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Effects of cost information, environmental innovation, and gender on new product development performance

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Abstract

Research aims: This study aims to examine the influence of cost information, environmental innovation practices, and gender on new product development performance.

Design/Methodology/Approach: Experimental methodology with 2x2 factorial design. There were 117 participants consisting of students from the Faculty of Economics and Business who had taken Management Accounting and Cost Management courses.

Research findings: The findings indicate that the performance of new product development is not significantly impacted by cost information or environmental innovation techniques. Nonetheless, there are notable relationships between gender and environmental innovation methods and cost information, suggesting that the influence varies depending on the designer's gender.

Theoretical contribution/ Originality: This study fills a gap in the literature by investigating the interaction between gender, environmental innovation strategies, and cost information in developing new products. The study adds to our understanding of how these factors could influence the efficacy of product development and decision-making pertaining to sustainability.

Practitioner/Policy implication: This study suggests that firms need to consider gender differences in environmental innovation practices to optimize new product development. In addition, presenting relevant cost information remains important in supporting strategic decision-making.

Research limitation/Implication: Unequal group sizes may reduce statistical sensitivity. Using students limits real-world relevance. Future studies should consider work experience and include professionals to enhance external validity.

Keywords: Cost Information; Environmental Innovation Practices; Gender; New Product Development; Cost Efficiency; Sustainability

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Introduction

In the era of globalization and increasingly fierce business competition, innovation is one of the key factors in the company's sustainability. New product development is the primary strategy used by companies to maintain competitiveness and meet evolving market needs (Husniar et al., 2023). Amanah et al. (2020) explain that product development is a way of doing business to create better products.

Companies will improve or modify existing products, expand product lines, add product descriptions and benefits, and create new products to meet market and customer needs. Developing new products is the key to success in business life. A company cannot survive without developing its products or services because competitors constantly introduce new products to the market (Rizqy et al., 2021).

In the process of producing new products, different aspects can affect the efficacy and efficiency of decisions made by the organization. One key factor that can influence is the cost information presented to decision-makers in the product design and development process (Alfiana & Jatiningsih, 2022). In addition, the application of environmental innovation practices is becoming increasingly a concern in the modern business world, along with increasing awareness of the importance of sustainability and corporate social responsibility (Musaad et al., 2020).

Cost information is important in business decision-making, especially regarding resource use efficiency and pricing strategy (Anh et al., 2023). Companies often face different types of cost information, such as specific and relative cost information (Booker et al., 2007), which can influence decisions in new product development. Specific cost information provides details about specific cost components in a product, while relative cost information compares the cost of a product with other alternatives. Understanding cost information can help managers and designers make more rational and optimal decisions regarding new product development (Yasaputri, 2023). However, few studies have examined how differences in the presentation of cost information can influence decision-making in the context of new product development.

In addition to cost information, environmental innovation practices are an influential factor in product development (Balzano & Marzi, 2023). Environmental innovation refers to applying technologies, processes, or business strategies that aim to reduce negative environmental impacts (Pujari, 2006). In recent decades, many companies have begun to adopt environmental innovation as part of their business strategy to improve efficiency, meet environmental regulations, and improve the company's image in the eyes of consumers (Luan et al., 2022). However, a key challenge in implementing environmental innovation is how firms can balance sustainability and profitability. Therefore, it is important to examine whether environmental innovation practices positively impact new product development performance.

One aspect that is rarely discussed in research related to new product development is the gender factor. Gender can play an important role in business decision-making, including product innovation and development. Some research suggests that men and women may have different approaches to making business decisions, especially in assessing the risks and benefits of a decision (Minasyan & Tovmasyan, 2020). Research conducted by Ismiati et al. (2024) shows that in decision-making, women prioritize emotions, while men prioritize logic and rationality. In the context of new product development, gender differences may affect how individuals interpret cost information and respond to environmental innovations.

Therefore, there is a gap in the literature on how gender and decision-making interact in the context of new product development, especially when cost information and environmental innovation practices are considered. Most previous studies only discuss the influence of each variable separately. Gender as a cognitive and emotional factor can influence how individuals respond to cost information and environmental policies in product design. This research offers a new contribution by integrating the three main factors of cost information, environmental innovation practices, and gender in an experiment. The aim is to empirically test the direct influence of each variable and the interaction between them on new product development performance. Thus, this study is expected to enrich the literature related to strategic decision-making in sustainable product innovation.

This study analyzes the influence of cost information, environmental innovation practices, and gender on new product development performance. In addition, this study also aims to explore the interaction between these three variables in influencing product development outcomes. By understanding how these factors interact, this research is expected to provide new insights for the academic world and business practitioners in designing more effective strategies for innovative and sustainable new product development.

This study employed an experimental approach using a 2x2 factorial design. University students who pose as professional product designers and possess a foundational understanding of cost management and management accounting participate in this project (Akbar et al., 2023). The experiment was conducted by giving participants the task of designing a new product based on a predetermined scenario, manipulating cost information and environmental innovation practices as independent variables. The data obtained were analyzed using the ANOVA test to test research hypotheses related to main effects and interactions between variables (Aziza et al., 2024).

The results of this study are expected to make a theoretical contribution to the literature related to decision-making in the context of new product development, as well as provide insight for business practitioners in designing more effective product development strategies. In addition, this study can also provide policy implications for companies in designing innovation policies that consider cost information factors, environmental innovation, and gender in the decision-making process. Therefore, this research is expected to provide broad benefits for academics, practitioners, and policymakers to improve the efficiency and effectiveness of new product development in various industrial sectors.

Literature Review and Hypotheses Development

Contingency Theory

Contingency theory in management accounting states that no one accounting system is optimal for all organizations. Accounting system design must be tailored to specific

situations and factors such as organizational structure and environment (Otley, 1980). Contingency theory is a theory of how a company is affected by external factors and how a company can survive by being flexible and adaptable to changes in the external environment. This theory considers the external environment as the primary determinant of firm performance. This theory explicitly emphasizes whether and where random variables affect company performance. Therefore, companies must acquire and develop their resources and improve their ability to face challenges. Situational organizations gain a competitive advantage by assessing their business environment and devising strategies accordingly (Shandy, 2020).

Cognitive Load Theory

Cognitive Load Theory explains how human information processing capabilities are limited and how this impacts decision-making. Three types of cognitive load are identified in this theory. Intrinsic load occurs due to the complexity of the material being learned, extrinsic load occurs due to the way information is delivered, and load occurs due to contributing to meaningful learning. A person's ability to learn and make decisions effectively can be impaired when the cognitive load exceeds their processing ability (Sweller, 1988).

Selectivity Hypothesis

The Selectivity Hypothesis, as explained by (Meyer & Levy, 1989), states that individuals process information based on the level of attention and type of information received, with notable differences between genders. Women tend to have a lower attention threshold than men, so they respond more quickly and process information critically and deeply, even to indirect messages. This concept is reinforced by (Wardani & Jatiningsih, 2024), who show that women are superior in elaborating complex and relevant information in decision-making, especially in new product development. This difference makes women more comprehensive information processors, which positively impacts team effectiveness and product design outcomes.

The Effect of Cost Information on New Product Development Performance

In new product development, cost information supports appropriate, efficient, and strategic decision-making. Contingency Theory Otley (1980) states that there is no universal management information system; an effective system must be tailored to the needs and conditions of the organization and the characteristics of decision-makers. In this context, the presentation of appropriate cost information is an important element for designers to respond optimally to the demands for efficiency and innovation in the product design process.

In addition, Cognitive Load Theory Sweller (1988) emphasizes that humans have a limited capacity to process information. If the information received is too complex or ambiguous, the cognitive load will increase and negatively impact decision-making effectiveness. Therefore, clearly and specifically structured information will be easier to process and

optimally utilized. Previous research shows that specific cost information can increase designers' attention to efficiency aspects, resulting in more cost-effective product designs (Booker et al., 2007). The same results were also found in Nurjanah and Jatiningsih (2023) study, which showed that participants who received specific cost information tended to produce higher-performing products than those who received relative cost information. Based on this argument, the following research hypothesis is proposed:

H_1: *There is a difference in new product development performance when designers use specific cost information versus relative cost information.*

The Effect of Environmental Innovation Practices on New Product Development Performance

Contingency theory also applies to environmental innovation practices, which emphasize that their success depends on the fit with the internal and external conditions of the company. Environmental innovation practices include sustainable initiatives such as energy efficiency, recycling, and waste reduction (Gomez-Conde et al., 2019). As environmental awareness increases, companies increasingly integrate sustainability into their new product development (Yin et al., 2019).

Research by Pujari (2006) and Paparoidamis et al. (2019) highlights the positive impact of environmental innovation practices on new product development by improving market competitiveness and corporate image. The alignment of these practices with corporate strategy ensures their effectiveness in driving innovation and performance. Referring to previous research, environmental innovation practices, such as the use of green materials and sustainable design, have been shown to impact new product development performance significantly. This provides a basis for firms to integrate environmental innovation practices as an integral part of their new product development strategy to gain a competitive advantage in the sustainable era. Based on these arguments, the following research hypothesis is proposed:

H_2: *There is a difference in new product development performance between companies that implement environmental innovation practices and companies that do not implement environmental innovation practices.*

The Effect of Gender on New Product Development Performance

The Selectivity Hypothesis explains differences in how men and women process information and make decisions. Women process information more thoroughly and consider various aspects before making decisions, while men tend to be more selective and often rely on intuition or personal beliefs (Wardani & Jatiningsih, 2024). These differences can impact decision outcomes in the context of new product development.

Previous research shows that leadership and decision-making styles differ between men and women. For example, men tend to be more assertive and risk-oriented, while women are more democratic and collaborative (Minasyan & Tovmasyan, 2020). In addition, Karmarkar (2023) found that men are more optimistic in the face of uncertainty, while women are more cautious in interpreting risky information. Referring to these findings, women are predicted to be able to produce more mature and comprehensive design decisions, which have the potential to improve new product development performance. Based on the Selectivity Hypothesis theory, differences in NPD performance based on designer gender are expected. Therefore, the proposed hypotheses are:

H_3: *There is a difference in new product development performance between male and female designers.*

Interaction between Cost Information and Gender

Contingency theory states that the effectiveness of cost information depends on the individual's characteristics and the conditions of the decision-making environment (Otley, 1980). Selectivity Hypothesis Meyer and Levy (1989) explain that individuals have differences in processing information based on the level of attention and cognitive strategies used.

In the context of new product development, previous research suggests that cost information may influence designers' decisions differently depending on their characteristics (Booker et al., 2007; Nurjanah & Jatiningsih, 2023). In addition, research examining the interaction between cost information and individual factors found that the way information is processed depends not only on the type of information provided but also on the characteristics of the decision maker (Karniouchina et al., 2020). Therefore, the interaction between cost information type and gender may affect new product development performance. Based on this argument, the following research hypothesis is proposed:

H_4: *There is a significant interaction between cost information and gender on new product development performance.*

Interactions between Environmental Innovation Practices and Gender

Contingency theory states that the effectiveness of a business strategy depends on the situational factors that influence it, including the characteristics of individuals in decision-making (Otley, 1980). In the context of new product development, environmental innovation practices may provide different benefits depending on how individuals in the organization process and assess the relevance of the practices. Previous research suggests that adopting environmental innovations in new product development depends on firm policies and how decision-makers respond to and implement sustainability strategies (Pujari, 2006; Paparoidamis et al., 2019). Minasyan and Tovmasyan (2020) found that

individual factors, including ways of thinking and information processing, can influence how a strategy is implemented in business decision-making. In addition, other studies suggest that the effectiveness of environmental innovation practices may vary depending on the decision-makers characteristics (Karniouchina et al., 2020). Therefore, the interaction between environmental innovation practices and gender may affect new product development performance. Based on this argument, the following research hypothesis is proposed:

H_5: *There is a significant interaction between environmental innovation practices and gender on new product development performance.*

Research Method

Research Design

This study uses an experimental design to examine the influence of cost information, environmental innovation practices, and gender on new product development performance. The experiment was conducted with a between-subjects design, where participants were placed in different conditions based on independent variables.

Experiment Matrix

Table 1 Experiment Matrix

Environmental Innovation Practice		Cost Information	
		Specific	Relative
	Available	Cell 1	Cell 2
	None	Cell 3	Cell 4

Based on Table 1, each participant will be given a different task, and the following is an explanation of the table above: 1) Cell 1= Participants with elements of environmental innovation practices with specific cost information; 2) Cell 2= Participants with elements of environmental innovation practices with relative cost information; 3) Cell 3= Participants without environmental innovation practices with specific cost information; and 4) Cell 4= Participants without environmental innovation practices with relative cost information

Subjects and Sampling

The subjects in this study are individuals involved in the product design decision-making process, which, in this case, are represented by accounting study program students who have taken managerial accounting and cost accounting courses. The sample consisted of 117 participants selected using the purposive sampling method to ensure suitability with the experimental context. Students were selected because they have an adequate knowledge base to understand cost information and assess product design scenarios.

Nonetheless, using university students as participants is limited, mainly because they have not had direct professional experience in real-world product development practices. This limitation may affect the level of generalizability of the research results. Therefore, the findings in this study are more appropriately interpreted as a representation of decision-making behavior in an experimental context and higher education environment rather than as a direct depiction of professional behavior in actual business practices. Participants were randomly assigned to the experimental conditions to minimize the influence of outside variables.

Operational Definition and Measurement of Variables

Cost information in this study was measured by manipulating it into two categories: specific cost information and relative cost information. Participants received cost data in the form of exact numbers or comparative rankings. Meanwhile, the use of environmental innovation practices is categorized into two conditions: companies that implement environmental innovation practices and those that do not. Gender is classified based on the participants' gender, namely male and female. Finally, New Product Development Performance is measured based on cost efficiency, level of innovation, and market potential of the designed product.

Data Collection Techniques and Instruments

The data in this study were collected through an experimental method using written scenarios and structured questionnaires. The experimental scenario was developed based on a combination of two independent variables: the type of cost information (specific vs. relative) and environmental innovation practices (available vs none), and it was organized as a case study. The case studies were designed to reflect decision-making situations in new product development, where participants were asked to make design decisions based on the information provided.

After reading the scenario and completing the design task, participants were asked to complete a post-test questionnaire to assess their perception of the information presented and the decision-making process undertaken. The research instruments, both scenarios, and post-test questionnaires, were developed by referring to relevant previous studies to ensure relevance to the concepts and variables under study. The instrument development was done by considering the clarity of the language, the appropriateness of the experimental logic, and the ease of understanding by the participants.

Experimental manipulation was carried out by presenting different scenario content for each condition. Cost information was provided as nominal numbers (specific) or general comparisons (relative). At the same time, environmental innovation practices were manipulated through the presence or absence of environmental policy statements in the scenario. The success of the manipulation was tested through manipulation items in the post-test questionnaire.

Participants were randomly assigned to each experimental condition to minimize bias and maintain internal validity. All participants received the exact instructions and worked in a uniformly allotted time, so the influence of outside variables could be significantly suppressed.

Data Analysis Technique

Data analysis in this study was conducted using the ANOVA (Analysis of Variance) statistical method, which is appropriate for testing the effect of multiple independent variables on one dependent variable in an experimental design. The initial analysis stage began with a manipulation test to ensure that the participants correctly understood the treatment in the experimental scenario. This test was conducted through descriptive analysis of the manipulation items in the post-test questionnaire.

Next, the ANOVA test was used to test all hypotheses in the study. This test was applied to see the effect of cost information, environmental innovation practices, and gender on new product development performance, individually and in the interaction between variables. ANOVA allows the identification of the main effect of each independent variable and the combined effect (interaction) between these variables.

The determination of significance in hypothesis testing is based on the p-value. The hypothesis is accepted for the primary effect test if the significance value (p) <0.05 and rejected if >0.05. Meanwhile, for testing the interaction effect (join effect), a looser significance limit of 0.10 is used. The interaction hypothesis is accepted if the significance value is <0.10 and rejected if >0.10.

The entire data analysis process was carried out with the help of the latest version of SPSS statistical software so that the data processing procedure is systematic and can be replicated by other researchers in a similar experimental context.

Result and Discussion

Demographic Data

From the experiments conducted on Universitas Muhammdiyah Yogyakarta Accounting Students, 117 participants were obtained who were willing to take part in the experiment. Based on Table 2, the number of students who can participate in the experiment is 117, consisting of 82 females and 35 males. This shows more female participants, with a percentage of 70%, compared to male participants, with a percentage of 30%.

Table 2 Demographic Data of Experiment Participants by Gender

No	Gender	Total	Percentage
1	Female	82	70%
2	Male	35	30%
Total		117	100%

Based on Table 3, the number of participants with the treatment type of specific cost information and environmental innovation practices is 42, the treatment type of specific cost information and environmental innovation practices is 20, the treatment type of relative cost information and environmental innovation practices is 18, and the treatment type of relative cost information and environmental innovation practices is 37.

Table 3 Data on participants who participated in the experiment for each cell

Description		Cost Information	
		Specific	Relative
Environmental Innovation Practice	Available	42	18
	None	20	37

Homogeneity Test

The homogeneity test was conducted before the ANOVA test to determine whether the variances of the populations were the same. A significance value of more than 0.05 indicates that the variance of each sample is the same (homogeneous). In contrast, a significance value of less than 0.05 indicates that the variance of each sample is not the same (inhomogeneous).

Table 4 Homogeneity Test Results

	Levene Statistic	df1	df2	Sig.
Cost Information	0,720	1	115	0,398
Environmental Innovation Practice	0,839	1	115	0,362
Gender	0,218	1	115	0,641

Based on Table 4, the significant value of cost information is 0.398, environmental innovation practices is 0.362, and gender is 0.641, meaning the value is greater than 0.05. So, it can be stated that the data variants in this study are homogeneous.

Descriptive Statistical Analysis

Descriptive statistical analysis describes the data, including mean, standard deviation, and number of data (N). Based on Table 5, the mean of each experiment is known. The mean of the specific cost information variable with female designers is 3.73, with a standard deviation of 0.92 with 46 (N) data. The mean of specific cost information type with male designers is 3.25 with a standard deviation of 0.93 with a total data of 16 (N). The mean relative cost information type for female designers is 3.33, with a standard deviation of 1.04 and a total data of 36 (N). The mean information type of relative cost with male designers is 3.57, with a standard deviation of 0.96 and a total data of 19 (N).

The mean variable of environmental innovation practice type "none" with female designers is 3.41 with a standard deviation of 0.90 with a total data of 39 (N). The mean of "none" type environmental innovation practices and male designers is 3.72 with a standard deviation of 0.95 with 18 (N) data. The mean of "available" type environmental innovation practices and female designers is 3.69, with a standard deviation of 1.05 and

a total data of 43 (N). The mean of "available" type environmental innovation practices with male designers is 3.11, with a standard deviation of 0.85 and a total data of 17 (N).

Table 5 Statistik Deskriptif

		Gender		Total
		Female	**Male**	
Cost Information	Specific	Mean = 3.73 Std. Dev = 0.92 N = 46	Mean = 3.25 Std. Dev = 0.93 N = 16	Mean = 3.61 Std. Dev = 0.94 N = 62
	Relative	Mean = 3.33 Std. Dev = 1.04 N = 36	Mean = 3.57 Std. Dev = 0.96 N = 19	Mean = 3.41 Std. Dev = 1.01 N = 55
	Total	Mean = 3.56 Std. Dev = 0.99 N = 82	Mean = 3.42 Std. Dev = 0.94 N = 35	
Environmental Innovation Practice	None	Mean = 3.41 Std. Dev = 0.90 N = 39	Mean = 3.72 Std. Dev = 0.95 N = 18	Mean = 3.50 Std. Dev = 0.92 N = 57
	Available	Mean = 3.69 Std. Dev = 1.05 N = 43	Mean = 3.11 Std. Dev = 0.85 N = 17	Mean = 3.53 Std. Dev = 1.03 N = 60
	Total	Mean = 3.56 Std. Dev = 0.99 N = 82	Mean = 3.42 Std. Dev = 0.94 N = 35	

The type of specific cost information with male designers has the lowest mean value, 3.25, with a standard deviation of 0.93 based on 16 (N) data points. Because it requires less money to develop new items, this indicates that the low mean value has the highest and best performance. The type of specific cost information pertaining to female designers, on the other hand, has the largest mean value (3.73), standard deviation (0.92), and amount of data (46). Because it costs more to produce new items, a high mean value indicates poor and negative performance.

With a mean value of 3.11 and a standard deviation of 0.85, the other variable, environmental innovation practices type "available" with male designers, has the lowest amount of data 17 (N). This demonstrates that circular products can be produced when male designers are involved in creating new items in businesses that do not use environmental innovation strategies. The greatest mean value of 3.72 with a standard deviation of 0.95 with 18 (N) data, on the other hand, is found for the "none" type of environmental innovation activities with male designers. This demonstrates that businesses that do not use environmental innovation techniques while creating new items are unable to create circular products.

Analysis of Variance (ANOVA) Test

Hypothesis testing using univariate ANOVA was conducted at a significance level of 5%. The hypothesis will be accepted if the significance value is smaller than 0.05. The use of significance value for joint interaction (join effect) is 0.10 (10%). If the significance value

> 0.10, then the hypothesis is rejected; if the significance value < 0.10, then the hypothesis is accepted. The ANOVA analysis results were used to test the hypothesis.

Table 6 ANOVA Test Results

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	4.695[a]	3	1.565	1.661	0.180
Intercept	1173.708	1	1173.708	1245.329	0.000
InfoCost	0.036	1	0.036	0.038	0.846
Gender	0.360	1	0.360	0.382	0.538
InfoCost*Gender	3.279	1	3.279	3.479	0.065
Error	106.501	113	0.942		
Total	1562.000	117			
Corrected Total	111.197	116			
R Squared = 0.042 (Adjusted R Squared = 0.017)					
Source	**Type III Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Corrected Model	5.315[a]	3	1.772	1.891	0.135
Intercept	1191.487	1	1191.487	1271.592	0.000
EnvironmentalPrac	0.616	1	0.616	0.657	0.419
Gender	0.440	1	0.440	0.470	0.495
EnvironmentalPrac*Gender	4.873	1	4.873	5.201	0.024
Error	105.881	113	0.937		
Total	1562.000	117			
Corrected Total	111.197	116			
R Squared = 0.048 (Adjusted R Squared = 0.023)					
Dependent variable = CostEff					

Based on Table 6, the ANOVA test results show that cost information has a significance value of 0.846 (p > 0.05), which means that there is no significant effect between the type of cost information (specific or relative) on cost efficiency in new product development. This finding does not support the first hypothesis and indicates that the type of information provided is not enough to produce differences in design performance. This may be because participants have a uniform level of understanding and experience, so their responses to the form of information presentation are not significantly different. The findings also suggest that the effectiveness of cost information may be more influenced by the context of decision complexity or level of accountability, as described in Contingency Theory.

The environmental innovation practices variable also showed insignificant results with a p-value of 0.419 (p> 0.05), which means that environmental innovation practices have no direct effect on product design cost efficiency. This indicates that simply including sustainability elements in the scenario is insufficient to encourage participants to make more efficient decisions. This finding is in line with the literature, which states that the success of environmental innovation is strongly influenced by structural support and organizational motivation (Paparoidamis et al., 2019; Fernando et al., 2021).

The gender variable also showed no significant effect, neither in the interaction with cost information (p = 0.538) nor environmental innovation practices (p = 0.495). This suggests that there is no considerable difference between men and women in terms of design cost efficiency in the context of this experiment. Although the Selectivity Hypothesis states that women tend to be more comprehensive in processing information, this result shows that this influence was not significantly reflected in the cost design decisions in this experiment.

However, the interaction between cost information and gender has a significance value of 0.065. Although it does not meet the 0.05 threshold, this value is below the tolerance limit of 0.10 (which is used for testing interaction effects in this study), so it can be said that there is a moderately significant interaction. That is, the effectiveness of the type of cost information in influencing design decisions appears to differ depending on the designer's gender. This indicates that cognitive characteristics or decision-making styles between men and women play a role in processing and utilizing cost information, as described in the Selectivity Hypothesis.

The interaction between environmental innovation practices and gender, with a significance value of 0.024 ($p < 0.05$), indicates a significant interaction. Participants' responses to the presence of environmental innovation practices in the scenario varied significantly by gender. This finding supports the theory that women have a higher sensitivity to sustainability issues and tend to be more responsive to information related to social or environmental values (Minasyan & Tovmasyan, 2020; Wardani & Jatiningsih, 2024), which aligns with the Selectivity Hypothesis by Meyer & Levy (1989) stating that women process information more thoroughly and are more attuned to subtle cues, including environmental concerns, and is also consistent with Contingency Theory by Otley (1980) which emphasizes that the effectiveness of organizational practices, such as environmental innovation, depends on situational variables including individual characteristics like gender.

Theoretical Implications

This study provides meaningful theoretical implications by integrating gender perspectives into decision-making theories, particularly in new product development. By supporting the Selectivity Hypothesis—which argues that men and women differ in how they gather, interpret, and utilize information—the findings underscore the necessity of considering gender differences when examining managerial behavior and outcomes. This emphasizes the need for future management accounting and decision sciences research to systematically include gender as a central explanatory variable, not merely as a demographic control.

Moreover, the application of Contingency Theory in this study reinforces the idea that the effectiveness of management accounting systems (MAS) depends not only on external environmental factors, such as cost structures and environmental innovation practices but also on internal individual characteristics, including gender. This layered understanding suggests that there is no one-size-fits-all approach to designing MAS.

Instead, systems should be adaptive, responding to different decision-makers cognitive and behavioral tendencies to optimize performance.

From a sustainability and innovation perspective, the study contributes to the growing body of literature on environmental innovation by demonstrating that the success of such practices is highly contingent upon who is making the decisions. Gender, as a cognitive and social construct, shapes the perceived importance of sustainability and the willingness to integrate such practices into strategic product development. Therefore, organizations aiming to enhance their environmental performance and innovation capabilities must recognize the role of gender diversity in leadership and product teams. This insight has practical implications for recruitment, training, and team composition in sustainability-driven projects.

Practical Implications

From a practical standpoint, this study underscores the importance of incorporating gender considerations into strategic decision-making processes, particularly in implementing cost strategies and environmental innovation practices. Organizations are encouraged to tailor their approaches to accommodate gender-based differences in decision-making styles, as doing so can enhance the effectiveness of new product development and contribute to improved overall performance. To support this, companies should invest in training and development programs that raise awareness of these differences and equip teams with the tools to leverage them for better collaboration and innovation. Additionally, the presentation of cost information should be carefully designed, considering how different formats—such as specific versus relative cost information—may influence male and female decision-makers differently. Ensuring that cost data is presented in a way that is both accessible and actionable for all team members can significantly improve decision quality. Finally, this study highlights the need for organizational policies that promote gender diversity within product development teams. By fostering diverse perspectives, companies can enhance creativity, improve sustainability outcomes, and drive innovative product solutions.

Conclusion

This study examines the influence of cost information, environmental innovation practices, and gender on new product development performance, particularly in cost efficiency. The method used was a factorial experiment with a 2x2 design involving 117 participants. Each participant was given an experimental scenario that manipulated a combination of independent variables and asked to make product design decisions. Data were analyzed using an ANOVA test to determine the main effect and interaction between variables.

The results showed that cost information and environmental innovation practices did not significantly affect cost efficiency in new product development. Similarly, the gender variable showed no significant difference in design performance. However, significant

interactions were found between cost information and gender, as well as between environmental innovation practices and gender. This suggests that the influence of information and organizational policies on design decision-making is influenced by individual characteristics, in this case, gender.

These findings have important implications for the industry, particularly in strategic decision-making regarding new product development. Companies need to consider the individual characteristics of designers when implementing cost strategies and environmental innovations because the effectiveness of a strategy depends not only on the content of information or policies but also on who uses it. In addition, the management of cost information needs to be done carefully so that it truly supports efficiency without relying solely on the form of information presentation.

This study has several limitations. First, the number of participants in each treatment group was not fully balanced, which may affect the data distribution. Secondly, the experiment was conducted in a controlled environment, so the results need to be interpreted in the context of a laboratory, not direct industrial practice. Third, this study only measured cost efficiency as a performance indicator, while other aspects, such as creativity, design innovation, and product sustainability, have not been analyzed.

Based on these limitations, future research is recommended to use a more balanced and representative number of participants. Research can also be conducted in the context of real organizations to increase external validity. In addition, future studies should consider other performance dimensions, such as creativity and product competitiveness, to gain a more thorough understanding of the factors that influence the success of new product development.

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The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.