


ENVIRONMENTAL MANAGEMENT CONTROL SYSTEMS AND ENVIRONMENTAL PERFORMANCE: DIRECT AND INDIRECT EFFECT

Fransiskus Eduardus Daromes^A, Suwandi Ng^B



ARTICLE INFO	ABSTRACT
<p>Article history:</p> <p>Received 20 February 2023</p> <p>Accepted 22 May 2023</p>	<p>Purpose: This study aims to examine the effect of environmental management control systems on environmental performance. Testing is carried out directly or through the environmental strategy mediation role.</p>
<p>Keywords:</p> <p>Environmental Management; Control Systems; Environmental Strategy; Environmental Performance; Hotel.</p>	<p>Theoretical framework: In contrast to previous studies, this research focuses on managerial activity processes that enable, encourage, ensure how a company and facilitate practices that achieve environmental performance and strategies to achieve it. The research model is built on the basis of stakeholder theory and contingency theory.</p>
	<p>Design/methodology/approach: The research was conducted through an online survey of hotel managers in Makassar City, Indonesia. Data analysis was performed by regression, path analysis and Sobel test.</p> <p>Findings: The results of the study prove that the environmental management control system has a positive and significant effect on environmental strategy and environmental performance. The Sobel test also proves that environmental strategy mediates the influence of environmental management control systems on environmental performance.</p> <p>Research, Practical & Social implications: This research covers hotels in Makassar, not all of them in Indonesia; therefore, generalizing the findings of this study should be exercised with caution. Secondly, this study assumes hotel homogeneity and does not consider hotel type. The findings of this study also provide recommendations on public policy and business practices to integrate environmental issues into managerial processes and decision-making as well as corporate control. Further research can expand this research by considering contextual and other contingency aspects. In addition, future research may use a larger sample and longitudinal data which allows to investigate changes in strategic environmental management control system policies over time.</p> <p>Originality/value: Improvements in research on environmental management control systems have become a very important issue in supporting the themes of sustainability in business practices globally. The originality of this research focuses on managerial processes to support sustainability practices in business, especially business practices in hotels.</p> <p>Doi: https://doi.org/10.26668/businessreview/2023.v8i6.1753</p>

^A Philosophy Doctor in Accounting at Diponegoro University. Associate Professor at The University of Atma Jaya Makassar. Indonesia. E-mail: fedaromes@gmail.com Orcid: <https://orcid.org/0000-0002-7268-673X>

^B Philosophy Doctor in Accounting at Hasanuddin University. Assistant Professor at The University of Atma Jaya Makassar. Indonesia. E-mail: swnd_ng@yahoo.com Orcid: <https://orcid.org/0000-0002-4421-7290>

SISTEMAS DE CONTROLE DE GESTÃO AMBIENTAL E DESEMPENHO AMBIENTAL: EFEITO DIRETO E INDIRETO

RESUMO

Objetivo: Este estudo tem como objetivo examinar o efeito de sistemas de controle de gestão ambiental sobre o desempenho ambiental. O teste é realizado diretamente ou através do papel de mediação da estratégia ambiental.

Referencial teórico: Em contraste com estudos anteriores, esta pesquisa enfoca os processos da atividade gerencial que permitem, incentivam, garantem como uma empresa e facilitam as práticas que alcançam o desempenho ambiental e as estratégias para alcançá-lo. O modelo de pesquisa é construído com base na teoria das partes interessadas e na teoria da contingência.

Desenho/metodologia/abordagem: A pesquisa foi realizada por meio de uma pesquisa online com gerentes de hotéis na cidade de Makassar, na Indonésia. A análise dos dados foi realizada por regressão, análise de trilha e teste de Sobel.

Resultados: Os resultados do estudo comprovam que o sistema de controle de gestão ambiental tem um efeito positivo e significativo na estratégia ambiental e no desempenho ambiental. O teste de Sobel também prova que a estratégia ambiental medeia a influência dos sistemas de controle de gestão ambiental no desempenho ambiental.

Pesquisa, implicações práticas e sociais: Esta pesquisa cobre hotéis em Makassar, nem todos na Indonésia; portanto, a generalização dos achados deste estudo deve ser feita com cautela. Em segundo lugar, este estudo assume a homogeneidade do hotel e não considera o tipo de hotel. As descobertas deste estudo também fornecem recomendações sobre políticas públicas e práticas de negócios para integrar as questões ambientais nos processos gerenciais e de tomada de decisão, bem como no controle corporativo. Pesquisas futuras podem expandir esta pesquisa considerando aspectos contextuais e outros aspectos contingenciais. Além disso, pesquisas futuras podem utilizar uma amostra maior e dados longitudinais que permitam investigar as mudanças nas políticas estratégicas do sistema de controle da gestão ambiental ao longo do tempo.

Originalidade/valor: Melhorias na pesquisa sobre sistemas de controle de gestão ambiental tornaram-se uma questão muito importante para apoiar os temas de sustentabilidade nas práticas de negócios globalmente. A originalidade desta pesquisa centra-se nos processos gerenciais para apoiar as práticas de sustentabilidade nos negócios, especialmente nas práticas de negócios em hotéis.

Palavras-chave: Sistemas de Controle de Gestão Ambiental, Estratégia Ambiental, Desempenho Ambiental, Hotel.

SISTEMAS DE CONTROL DE LA GESTIÓN MEDIOAMBIENTAL Y COMPORTAMIENTO MEDIOAMBIENTAL: EFECTO DIRECTO E INDIRECTO

RESUMEN

Propósito: Este estudio pretende examinar el efecto de los sistemas de control de la gestión medioambiental sobre el comportamiento medioambiental. La prueba se realiza directamente o a través del papel mediador de la estrategia medioambiental.

Marco teórico: A diferencia de estudios anteriores, esta investigación se centra en los procesos de la actividad directiva que permiten, fomentan, aseguran como empresa y facilitan las prácticas que logran el comportamiento medioambiental y las estrategias para lograrlo. El modelo de investigación se basa en la teoría de las partes interesadas y la teoría de la contingencia.

Diseño/metodología/enfoque: La investigación se llevó a cabo mediante una encuesta en línea a directores de hotel de la ciudad de Makassar (Indonesia). El análisis de los datos se llevó a cabo mediante regresión, análisis de pistas y la prueba de Sobel.

Resultados: Los resultados del estudio demuestran que el sistema de control de la gestión medioambiental tiene un efecto positivo y significativo sobre la estrategia medioambiental y el comportamiento medioambiental. La prueba de Sobel también demuestra que la estrategia medioambiental media la influencia de los sistemas de control de la gestión medioambiental en el rendimiento medioambiental.

Consecuencias para la investigación, la práctica y la sociedad: Esta investigación abarca los hoteles de Makassar, no todos los de Indonesia; por lo tanto, la generalización de las conclusiones de este estudio debe hacerse con cautela. En segundo lugar, este estudio presupone la homogeneidad de los hoteles y no tiene en cuenta el tipo de hotel. Las conclusiones de este estudio también ofrecen recomendaciones sobre políticas públicas y prácticas empresariales para integrar las cuestiones medioambientales en los procesos de gestión y toma de decisiones, así como en el control empresarial. Las investigaciones futuras pueden ampliar este estudio teniendo en cuenta aspectos contextuales y otros aspectos contingentes. Asimismo, las investigaciones futuras podrían utilizar una muestra de mayor tamaño y datos longitudinales para investigar los cambios en las políticas estratégicas del sistema de control de la gestión medioambiental a lo largo del tiempo.

Originalidad/valor: La mejora de la investigación sobre los sistemas de control de la gestión medioambiental se ha convertido en una cuestión muy importante para apoyar las cuestiones de sostenibilidad en las prácticas empresariales a escala mundial. La originalidad de esta investigación se centra en los procesos de gestión para apoyar las prácticas de sostenibilidad en las empresas, especialmente en las prácticas empresariales hoteleras.

Palabras clave: Sistemas de Control de la Gestión Medioambiental, Estrategia Medioambiental, Rendimiento Medioambiental, Hotel.

INTRODUCTION

The growing development of issues and practices of environmental concern in the process of encouraging corporate management has triggered a series of studies which discusses these matters including research related to environmental management control systems. Environmental responsibility has recently become a topic of discussion in management control literature, and environmental or sustainability management control systems are attaining momentum (Guenther, *et al.*, 2016). Themes of management control system research has begun to shift by integrating sustainability aspects in general and specifically related to environmental management control systems. Particularly in recent decades, relative stakeholders have exerted significant pressure on industrial sectors to enhance their environmental performance (Adebanjo *et al.*, 2016).

To date, environmental management research has thoroughly investigated environmental objectives as a fundamental trigger of organizations' environmental proactivity. However, Ditilo and Lisi (2014) states that there has been little attention paid to intra-organizational sustainability issues and specifically related to the roles of management control systems that support sustainability within organizations. The same thing was also reported by Lisi, (2015); Ong *et al.*, (2019) who presented that the research themes were related to environmental issues is relatively silent on which specific managerial processes.

In response to the above study, the management control literature has begun to delve into this issue by delving into the potential role of specific environmental performance measurement and control systems in supporting companies' environmental efforts. (Gond *et al.*, 2012; Lisi, 2015; Ong *et al.*, 2019). However, in contrast to previous studies, this research focuses on managerial activity processes that enable, encourage, ensure how a company and facilitate practices that achieve environmental performance and strategies to achieve it. This is in line with the argumentation of Joshi & Li (2016); Ditillo & Lisi (2016) who argued for the importance of management control system mechanisms in improving sustainability performance. The same is argued by Grewal & Serafeim (2020) which states that through a

control system and managerial processes a company is able to achieve maximum environmental performance.

Based on the arguments above, this research was conducted to test the model of how a managerial process and strategy is carried out to create environmental performance in a business entity. Gond *et al.*, (2012); Ditillo & Lisi (2016) explicitly explains how sustainability themes including those related to environmental performance need to be integrated with the company's management control system to ensure that business operations are carried out in accordance with sustainable development goals. Furthermore, strictly speaking the literature review developed by Guenther, Endrikat, & Guenther (2016); that the concept of an environmental management control system provides a hopeful approach for integrating currently fragmented lines of investigation regarding internal drivers and managerial processes that can drive a company's environmental and financial performance. San Ong, Magsi, & Burgess (2019) further outlines that to become a socially and environmentally responsible entity, companies should use management control systems and then embrace environmental systems. Thus, the message to be conveyed is that in order to build environmental performance it is necessary to integrate it in managerial processes which are the main function of the management control system process, namely from the process of planning, organizing resources, implementing and controlling them.

More than the above, in an effort to support and achieve environmental performance, conceptually the management control system also needs to take strategic steps. This is important because the strategy will then determine how the organization should use its resources to meet its goals. A well-developed strategy guides employees in the successful pursuit of their organizational goals; it conveys to employees what they should be doing (Merchant & Stede, 2017). In particular, environmental strategy can be understood as the extent to which environmental issues are integrated with the company's strategic plan (Banerjee *et al.*, 2003; Solovida & Latan (2017); Kraus, Rehman, & García, 2020). Things that need to be done regarding this environmental strategy include implementing environmentally sound initiatives.

Based on a series of phenomena and theoretical arguments as explained earlier, the model developed in this research is to examine the influence of managerial processes in the form of an environmental management control system on environmental performance. Testing of the research model will be carried out both directly and through the company's strategy related to environmental strategy. Therefore, this study aims to investigate the effect of

environmental management control systems on environmental performance, which is tested both directly and through environmental strategies.

This research was conducted in the hospitality service industry in Makassar, Indonesia. The choice of the hotel industry was based on the fact that the hotel industry is one of the greatest producers of employment and economic gain in the tourist industry, but it is also one of the most energy demanding. In fact, hotels and other types of accommodation account for 2% of the 5% global CO₂ emitted by the tourism sector. (<https://www.traveldailynews.com/post/sustainable-travel-survey-2021-83-say-sustainable-travel-is-important>).

In building the theoretical model of this research, there are several underlying theories. The first is stakeholder theory (Freeman, et al, 2010). The basic premise of stakeholder theory is that companies exist not solely to meet the interests of shareholders but companies must exist to meet the interests of stakeholders broadly. The environmental management control system is designed with a complete awareness to ensure that the company is present to ensure that its behavior and actions lead to the achievement of corporate goals and strategies that are integrated into achieving sustainable performance, including those related to environmental performance.

Second, studies in management accounting basically depend on situational aspects because it determines which framework is best suited for specific companies in specific conditions. (Otley, 2016). In this context, modern managers can utilize environmental management control systems to translate environmental strategies to achieve environmental performance (San Ong, *et al*, 2019).

The follow-up series of research materials will successively present the theoretical basis and review of the literature, as well as explain research methodologies such as sample selection and variable measurement. Following that, the findings are presented. The last section summarizes the findings and concludes the paper by discussing their implications for theory and practice, acknowledging the study's limitations, and recommending further research.

LITERATURE REVIEW

Environmental Management Control Systems

The early stages of the research concept on environmental management control systems appeared disorganized and unclear. To overcome this unsatisfactory situation, Guenther *et al.*, (2016) tried to position and create a framework for how the concept of an environmental

management control system can be placed in the topic of sustainability and how the environmental management control system relates to environmental management accounting and environmental control systems. In order to crystallize this view, a framework was devised in order to integrate and organize the ideas mentioned above in the larger landscape of general management accounting concepts, management control, management systems, and break down many confusing concepts and meanings.

Furthermore, in a series of improvements to the concept of environmental management control systems, Gunther *et al.*, (2016) used the management control systems framework from Malmi and Brown (2008); Merchant & Stede (2017), because it is based on a wide understanding of management control systems and represents the concept of management control systems as a bundle. In the case of environmental issues, a broad conceptualization is extremely crucial because existing research has demonstrated that several factors, such as organizational cultural characteristics (Sharma and Vredenburg, 1998), specific governance mechanisms (Kock *et al.*, 2012), and the issues stated above, can influence environmental strategy and environmental performance.

The development of the above theoretical concepts as explained in the theories of management control systems which lead to environmental problems has sparked the emergence of the concept of environmental management control systems. Management control systems and environmental management control systems have theoretically been classified as consisting of both formal and informal control system elements (Malmi and Brown, 2008); Merchants & Stede, 2017). Formal control systems are governed by rules, standard operating procedures, and controls that can improve environmental performance (Pondeville *et al.*, 2013), whereas informal systems involve employee engagement, manager involvement, and workgroups in handling environmental challenges. (Pondeville *et al.*, 2013). Furthermore, San Ong, *et al.*, (2019) emphasized that the environmental management control system provides a potential strategy in incorporating environmental concerns into internal control and managerial procedures, which improves company performance. Environmental management control systems can also provide flexibility to organizations and support organizational changes to achieve better environmental performance (Guenther *et al.*, 2016; San Ong, *et al.*, 2019; Severo and De Guimarães (2022).

Environmental Strategy

Environmental issues are increasingly becoming important for all businesses. One result of this pattern is stakeholders' strong desire to push managers to concentrate more on environmental concerns and evaluate environmental performance (Burritt and Schaltegger, 2010; Rodrigue *et al.*, 2013; Solovida & Latan, 2017). To attain this aim, many businesses are beginning to think about establishing long-term environmental plans to enhance their environmental performance. (Gunarathne and Lee, 2015; Lisi, 2015; San Ong *et al.*, 2019).

This causes companies to incorporate environmental issues into a strategy that is referred to as an environmental strategy. Environmental strategy can be understood as the extent to which environmental issues are integrated with the company's strategic plan (Banerjee *et al.*, 2003; Kraus, *et.al.*, (2020). It requires a company's commitment to pay continuous attention to its environmental strategic orientation. Environmental strategy will drive corporate policies toward the implementation of an environmental management system (Ferreira *et al.*, 2010) in order to reach long-term environmental performance.

Solovida and Latan (2017) noted that the execution of a company's environmental strategy is visible in its environmental performance, and the process of analyzing environmental performance demonstrates the significance of a proactive corporate environmental strategy. Improvements in the company's environmental strategy will support the use of indicators to ensure long-term environmental performance.

Environmental Performance

Environmental responsibility has become the focus of global attention, partly because of concerns about environmental damage, partly because company performance is currently being measured not only for its financial performance but also for its environmental performance (Schaltegger, *et.al.*, 2016). Environmental performance is the result of organizational management related to environmental issues (Hertin, Berkhout, Wagner, & Tyteca, 2008). Environmental performance aims to minimize negative impacts on the natural environment caused by the company's productive activities and social perceptions of these impacts (de Burgos-Jiménez, *et.al.*, 2013). Environmental performance describes how the company is responsible for the surrounding environment.

In general, environmental performance consists of two important things. The first is the measured outcome of the environmental management system over the organization's control of

environmental aspects based on environmental policies and objectives. The second is the result of the environmental management system on the environment (Arafat *et al.*, 2012).

Lankoski (2000) explains environmental performance by referring to the level of environmental damage caused by company activities. A company that is able to minimize the level of environmental damage will have good environmental performance. Conversely, a company that has poor environmental performance will be seen in the level of environmental damage caused by its activities.

The accounting literature study conducted by San Ong, *et al.*, (2019) explains environmental performance as the impact generated through the practice of recycling hazardous waste as described by (Al-Tuwaijri *et al.*, 2004), as well as the effective use of input materials to minimize the environmental pollution in the production process (Henri and Journeault, 2010). In another section, Nawrocka and Parker (2009) explain environmental performance by providing a synopsis of the use of operational performance indicators that assess the utilization of all resources, such as waste disposal, emissions or water usage, and carbon dioxide emissions.

Theoretical Framework and Hypotheses

The environmental management control system contributes to creating and driving the company's environmental performance. This may be accomplished by incorporating environmental considerations into internal control and general managerial procedures, which will enhance environmental performance (Guenther *et al.*, 2016). Environmental management control systems may also give enterprises with flexibility and facilitate organizational transformation in order to improve environmental performance.

Conceptually, a management control system encourages and ensures the practices and behavior of organizational actors (Ahrens and Chapman, 2007), supports strategy (Langfield-Smith, 1997), and facilitates the achievement of organizational goals (Flamholtz *et al.*, 1985; Mahdi and Abass 2022), an environmental management control system provides opportunities for the formation of a practice of environmental issues that are formed in an integrated and holistic manner into company strategy and practice and to align company operations and activities with environmental strategy (Gunther, 2016). Thus, the concept of an environmental management control system is a condition created that enables, encourages, and forces the behavior of all components within an organization to be directed towards the goals and strategies of the company to achieve environmental performance.

Therefore, an environmental management control system guides managers to drive environmental strategies throughout the company in achieving environmental performance (Epstein and Wisner, 2005; Gunther *et al.*, 2016). In other words, the environmental management control system consists of various controls such as cybernetic, cultural, or administrative controls that ensure that the environmental strategy is implemented across all functions and divisions of the company, shapes employee behavior in such a way that environmental goals are met, and contributes to strategy formulation.

An environmental management control system is a manifestation of management's awareness of their duties and responsibilities, which not only serve the interests of company owners, but also must consider the rights of stakeholders at large. This is in line with the basic spirit of stakeholder theory (Freeman, *et al.*, 2010). The management control system mechanism allows management to integrate environmental issues in the entire process of managerial activity from planning, organizing resources, directing actions and controlling them. This process enables management to direct the understanding and actions of employees to support company-wide goals and strategies and specifically to achieve environmental performance.

In other words, the adoption of environmental management control system practices facilitates the incorporation of environmental factors into operational and managerial actions of organizations, which contributes to environmental and economic performance (Henri and Journeault, 2010; Journeault and De Ronge, 2016; Henri & Journeault, 2018). The practice of this environmental management control system is information that can reveal information for environmental decision making. Available activities and information send cues related to environmental issues and encourage discussion, debate, and exchange of information. Environmental management control systems can assist in the growth of environmental programs by providing continuous agendas and forums for face-to-face debate and dialogue; it can also support the incorporation of ecological concerns into organizational processes and the efficient management of the resources required to take action on the environment. Furthermore, by guiding the actions of individuals and groups, environmental management control systems become one means of promoting alignment of environmental goals between individuals and organizations (Flamholtz and Das, 1985; Henri & Journeault, 2018). The above processes and understandings in turn motivate and direct workers to coordinate their behavior with the environmental goals of the company.

Guenther *et al.*, 2016; Henri & Journeault, 2010; Pondeville *et al.*, 2013 have revealed that the environmental management control system is a process for manifesting environmental aspects in the management system control process. Its use can increase the company's ability to translate their environmental motivation into performance improvements including those related to environmental performance. In addition, Journeault (2016) states that environmental management control systems are designed to guide environmental strategies to create environmental control systems.

The statements above are in line with several previous studies which state that environmental management control systems play an important role in supporting the adoption of environmental strategy deployment within organizations (for example, Epstein and Buhovac, 2014; Gond, Grubnic, and Herzig, 2012; Pondeville and Swaen, 2013; Arjalie`s and Mundy, 2013; Journeault and De Ronge, 2016). The literature emphasizes how environmental management control systems assist in identifying environmental challenges and opportunities, as well as the development of environmental strategic goals and priorities. (Henri & Journeault, 2018). the same thing has also been expressed by Perego and Hartmann (2009); Journeault and De Ronge (2016); Journeault (2016) who have shown that by integrating environmental issues into organisational processes, disseminating proactive environmental efforts, and developing contextual environmental capabilities, environmental management control systems can support in the achievement of these strategic environmental objectives. Further studies by Henri & Journeault (2018) state that environmental management control systems provide companies with a competitive advantage in supporting the achievement of environmental performance.

Therefore, based on the above arguments, there are several hypotheses that can be built, namely:

H1: Environmental management control system has a positive effect on environmental strategy.

H2: Environmental strategy has a positive effect on environmental performance

H3: Environmental management control system has a positive effect on environmental performance.

This research model will also examine the mediating role of environmental strategy in the relationship between environmental management control systems and environmental performance. Conceptually, Merchant & Stede (2017) states that strategy is a mechanism that determines how organizations should use their resources to meet these goals. A well-developed strategy guides employees in the successful pursuit of their organizational goals; it conveys to

employees what it is supposed to do. Furthermore, in the context of environmental control, environmental strategy is a set of initiatives used by companies to reduce the impact of operations on the environment, also including minimizing energy usage and disposal, utilizing ecologically sustainable resources, and incorporating environmental management systems. (Bansal & Roth, 2000).

In the perspective of contingency theory (Otley, 2016) states that it is important to consider contextual aspects in a control mechanism including in strategic planning. Environmental strategies are used by managers to guide companies in influencing environmental company performance. Singjai *et al.* (2018) revealed that environmental strategy positively influences environmental performance and organizational competitive advantage. This research assumes that organizational capabilities can influence the implementation of environmental strategies which ultimately have an impact on environmental performance and organizational competitive advantage.

An important point that can be drawn from the above argument is that environmental strategy is a channel or vehicle for an environmental management control system mechanism in encouraging and achieving environmental performance. Environmental strategy is a means of implementing an environmental management control system whether it is related to planning, organizing resources and controlling the environment. The environmental strategy helps implement the control system design to implement ecological aspects in the spirit and attitude of the company in an environmental management control system mechanism. Based on the explanations above, the following hypotheses can be arranged as follows:

H4: Environmental strategy mediates the influence of environmental management control systems on environmental performance.

MATERIALS AND METHODS

Research Data

The research data was obtained by distributing questionnaires filled out by respondents online via the Google form. Questionnaires distributed to respondents were 108 questionnaires which were distributed to hotels in Makassar City which had been selected based on the sample criteria in this study. Respondents in this study were all managers and department heads working in 3rd, 4th and 5th star hotels in Makassar City. Of the 108 questionnaires sent, 48 questionnaires were not filled in by respondents, and 60 questionnaires were filled in, of which

8 questionnaires did not include the identity of the hotel but still met the criteria as a sample in this study. Thus obtained a response rate of 55%.

Table 1, Characteristics of Respondents

Respondents		N	Percentage
Gender	Male	33	55
	Female	27	45
Total Respondents		60	100
Age	Less than 25 years	5	8,3
	26 - 35 years	41	68,3
	36 - 45 years	9	15
	46 - 55 years	4	6,7
	More than 55 years	1	1,7
Total Respondents			100
Tenure	Less than 2 years	16	26,6
	3 - 5 years	36	60
	6 - 10 years	5	8,3
	More than 10 years	3	5,10
Total Respondents		60	100

Prepared by Daromes and Ng (2023)

Measurement of Constructs

All of the constructs of this study were all assessed using existing measuring scales that had been verified in prior investigations.. The measurement scale uses a seven-point Likert scale as follows: Environmental Performance:1 (much worse), 4 (neutral) and 7 (much better). Environmental Performance consists of 14 elements that were derived from instruments created by Sharma and Vredenburg (1998) and afterwards utilized by Henri and Journeault (2010).

The environmental strategy construct was adopted and modified from the measurement developed by Walls et al. (2008); and has been used by Solovida & Latan (2017); Latan, et al., (2018). We adapt this measurement by emphasizing the aspects of historical orientation, network embeddedness, endowments, managerial vision, and top management skills. All items were measured using a seven-point likert scale. The last one for environmental management control systems construct measurement is adapted to the measurement used by Pondeville, et al., (2013); namely 16 items from an extensive review of the environmental management literature: eight related to environmental outcome control and environmental procedures and

eight related to employee participation and teamwork. Each indicator is measured using 7 likert scale.

RESULTS AND DISCUSSION

Model Testing Results (F-Test)

The F statistical test (F-test) is used to determine whether there is a simultaneous effect of the independent variables on the dependent variable and to determine whether the regression model can be used to predict the dependent variable.

Table 2
Model Fit Test (Test F)

Equation	Exogenous Variables	Endogenous Variables	F	Sig.
Sub-structure 1	Environmental management control systems (EMCS)	<i>Environmental Strategy (ES)</i>	71.508	0.000
Sub-structure 2	EMCS	<i>Environmental Performance (EP)</i>	40.506	0.000
	Environmental Strategy (ES)			

Prepared by Daromes and Ng (2023)

Based on the results of the ANOVA test or F-test shown in table 2 above, it shows that for the substructure equation 1 which tests the effect of environmental management control systems on environmental strategy, it has a significance value of $0.000 < 0.05$. Likewise, substructure 2 which examines the effect of environmental management control systems and environmental strategy on environmental performance has a significance value of $0.000 < 0.05$. Thus the theoretical model of this research is confirmed to be accepted.

Table 3
Coefficient of Determination (R^2)

Equation	Exogenous Variables	Endogenous Variables	R square (R^2)	Adjusted R square
Sub-structure 1	EMCS	<i>Environmental Strategy (ES)</i>	0.552	0.544
Sub-structure 2	EMCS	<i>Environmental Performance (EP)</i>	0.587	0.572
	Environmental Strategy (ES)			

Prepared by Daromes and Ng (2023)

Based on the test results for the coefficient of determination (R^2) presented in Table 3, it shows that sub-structural equation 1 which examines the influence of environmental management control systems on environmental strategy shows an R square value of 0.554, meaning that the variation in environmental strategy variables (Y1) can be explained by the variation of exogenous variables, namely environmental management control systems (X1), is

55.4% and the rest is explained by other variables outside the model that are not included in this analysis. Likewise, the sub-structural equation 2 which examines the influence of environmental management control systems and environmental strategy on environmental performance shows an adjusted R square value of 0.572, meaning that variations in environmental performance (Y2) variables can be explained by variations in exogenous variables, namely environmental management control systems (X1), and environmental strategy (X2) of 57.20% and the rest is explained by other variables outside the model that are not included in this analysis.

Partial Test (T Test)

The t statistical test is used to determine whether the independent variables partially influence or not the dependent variable in the regression. If the calculation results show a probability value (p value) $< (\alpha) 0.05$, it means that there is a significant partial effect between the independent variables and the dependent variable. The results of the t statistical test in this study can be seen in table 4 below:

Table 4
Result of *t* test

Equation	Exogenous Variables	Endogenous Variables	Standardized Beta Coefficient	<i>Sig.</i>	α	Confirmation of Significance
Sub-structure 1	EMCS	<i>Environmental Strategy (ES)</i>	0.743	0.000	0.05	Accepted
Sub-structure 2	EMCS	<i>Environmental Performance (EP)</i>	0.306	0.020	0.05	Accepted
	Environmental Strategy (ES)		0.511	0.000	0.05	Accepted

Prepared by Daromes and Ng (2023)

The results of the t statistical test as shown in table 4, show that environmental management control systems have an effect of 0.743 with a significance probability value of 0.000, less than 0.05. Thus, it can be concluded that environmental management control systems have a positive and significant impact on environmental strategy. Thus, H1 which states that environmental management control systems have a significant effect on environmental strategy, is accepted.

Secondly, in the second hypothesis it can be concluded that environmental management control systems have a positive and significant impact on environmental performance which is acceptable. This can be confirmed from table 4, namely that environmental management control systems have an effect of 0.306 with a significance probability value of 0.000, less than 0.05. Furthermore, the third hypothesis which states that the environmental strategy has a positive

effect on the environmental strategy is acceptable. This can be seen in the coefficient value of 0.511 with a probability level of 0.000.

Direct Effect and Indirect Effect Results

The results of statistical tests regarding testing the direct effect and indirect effect can be explained in table 5 and table 6 below:

Table 5
Direct Effects

Combination of Variable Effects	Direct Effects
EMCS → ES	0.743
ES → EP	0.306
EMCS → EP	0.511

Prepared by Daromes and Ng (2023)

Table 6
Indirect Effect

Combination of Variable Effects	Calculation	Indirect Effect
EMCS → ES → EP	(0.743×0.511)	0.379

Prepared by Daromes and Ng (2023)

Sobel Test Results

The predictive value of a model can be known in path analysis, but the significance value of the role of intermediary variables or indirect effects in a model cannot be known. One solution to overcome this problem is the Sobel test which aims to obtain a significant value of the role of the intermediary variable in a model. The significance value of the role of the intermediary variable is obtained by calculating the estimated value and standard error (S.E) of a path (Sobel, 1982) with the following formula:

$$Z\text{-value} = a*b/\text{SQRT}(b^2*SE_a^2 + a^2*SE_b^2)$$

Description:

a = Regression coefficient (unstandardize) for the relationship between the independent variable and the mediating variable;

b = Regression coefficient (unstandardize) for the relationship between the dependent variable and the mediating variable;

SEa = Standard error value of the relationship between the independent variable and the mediating variable;

SEb = Standard error value of the relationship between the dependent variable and the mediating variable

Testing the mediation hypothesis can be done using the sobel test. This Sobel test was conducted to test the extent of indirect effect of independent variable (X) on dependent variable (Y) through mediating variable (M) or in other words to test the significance of the indirect

effect. The multiplication between the direct effect of the independent variable on the mediator variable (a) and the direct effect of the mediator variable on the dependent variable (b) will produce the ab coefficient. The indirect effect (ab) significance test is conducted using the ratio of coefficient (ab) to standard error, which yields a t-statistic value. If the absolute value of the t-statistic $>$ t table or p -value < 0.05 , it can be concluded that variable M mediates the causal relationship between the independent variable (X) and the dependent variable (Y). The results of the Sobel test are presented in table 7 below:

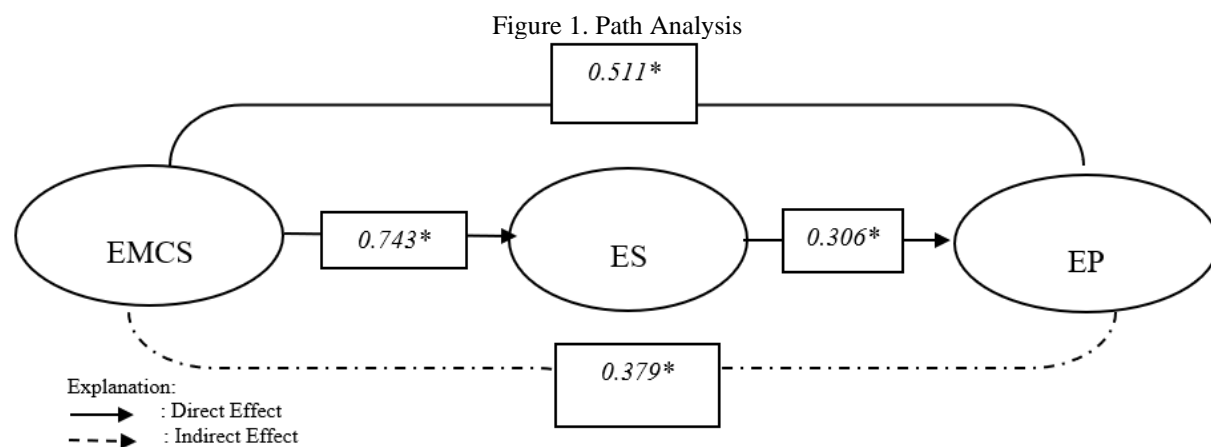
Table 7
Sobel Test Results

Combination of Variable Effects	Estimated Value	Standard Error	p value of Sobel Test	Confirmation of Significance
EMCS → <i>Environmental Performance (EP)</i> via <i>Environmental Strategy (ES)</i>	0.291;1.131	0.034;0.282	0.000	Accepted

Prepared by Daromes and Ng (2023)

Path Analysis Results

Hypothesis testing was carried out using the regression model in path analysis to test the effect of each exogenous variable on the endogenous variable. The results of data processing using path analysis for this research model can be seen in Figure 1 and Table 8 below:



Prepared by Daromes and Ng (2023)

Table 8
Path Equation Analysis Results

Equation	Exogenous Variables	Endogenous Variables	Standardized Beta Coefficient	Sig.	α	Confirmation of Significance
Sub-structure 1	EMCS	<i>Environmental Strategy (ES)</i>	0.743	0.000	0.05	Accepted
	EMCS		0.306	0.020	0.05	Accepted

Sub-structure 2	Environmental Strategy (ES)	<i>Environmental Performance (EP)</i>	0.511	0.000	0.05	Accepted
<i>Environmental Management Control System (EMCS)</i> → <i>Environmental Performance (EP)</i> via <i>Environmental Strategy (ES)</i>			0.379	0.000	0.05	Accepted

Prepared by Daromes and Ng (2023)

DISCUSSION

This research was conducted to investigate the impact of the environmental management control system on environmental performance, which was tested either directly or through environmental strategies. The research data was obtained through an online survey of managers at three, four, and five-star hotels in Makassar, Indonesia. The regression approach, path analysis, and Sobel testing were used to process and analyze the data.

From the results of data processing, several findings were revealed, including that the environmental management control system had a positive and significant impact on both environmental strategy and environmental performance. These findings confirm the first hypothesis (H1) and the third hypothesis (H3). Confirmation of these findings reveals the fact that the environmental management control system drives and creates the conditions for strategy creation. Pondeville, *et al.*, (2013) adapted environmental issues in the definition of a management control system put forward by Simons (1995) and following the suggestion from Perego (2005) we have defined an environmental management control system as a routine and information-based formal procedure that managers use to maintain or change patterns in organizational activities, especially those concerning environmental aspects of organizational performance. An environmental management control system package includes formal procedures related to environmental information directed in the framework of formulating environmental strategies.

Embedding environmental issues in the entire managerial process provides certainty, moves and even forces all components within the organization to direct their behavior to achieve the set goals. In a broad context, a management control system is designed to support its strategy (Ittner and Larcker, 1997; Widener, 2004; Pondeville, *et al.*, 2013). Even Langfield-Smith, (1997) asserts that management control systems must be explicitly directed to support business strategy. The imperative nature of the management control system drives the strategy to achieve it. This is in line with Journeault (2011) which states that an environmental management control system will support the implementation of an environmental strategy in all components within an organization.

In addition to encouraging the implementation of environmental strategies, the environmental management control system also impacts on environmental performance. The components of procedures and standards in the environmental control system are integrative mechanisms that can improve environmental performance. Fryxell and Vryza (1999); Bartolomeo *et al.*, (2000) state that the implementation of an environmental management control system can be carried out through mechanisms such as ensuring that environmental staff participate and integrate environmental criteria into the company's managerial processes in the form of planning, resource organization and control. Environmental rules and procedures can be established by managers to link expected results to decisions and achieve environmental goals (Pondeville, *et al.*, 2013). These things lead to the achievement of good environmental performance.

The environmental management control system encourages the integration of the environment in planning and performance, which is an efficient means to follow up on environmental management. These things ensure the support of managers and employees. Thus, the environmental management control system depends on employee participation and awareness, involvement and support from superiors, mutual coordination between cross-functional environmental issues will encourage the creation of environmental performance (Pondeville, *et al.*, (2013); San Ong, *et al.*, (2019).

Confirmed performance achievement indicators in cost efficiency and service quality improvement, emission reduction, and development of stronger partnerships with stakeholders such as local communities, government, government, and environmental groups. Other things have also been confirmed by increasing employee learning aspects, increasing employee awareness and morality and being pro-active in responding to environmental issues.

The findings above are in line with the findings and literature review in the hotel and tourism sector which proves that hotels with evidence from previous studies indicate that eco-friendly hotels tend to have a good reputation and can gain competitive advantage in the market and have a positive corporate image. This can happen because there is a mechanism that regulates how to practice an environmentally oriented control system (Graci & Dodds, 2008); Wyngaard and Lange, (2013); Abdel-Maksoud, Kamel, & Elbanna, 2016).

The results of further hypothesis testing are related to the effect of environmental strategy on environmental performance (H2). Confirmation of hypothesis testing reveals that environmental strategy has a significant influence on environmental performance. This indicates that the environmental strategy carried out by the company in the form of efforts to

maintain environmental reputation and supported by managerial competencies related to environmental aspects encourages employees to continue learning in increasing capacity to achieve better environmental performance, especially in controlling hotel waste and reducing activities that can reduce emission effects.

Likewise, the strategy of increasing the amount of investment related to research and development in the environmental field, as well as superior support for long-term environmental commitments will build employee awareness and commitment to behaving in an environmentally friendly manner. Other indications that reflect environmental performance include increasing innovation related to environmental issues both in processes and services that are oriented towards environmentally friendly aspects.

Confirmation of the findings above means that the company's environmental strategy encourages commitment to achieving company performance. Environmental plan for meeting environmental regulations, and management's attention to environmental concerns will have an impact on the company's capacity to achieve environmental performance. This is in line with the statement of Rodrigue *et al.*, (2013) which states that an environmental strategy will increase a company's environmental performance above and beyond simply compliance with existing requirements. Good environmental performance results are the impact of a good corporate environmental strategy.

Confirmation of the last hypothesis (H4), namely how the mediating role of environmental strategy in the relationship between the environmental management control system and environmental performance. The results of statistical testing show that environmental strategy has a mediating role in the relationship between the two variables mentioned above (table 7).

The findings of this study are to confirm that environmental strategy is an important medium or tool in realizing an environmental management control system. Through the environmental strategy, management ensures that all management principles and procedures that are integrated with the environment can be realized in concrete ways and steps. In other words, environmental strategy is a vehicle for implementing an environmental management control system towards the goal of achieving sustainable performance.

Conceptually, this is in line with the statement made by Merchant & Van der Stede (2017), namely that to support the objectives of a management control system, strategic steps are needed. This is important because the strategy will then determine how the organization should use its resources to achieve its goals. The findings of this study also confirm how the

contingency aspect (Otley, 2016) is an important aspect of this research model. The environmental strategy explains how an environmental management control system is directed and realized by considering contextual aspects in the form of a strategic concept as developed by Walls et al. (2008) namely building a multi-dimensional environment, namely historical and reputation orientation, issue formation, corporate philanthropy, managerial vision, top management capabilities, and human resources

The important point is that in achieving environmental performance in the long term, it is necessary to improve the company's environmental strategy. This is in line with the research results of Henri and Journeault (2010); Journeault (2016) which explains that corporate environmental strategic planning is an integrated part of an environmental management control system that can improve environmental performance.

CONCLUSION

This research has confirmed the empirical evidence of the model built, namely how the environmental management control system influences environmental performance which is tested both directly and through environmental strategy mechanisms. In other words, environmental strategy mediates the relationship between the environmental management control system and environmental performance.

The results of this study completely confirm the following: first, the environmental management control system has a significant effect on environmental performance; second, the management control system has a significant effect on environmental strategy; third, environmental strategy has a significant effect on environmental performance; and lastly, the environmental strategy significantly mediates the influence of the environmental management control system on environmental performance.

The research findings contribute to the management and organizational accounting literature, especially regarding the two theories that form the basis of the theoretical model of this research. The first is related to the stakeholder theory (Freeman, *et al.*, 2010), the basic premise of this theory is that companies exist not solely to maximize the interests of the owners of capital, but also to maximize the interests of stakeholders at large. The integration of environmental aspects into the management control system provides certainty and drives the organization and its related components to work in order to achieve the goals and objectives of the organization and while still maximizing the rights of stakeholders at large.

Second, this study also confirms and contributes to contingency theory (Otley, 2016). The environmental strategy, which is a bridge for implementing an environmental management control system in achieving environmental performance, illustrates how contextual aspects within an organization need to be considered in order for managers to carry out managerial functions.

In addition to providing theoretical contributions, the findings of this study also provide recommendations on public policy and business practices to integrate environmental issues into managerial processes and decision-making as well as corporate control. Environmental managers and top management as a whole, to focus on and adopt and integrate environmental issues in enterprise management, especially to achieve sustainable performance. Managers are at the forefront of carrying out the spirit of sustainability in all hotel operational activities and policies. His authority as a manager allows him to move and if necessary "force" all subordinates within his span of control to behave in order to carry out their duties within the spirit of sustainability. This is important to implement in supporting sustainable economic growth.

This study is not free of limitations, which have to be taken into consideration when interpreting the findings. First, this research covers hotels in Makassar, not all of them in Indonesia; therefore, generalizing the findings of this study should be exercised with caution. Second, this study assumes hotel homogeneity and does not consider hotel type. Third, this study only considers strategic contextual factors that affect corporate environmental performance, without examining other contingency aspects, such as cultural factors, government regulations, organizational structure, and company size (see Christ and Burritt, 2013).

Further research can expand this research by considering contextual and other contingency aspects. In addition, future research may use a larger sample and longitudinal data which allows to investigate changes in strategic environmental management control system policies over time. Causality testing should also be considered.

REFERENCES

- Abdel-Maksoud, A., Kamel, H., & Elbanna, S. (2016). Investigating relationships between stakeholders' pressure, eco-control systems and hotel performance. *International Journal of Hospitality Management*, 59, 95-104. <https://doi.org/10.1016/j.ijhm.2016.09.006>
- Adebanjo, D., Teh, P. L., & Ahmed, P. K. (2016). The impact of external pressure and sustainable management practices on manufacturing performance and environmental

outcomes. *International Journal of Operations & Production Management*.
<https://doi.org/10.1108/IJOPM-11-2014-0543>

Ahrens, T., & Chapman, C. S. (2007). Management accounting as practice. *Accounting, organizations and society*, 32(1-2), 1-27. <https://doi.org/10.1016/j.aos.2006.09.013>

Al-Tuwaijri, S. A., Christensen, T. E., & Hughes II, K. E. (2004). The relations among environmental disclosure, environmental performance, and economic performance: a simultaneous equations approach. *Accounting, organizations and society*, 29(5-6), 447-471. [https://doi.org/10.1016/S0361-3682\(03\)00032-1](https://doi.org/10.1016/S0361-3682(03)00032-1)

Arafat, M. Y., Warokka, A., & Dewi, S. R. (2012). Does Environmental Performance Really Matter? A Lesson from the Debate of Environmental Disclosure and Firm Performance. *Journal of Organizational Management Studies*, 2012, h1-15. <http://doi.org/10.5171/2012.213910>

Arjaliès, D. L., & Mundy, J. (2013). The use of management control systems to manage CSR strategy: A levers of control perspective. *Management Accounting Research*, 24(4), 284-300. <https://doi.org/10.1016/j.mar.2013.06.003>

Banerjee, S. B. (2002). Corporate environmentalism: The construct and its measurement. *Journal of business research*, 55(3), 177-191. [https://doi.org/10.1016/S0148-2963\(00\)00135-1](https://doi.org/10.1016/S0148-2963(00)00135-1)

Banerjee, S. B. (2008). Corporate social responsibility: The good, the bad and the ugly. *Critical sociology*, 34(1), 51-79. <https://doi.org/10.1177/0896920507084>

Bansal, P., & Roth, K. (2000). Why companies go green: A model of ecological responsiveness. *Academy of management journal*, 43(4), 717-736. <https://doi.org/10.5465/1556363>

Bartolomeo, M., Bennett, M., Bouma, J. J., Heydkamp, P., James, P., & Wolters, T. (2000). Environmental management accounting in Europe: current practice and future potential. *European Accounting Review*, 9(1), 31-52. <https://doi.org/10.1080/096381800407932>

Burritt, R. L., & Schaltegger, S. (2010). Sustainability accounting and reporting: fad or trend?. *Accounting, Auditing & Accountability Journal*. <https://doi.org/10.1108/09513571011080144>

Christ, K. L., & Burritt, R. L. (2013). Environmental management accounting: the significance of contingent variables for adoption. *Journal of Cleaner Production*, 41, 163-173. <https://doi.org/10.1016/j.jclepro.2012.10.007>

de Burgos-Jiménez, J., Vázquez-Brust, D., Plaza-Úbeda, J. A., & Dijkshoorn, J. (2013). Environmental protection and financial performance: An empirical analysis in Wales. *International Journal of Operations & Production Management*. <https://doi.org/10.1108/IJOPM-11-2010-0374>

Ditillo, A., & Lisi, I. E. (2014). Towards a more comprehensive framework for sustainability control systems research. In *Accounting for the environment: More talk and little progress*. Emerald Group Publishing Limited. <https://doi.org/10.1108/S1479-359820140000005010>

Ditillo, A., & Lisi, I. E. (2016). Exploring sustainability control systems' integration: The relevance of sustainability orientation. *Journal of Management Accounting Research*, 28(2), 125-148. <https://doi.org/10.2308/jmar-51469>

Epstein, M. J., & Buhovac, A. R. (2014). Making sustainability work 2nd edition: Best Practices in managing and measuring corporate social, environmental, and economic impacts. *San Francisco (CA, US): Berrett-Koehler Publishers*.

Epstein, M. J., & Wisner, P. S. (2005). Managing and controlling environmental performance: Evidence from Mexico. In *Advances in Management Accounting*. Emerald Group Publishing Limited. [https://doi.org/10.1016/S1474-7871\(05\)14005-2](https://doi.org/10.1016/S1474-7871(05)14005-2)

Ferreira, A., Moulang, C., & Hendro, B. (2010). Environmental management accounting and innovation: an exploratory analysis. *Accounting, Auditing & Accountability Journal*. <https://doi.org/10.1108/09513571011080180>

Flamholtz, E. G., Das, T. K., & Tsui, A. S. (1985). Toward an integrative framework of organizational control. *Accounting, organizations and society*, 10(1), 35-50. [https://doi.org/10.1016/0361-3682\(85\)90030-3](https://doi.org/10.1016/0361-3682(85)90030-3)

Freeman, R. E., Harrison, J. S., Wicks, A. C., Parmar, B. L., & De Colle, S. (2010). Stakeholder theory: The state of the art.

Fryxell, G. E., & Vryza, M. (1999). Managing environmental issues across multiple functions: an empirical study of corporate environmental departments and functional coordination. *Journal of environmental management*, 55(1), 39-56. <https://doi.org/10.1006/jema.1998.0241>

Gond, J. P., Grubnic, S., Herzig, C., & Moon, J. (2012). Configuring management control systems: Theorizing the integration of strategy and sustainability. *Management Accounting Research*, 23(3), 205-223. <https://doi.org/10.1016/j.mar.2012.06.003>

Graci, S., & Dodds, R. (2008). Why go green? The business case for environmental commitment in the Canadian hotel industry. *Anatolia*, 19(2), 251-270. <https://doi.org/10.1080/13032917.2008.9687072>

Grewal, J., & Serafeim, G. (2020). Research on corporate sustainability: Review and directions for future research. *Foundations and Trends® in Accounting*, 14(2), 73-127. <http://dx.doi.org/10.1561/14000000061>

Guenther, E., Endrikat, J., & Guenther, T. W. (2016). Environmental management control systems: a conceptualization and a review of the empirical evidence. *Journal of Cleaner Production*, 136, 147-171. <https://doi.org/10.1016/j.jclepro.2016.02.043>

Gunarathne, N., & Lee, K. H. (2015). Environmental Management Accounting (EMA) for environmental management and organizational change: An eco-control approach. *Journal of Accounting & Organizational Change*. <https://doi.org/10.1108/JAOC-10-2013-0078>

Henri, J. F., & Journeault, M. (2010). Eco-control: The influence of management control systems on environmental and economic performance. *Accounting, Organizations and Society*, 35(1), 63-80. <https://doi.org/10.1108/JAOC-04-2016-0023>

Henri, J. F., & Journeault, M. (2018). Antecedents and Consequences of Eco-Control Deployment: Evidence from Canadian Manufacturing Firms. *Accounting Perspectives*, 17(2), 253-273. <https://doi.org/10.1111/1911-3838.12168>

Hertin, J., Berkhout, F., Wagner, M., & Tyteca, D. (2008). Are EMS environmentally effective? The link between environmental management systems and environmental performance in European companies. *Journal of environmental planning and management*, 51(2), 259-283. <https://doi.org/10.1080/09640560701865040>

Ioannou, I., Li, S. X., & Serafeim, G. (2016). The effect of target difficulty on target completion: The case of reducing carbon emissions. *The Accounting Review*, 91(5), 1467-1492. <https://doi.org/10.2308/accr-51307>

Ittner, C. D., & Larcker, D. F. (1997). Quality strategy, strategic control systems, and organizational performance. *Accounting, Organizations and Society*, 22(3-4), 293-314. [https://doi.org/10.1016/S0361-3682\(96\)00035-9](https://doi.org/10.1016/S0361-3682(96)00035-9)

Joshi, S., & Li, Y. (2016). What is corporate sustainability and how do firms practice it? A management accounting research perspective. *Journal of Management Accounting Research*, 28(2), 1-11. <https://doi.org/10.2308/jmar-10496>

Journeault, M. (2011). *Eco-control and corporate sustainability strategy* (Doctoral dissertation, Thèse de doctorat en Science de Gestion Université Catholique de Louvain). Unpublished dissertation. https://dial.uclouvain.be/pr/boreal/object/boreal%3A76180/datastream/PDF_01/view

Journeault, M. (2016). The influence of the eco-control package on environmental and economic performance: A natural resource-based approach. *Journal of Management Accounting Research*, 28(2), 149-178. <https://doi.org/10.2308/jmar-51476>

Kock, C. J., Santalo, J., & Diestre, L. (2012). Corporate governance and the environment: what type of governance creates greener companies?. *Journal of Management Studies*, 49(3), 492-514. <https://doi.org/10.1111/j.1467-6486.2010.00993.x>

Kraus, S., Rehman, S. U., & García, F. J. S. (2020). Corporate social responsibility and environmental performance: The mediating role of environmental strategy and green innovation. *Technological Forecasting and Social Change*, 160, 120262. <https://doi.org/10.1016/j.techfore.2020.120262>

Langfield-Smith, K. (1997). Management control systems and strategy: a critical review. *Accounting, organizations and society*, 22(2), 207-232. [https://doi.org/10.1016/S0361-3682\(95\)00040-2](https://doi.org/10.1016/S0361-3682(95)00040-2)

Lankoski, L. (2000). *Determinants of environmental profit: An analysis of the firm-level relationship between environmental performance and economic performance*. Helsinki University of Technology.

- Latan, H., Jabbour, C. J. C., de Sousa Jabbour, A. B. L., Wamba, S. F., & Shahbaz, M. (2018). Effects of environmental strategy, environmental uncertainty and top management's commitment on corporate environmental performance: The role of environmental management accounting. *Journal of cleaner production*, 180, 297-306. <https://doi.org/10.1016/j.jclepro.2018.01.106>
- Lisi, I. E. (2015). Translating environmental motivations into performance: The role of environmental performance measurement systems. *Management Accounting Research*, 29, 27-44. <https://doi.org/10.1016/j.mar.2015.06.001>
- Mahdi, N. A., & Abass, Z. K. (2022). A University Control Systems Development Using the Strategic of Sustainability: Survey Study in the Iraqi Private Universities. *International Journal of Professional Business Review*, 7(4), e0618-e0618. <https://doi.org/10.26668/businessreview/2022.v7i4.e168>
- Malmi, T., & Brown, D. A. (2008). Management control systems as a package—Opportunities, challenges and research directions. *Management accounting research*, 19(4), 287-300. <https://doi.org/10.1016/j.mar.2008.09.003>
- Merchant, K. A., & Stede, W. A. (2017). Management Control Systems: Performance Measurement, Evaluation and Incentives.
- Nawrocka, D., & Parker, T. (2009). Finding the connection: environmental management systems and environmental performance. *Journal of cleaner production*, 17(6), 601-607. <https://doi.org/10.1016/j.jclepro.2008.10.003>
- Otley, D. (2016). The contingency theory of management accounting and control: 1980–2014. *Management accounting research*, 31, 45-62. <https://doi.org/10.1016/j.mar.2016.02.001>
- Perego, P. M. (2005). *Environmental management control. An empirical study on the use of environmental performance measures in management control systems*. Ponsen & Looijen, Nijmegen, Ph.D. Dissertation. <https://repository.ubn.ru.nl/bitstream/handle/2066/46728/46728.pdf>
- Perego, P., & Hartmann, F. (2009). Aligning performance measurement systems with strategy: The case of environmental strategy. *Abacus*, 45(4), 397-428. <https://doi.org/10.1111/j.1467-6281.2009.00297.x>
- Pondeville, S., Swaen, V., & De Rongé, Y. (2013). Environmental management control systems: The role of contextual and strategic factors. *Management accounting research*, 24(4), 317-332. <https://doi.org/10.1016/j.mar.2013.06.007>
- Rodrigue, M., Magnan, M., & Boulianne, E. (2013). Stakeholders' influence on environmental strategy and performance indicators: A managerial perspective. *Management Accounting Research*, 24(4), 301-316. <https://doi.org/10.1016/j.mar.2013.06.004>
- San Ong, T., Magsi, H. B., & Burgess, T. F. (2019). Organisational culture, environmental management control systems, environmental performance of Pakistani manufacturing industry. *International Journal of Productivity and Performance Management*. <https://doi.org/10.1108/IJPPM-05-2018-0187>

Severo, E. A., & De Guimarães, J. C. F. (2022). Antecedent and Consequents of Eco-Innovation for Sustainability: Generations' Perceptions in Brazil and Portugal. *International Journal of Professional Business Review*, 7(1), e0280-e0280. <https://doi.org/10.26668/businessreview/2022.v7i1.280>

Schaltegger, S., Lüdeke-Freund, F., & Hansen, E. G. (2016). Business models for sustainability: A co-evolutionary analysis of sustainable entrepreneurship, innovation, and transformation. *Organization & Environment*, 29(3), 264-289. <https://doi.org/10.1177/108602661666332>

Sharma, S., & Vredenburg, H. (1998). Proactive corporate environmental strategy and the development of competitively valuable organizational capabilities. *Strategic management journal*, 19(8), 729-753. [https://doi.org/10.1002/\(SICI\)1097-0266\(199808\)19:8<729::AID-SMJ967>3.0.CO;2-4](https://doi.org/10.1002/(SICI)1097-0266(199808)19:8<729::AID-SMJ967>3.0.CO;2-4)

Simons, R. (1994). *Levers of control: How managers use innovative control systems to drive strategic renewal*. Harvard Business Press.

Singjai, K., Winata, L., & Kummer, T. F. (2018). Green initiatives and their competitive advantage for the hotel industry in developing countries. *International Journal of Hospitality Management*, 75, 131-143. <https://doi.org/10.1016/j.ijhm.2018.03.007>

Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. *Sociological methodology*, 13, 290-312. <https://doi.org/10.2307/270723>

Solovida, G. T., & Latan, H. (2017). Linking environmental strategy to environmental performance: mediation role of environmental management accounting. *Management and Policy Journal*. <https://doi.org/10.1108/SAMPJ-08-2016-0046>

Walls, J. L. (2008). Assessment of the construct validity of environmental strategy measures. <https://deepblue.lib.umich.edu/handle/2027.42/58598>

Widener, S. K. (2004). An empirical investigation of the relation between the use of strategic human capital and the design of the management control system. *Accounting, Organizations and Society*, 29(3-4), 377-399. [https://doi.org/10.1016/S0361-3682\(03\)00046-1](https://doi.org/10.1016/S0361-3682(03)00046-1)

Wyngaard, A. T., & De Lange, R. (2013). The effectiveness of implementing eco initiatives to recycle water and food waste in selected Cape Town hotels. *International Journal of Hospitality Management*, 34, 309-316. <https://doi.org/10.1016/j.ijhm.2013.04.007>