest that management control systems have an ambivalent role. On the one hand, the dominance of financial indicators can limit the scope for radical innovation. Our interviewee, a finance director, stated:

"Every innovation idea must pass a cost analysis. If it's too expensive and the market isn't ready, it's difficult for us to approve it."

But on the other hand, strict cost controls encourage creativity in finding environmentally friendly solutions that remain efficient. From a business perspective, Simons (1995), the use of control systems remains more diagnostic than interactive. Although sustainability issues are beginning to be discussed in management meetings, there is no formal mechanism to identify them as a key strategic uncertainty that is continuously monitored through interactive control systems.

b. The Role of Cultural Controls

Organizational culture also plays a significant role. In some family businesses, green innovation is driven by the owners' moral values. Statements such as:

"We live in this area. If development damages the environment, our children will suffer the consequences."

Shows that cultural controls also shape organizational behavior. Within the framework of Malmi & Brown (2008), management values and beliefs can serve as a powerful control mechanism even if they are not formally documented.

D) Contextual Factors Influencing Implementation (RQ4)

a. Regulatory Pressure

Environmental regulations are the initial trigger for sustainability integration. Without regulatory pressure, companies tend to maintain a conventional financial orientation.

b. Market Sensitivity

The property market in Central Java remains highly price-sensitive. Consumers have yet to fully prioritize green certification in their purchasing decisions.

c. Organizational Structure and Leadership

Proactive leadership on sustainability issues accelerates the integration of green innovations into organizational practices. Conversely, bureaucratic structures slow down the adoption process.

E) Theoretical Synthesis and Conceptual Contributions

Based on the integration of empirical findings and management control theory, several important points can be concluded:

1. Management control systems are still dominated by diagnostic controls.
2. Green innovation is incremental and economically rational.
3. The integration of sustainability in MCS is partial within the framework of “MCS as a package”.
4. Cultural controls function as important moderators.
5. The regional context influences the form and speed of integration.

These findings suggest that the relationship between management control systems and green innovation is contextual, dynamic, and socially negotiated, rather than a deterministic, linear relationship. Based on the research findings, several stages of integration evolution can be identified: the regulatory compliance stage; the efficiency-based incremental innovation stage; the strategic interactive integration stage; and the full alignment stage within the control package. This analysis suggests that real estate companies in Central Java are currently in a transition between the second and third stages.

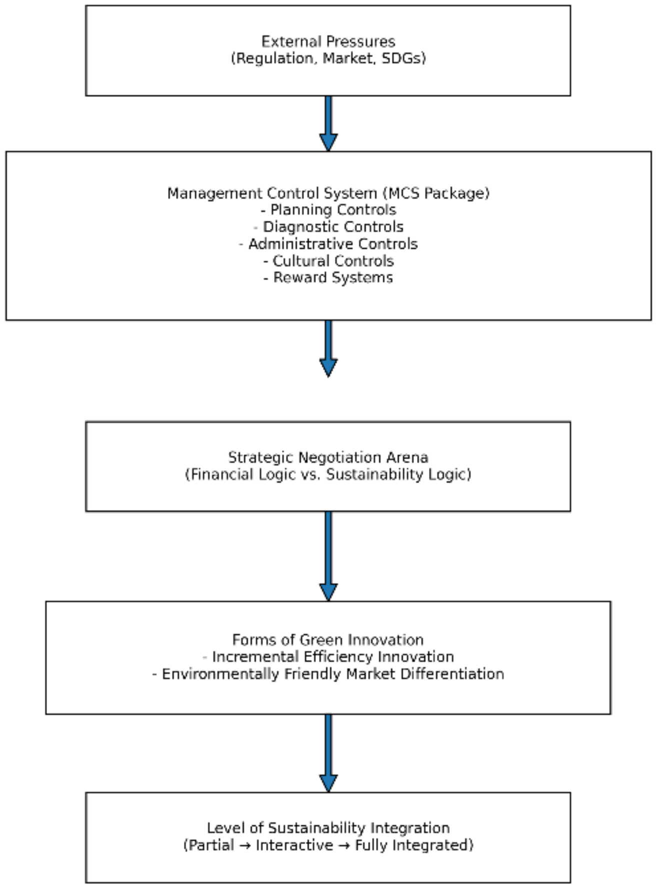

Figure 1. Evolutionary Model of Integration

IV. CONCLUSION

Based on the analysis, several key conclusions can be drawn that answer the overall research questions. Management control system practices in real estate companies in Central Java are still dominated by a financial and project-based orientation. Mechanisms such as budgeting, cost variance analysis, project progress monitoring, and profit margin evaluation remain the primary instruments for decision-making. Although sustainability aspects have begun to be integrated, their role remains supplementary and has not yet become a primary performance indicator. Therefore, the management control system has not been fully reconstructed into a sustainability-oriented control system but is still in a gradual adaptation phase.

The relationship between management control systems and green innovation also exhibits an ambivalent and dynamic character. The dominance of financial indicators in diagnostic control systems indeed limits the scope for high-risk or costly innovations. However, on the other hand, strict cost controls actually encourage the search for creative solutions that are both environmentally friendly and efficient. Therefore, management control systems cannot be positioned solely as an obstacle or driver of green innovation, but rather as an arena for negotiation between economic logic and sustainability logic.

From the perspective of "MCS as a package," the integration of green innovation into management control systems remains partial. While planning and administrative aspects are beginning to incorporate environmental considerations, reward and compensation systems have yet to formally incorporate environmental performance indicators. This situation indicates that sustainability has not yet been fully institutionalized across all elements of organizational control.

Furthermore, contextual factors have been shown to play a significant role in shaping these dynamics. Regulatory pressures were the initial trigger for the integration of environmental issues, while consumer price sensitivity in the Central Java market limited the space for high-cost innovation. Leadership and organizational culture also served as moderating factors, determining whether sustainability was positioned as a strategic commitment or merely administrative compliance. Overall, the integration of management control systems and green innovation in the Central Java real estate sector was an evolutionary, contextual, and socially negotiated process. Sustainability did not emerge as a radical transformation, but rather as a gradual adaptation within an established financial control framework.

This study makes several contributions to the literature on management control systems and green innovation. First, it demonstrates that the relationship between management control systems and green innovation is not linear and deterministic, but rather contextual and dependent on how the control systems are interpreted and used in organizational practice. Second, it broadens understanding of the use of diagnostic control systems in a sustainability context by demonstrating that tight cost controls do not always inhibit innovation but, under certain conditions, actually encourage efficient, incremental innovation. Third, it emphasizes the importance of aligning control elements across all levels, from planning and administrative procedures to incentive systems and organizational culture, so that sustainability integration does not stop at the symbolic level. Fourth, it provides empirical contributions to the regional context of Indonesia, particularly Central Java, which has been relatively underexplored in studies of green innovation and management control.

For real estate practitioners, these findings indicate the need for more structured strategic steps. Companies need to integrate measurable environmental indicators into formal KPIs and managerial performance evaluation systems. Aligning sustainability-based incentive systems is also crucial to strengthening internal commitment to green innovation. Furthermore, strengthening interactive control systems is necessary to position sustainability issues as strategic uncertainties that are routinely discussed in top-level management forums. In a price-sensitive market context, a gradual, efficiency-based innovation strategy remains relevant as a transitional approach to a more sustainable business model.

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