

THE INFLUENCE OF GREEN HRM AND RESPONSIVE BOUNDARY-SPANNING ON WORKER PRODUCTIVITY MEDIATED BY GREEN INNOVATION IN FIVE-STAR HOTELS IN TABANAN

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Abstract:

The growth of the hospitality industry in Bali, particularly five-star hotels in Tabanan, requires improvements in employee productivity through sustainable management practices. This study aims to analyze the influence of Green Human Resource Management (Green HRM) and responsive boundary-spanning on worker productivity, with green innovation as a mediating variable. This quantitative research used survey data collected from 200 employees of five-star hotels in Tabanan through a Likert-scale questionnaire. Data were analyzed using Structural Equation Modeling (SEM) to test the relationships among the variables. The results indicate that Green HRM and responsive boundary-spanning have a significant positive effect on green innovation and worker productivity. In addition, green innovation is found to mediate the relationship between Green HRM and worker productivity, as well as between responsive boundary-spanning and worker productivity. These findings affirm that environmentally oriented HR practices, the organization's ability to respond to external dynamics, and the adoption of green innovation are strategic factors in strengthening operational efficiency and hotel competitiveness. This study provides theoretical and practical contributions for the hospitality industry in developing sustainability policies that are oriented toward employee performance.

Keywords: Green HRM, Responsive Boundary-Spanning, Green Innovation, Worker Productivity

INTRODUCTION

Over the past two decades, Indonesia's tourism and hospitality sector has experienced substantial development and has become one of the main pillars of the national economy. This growth is reflected in the increasing number of tourist arrivals, the expansion of investments, and the strengthening of supporting destination infrastructure (Wachyuni & Kusumaningrum, 2020). These dynamics have driven changes in tourist behavior, with visitors increasingly demanding more personalized services, high-quality experiences, and elevated standards of comfort. Such shifts in preferences require the hotel industry to adapt through service innovation, improvements in operational quality, and the differentiation of guest experiences (Ogunnaike et al., 2022). In addition, advances in digital technology have accelerated the transformation of consumer behavior, particularly in information search, booking processes, and the provision of reviews, thereby requiring hotels to strengthen their adaptive capacity toward changing patterns of tourist interaction (Kim & Kim, 2022).

In the context of intensifying industrial competition, the ability of hotels to maintain service quality and create added value has become increasingly critical. Superior, responsive, and personalized service is known to contribute significantly to the formation of customer loyalty and



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hotel competitiveness (Chang & Lin, 2024). A key internal factor determining the success of such services is worker productivity. In the hospitality sector, worker productivity is directly related to operational effectiveness, service quality, and hotel reputation (Choi & Kim, 2024). Empirical evidence shows that worker productivity not only affects individual work efficiency but also plays an important role in service innovation and the effectiveness of working relationships, which collectively reinforce the hotel's competitive position (Al-Sabi et al., 2023). Likewise, organizational support and a conducive work system exert a strong influence on the quality of work outcomes and the sustainability of hotels' competitive advantage (Dorta-Afonso et al., 2021).

As a leading tourism destination, Bali has recorded a significant post-pandemic recovery, with more than 5.2 million international tourist arrivals in 2023 (BPS, 2023). The occupancy rate of star-rated hotels, reaching 57.43%, reflects high demand for quality accommodation services. Tabanan, as one of the regions with growing accommodation investment, recorded more than 3.3 million tourist visits, thereby intensifying competitive pressure on five-star hotels in maintaining operational efficiency and service quality. With only four five-star hotels in operation, the demand for high worker productivity has become increasingly strategic for sustaining service quality and reputation (Dinas Pariwisata Provinsi Bali, 2024).

In responding to these challenges, sustainability-oriented human resource management approaches such as Green Human Resource Management (Green HRM) have become highly relevant. Green HRM promotes environmentally friendly practices through recruitment, training, performance appraisal, and reward systems, and has been shown to enhance pro-environmental work behavior and worker productivity (Zihan & Makbul, 2024). Several studies affirm that Green HRM plays a strategic role in driving green innovation—namely product, process, and managerial innovations oriented toward sustainability—which in turn reinforces operational efficiency and organizational performance (Papademetriou et al., 2023; AlKetbi & Rice, 2024).

Furthermore, responsive boundary-spanning practices—defined as the ability of organizations or individuals to access and integrate information from external sources such as customers, suppliers, and industry partners—make an important contribution to the emergence of green innovation (Sun et al., 2025). Boundary-spanning expands an organization's capacity to capture cross-boundary knowledge that supports the implementation of environmentally friendly solutions and the improvement of work processes. In the dynamic hotel industry, the ability to absorb external insights adaptively is crucial for strengthening innovation and worker productivity.

Although the relationships among Green HRM, responsive boundary-spanning, and green innovation have been widely examined, empirical studies that specifically investigate the influence of these three variables on worker productivity in the context of five-star hotels remain limited, particularly in the Tabanan area. Therefore, this study is important to fill the existing literature gap and provide a more comprehensive understanding of how sustainable management practices and external collaboration can affect worker productivity as a fundamental factor in the success of the hospitality industry.

Green Human Resource Management (Green HRM). Green Human Resource Management (Green HRM) refers to human resource management practices that integrate sustainability principles into HR functions such as recruitment, training, performance appraisal, and compensation (Emilisa, 2020). These practices contribute to the development of pro-environmental work behavior and an organizational culture that supports resource efficiency (Zihan & Makbul, 2024). Other findings indicate that Green HRM not only enhances organizational innovation through the strengthening of environmental strategies but also promotes employee retention and operational sustainability (Housheya & Atikbay, 2025; Lin et al., 2024a). In terms of implementation, Green HRM

is shaped by stakeholder pressure, top management support, organizational culture, reward systems, and organizational capacity (Jamal et al., 2021; Gazi et al., 2024).

The dimensions of Green HRM in this study follow the model of Emilisa (2020) – green competencies, green attitudes, green behavior, and green results – as it provides a comprehensive depiction of the integration of sustainability into HR practices.

Responsive Boundary-Spanning Search. Responsive boundary-spanning search is the process of seeking, absorbing, and utilizing external knowledge to respond to environmental dynamics (Ze et al., 2018). This activity enables organizations to create adaptive and sustainable innovation through the integration of cross-boundary information related to markets, technology, and changes in the external environment (Wang et al., 2022; Cao et al., 2021). In addition, responsive boundary-spanning search has been shown to strengthen green innovation, particularly when combined with technological capabilities such as artificial intelligence (Sun et al., 2025).

The dimensions used in this study are market responsiveness and technological responsiveness (Duan et al., 2020), as these are the most relevant in explaining an organization's ability to respond adaptively to external dynamics.

Green Innovation. Green innovation refers to the development of products, processes, or managerial systems aimed at reducing environmental impact through energy efficiency, waste reduction, and the use of clean technologies (Citrahartani & Dewi, 2023). The success of green innovation is influenced by a combination of internal factors – such as leadership, innovation culture, and organizational capabilities – and external pressures, including regulatory requirements and customer demands (Cao et al., 2021). In addition to enhancing environmental performance, green innovation has also been shown to strengthen firms' financial and operational performance (Liu et al., 2024; Chen & Jin, 2023).

The dimensions of green innovation in this study follow Chen et al. (2016), namely green product innovation, green process innovation, and green managerial innovation, as they offer a more comprehensive scope for understanding sustainable innovation.

Worker Productivity. Worker productivity reflects employees' ability to generate output efficiently and effectively by utilizing available resources. Worker productivity is influenced by work engagement, intellectual capital, environmental practices, and performance measurement systems that are oriented toward sustainability (Abdelwahed & Doghan, 2023; Khalil et al., 2024; Nugent & Radicic, 2023). The physical, psychological, and social work environment also plays an important role in creating conducive conditions for improving productivity (Bahmani & Kumar, 2024).

The dimensions of worker productivity in this study refer to employee empowerment, teamwork, and employee training, as well as physical, psychological, and social aspects, because the combination of these two groups of dimensions is considered the most representative for explaining employee productivity comprehensively.

Conceptual Framework. The conceptual framework of this study is built upon the theoretical relationships among Green Human Resource Management (Green HRM), Responsive Boundary-Spanning (RBS), Green Innovation (GI), and Worker Productivity (WP). Green HRM is viewed as a strategic practice that integrates sustainability values into human resource management, and has been shown in various studies to enhance green innovation and employee performance (Alreahi et al., 2023; Elshaer et al., 2024). On the other hand, responsive boundary-spanning search represents an organizational mechanism for adaptively acquiring external knowledge, which plays an important role in strengthening green innovation and operational effectiveness (Duan et al., 2020; Sun et al., 2025).



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Green Innovation then functions as a mediating variable that bridges the effects of Green HRM and RBS on worker productivity, as the implementation of environmentally based innovation creates work processes that are more efficient, safe, and environmentally friendly (Liu et al., 2024; Chen & Jin, 2023). Meanwhile, Worker Productivity is influenced by work engagement, the work environment, and management practices that promote innovation and efficiency (Abdelwahed & Doghan, 2023; Nugent & Radicic, 2023). Accordingly, the conceptual framework of this study positions Green Innovation as a key mechanism linking the effects of Green HRM and RBS to worker productivity.

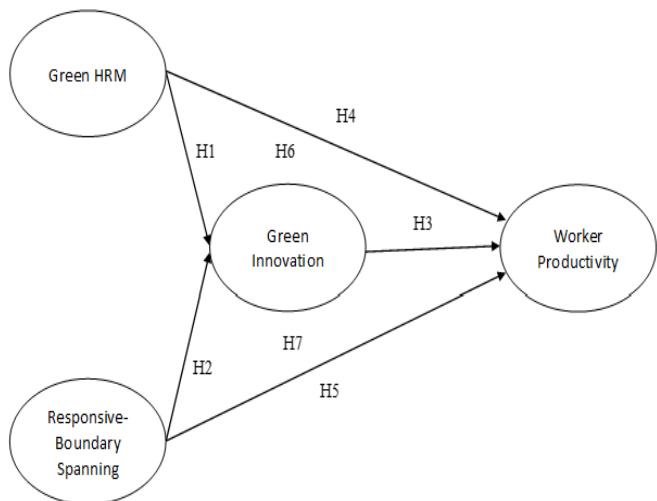


Figure 1. Conceptual Framework

Hypotheses.

H1 - Green HRM → Green Innovation. Green HRM strengthens green innovation through environmentally oriented training, recruitment, and performance management practices. Previous studies show that Green HRM significantly enhances organizational creativity and innovation (Alreahi et al., 2023; Elshaer et al., 2024).

H1: Green HRM has a positive effect on Green Innovation.

H2 - Responsive Boundary-Spanning → Green Innovation. Responsive boundary-spanning provides access to cross-boundary information that supports the development of green innovation. Prior research confirms that external knowledge search activities enhance innovation and the adoption of environmentally friendly solutions (Duan et al., 2020; Sun et al., 2025).

H2: Responsive Boundary-Spanning has a positive effect on Green Innovation.

H3 - Green Innovation → Worker Productivity. Green innovation creates work processes that are more effective and efficient, thereby improving employee productivity. Green innovation has been shown to enhance operational performance and the quality of work outcomes (Becker, 2023; Li & Ibrahim, 2024).

H3: Green Innovation has a positive effect on Worker Productivity.

H4 - Green HRM → Worker Productivity. Green HRM practices increase motivation, positive work behavior, and employee retention, thus directly contributing to higher productivity. Green HRM also encourages compliance with efficient operational procedures (Uslu et al., 2023; Hassanein et al., 2024).

H4: Green HRM has a positive effect on Worker Productivity.

H5 - Responsive Boundary-Spanning → Worker Productivity. Responsive boundary-spanning enhances access to information, coordination, and cross-boundary solutions that improve



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work effectiveness. Employees engaged in boundary-spanning activities are found to be more proactive and productive (Zhang et al., 2023; Xue & Woo, 2022).

H5: Responsive Boundary-Spanning has a positive effect on Worker Productivity.

H6 - Green HRM → Worker Productivity through Green Innovation. Green HRM fosters the emergence of green innovation that contributes to improved work processes and efficiency. Therefore, green innovation functions as a mediating mechanism that strengthens the effect of Green HRM on productivity (Makumbe, 2024; Hajj Hussein & Bou Zakhem, 2024).

H6: Green HRM has a positive effect on Worker Productivity through the mediation of Green Innovation.

H7 - Responsive Boundary-Spanning → Worker Productivity through Green Innovation. Boundary-spanning activities generate green innovations that increase efficiency. Boundary-spanning activities generate green innovation that enhances operational efficiency and supports productivity. Green innovation serves as a key mechanism that bridges the relationship between RBS and employee performance (Yin & Jiang, 2024; Sun et al., 2025).

H7: Responsive Boundary-Spanning has a positive effect on Worker Productivity through the mediation of Green Innovation.

METHODS

This study employed a quantitative approach with a hypothesis-testing design to examine the effects of Green Human Resource Management (Green HRM) and Responsive Boundary-Spanning on Worker Productivity through the mediation of Green Innovation among employees of five-star hotels in Tabanan. This approach follows the methodological references of Gazi et al. (2025) and Sun et al. (2025). Data were collected cross-sectionally during October–November 2025, with the individual as the unit of analysis, and were obtained in the actual work environment, thereby classifying the study as having a non-contrived setting (Sekaran & Bougie, 2016). The relationships among the constructs were analyzed as correlational in nature, as the study aimed to identify significant associations among the research variables (Cooksey, 2020).

There are four main variables in this study, namely Green HRM and Responsive Boundary-Spanning as independent variables, Worker Productivity as the dependent variable, and Green Innovation as the mediating variable. All variables were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The measurement instrument was adapted from Liu and Tong (2022), consisting of 5 items for Green HRM, 4 items for Responsive Boundary-Spanning, 5 items for Green Innovation, and 5 items for Worker Productivity. Data were collected through an online questionnaire, with primary data obtained directly from respondents and secondary data sourced from supporting literature (Hair et al., 2020; Amalia et al., 2022).

The sampling technique used was purposive sampling based on criteria relevant to the research context. The sample size was determined using the general rule of 5–10 times the number of indicators (Hair et al., 2020); with 19 statement items, the required sample ranged between 95 and 190 respondents. This study used 200 respondents, which is considered adequate for further analysis (Robinson, 2014).

Prior to structural analysis, validity and reliability tests were conducted. Validity was assessed using factor loadings with a threshold of ≥ 0.40 in accordance with Hair et al. (2019), and all indicators met this criterion. Reliability was examined using Cronbach's alpha with a cut-off value of ≥ 0.60 (Hair et al., 2019), and all variables were found to be reliable. Data analysis comprised descriptive statistics and Structural Equation Modeling (SEM) using AMOS. Model goodness-of-fit was evaluated using absolute fit, incremental fit, and parsimonious fit indices (Hair et al., 2020). The



evaluation results indicate that most indices fell within the good-fit category, suggesting that the model was suitable for further testing. Mediation was assessed using the Sobel test to confirm the role of Green Innovation in the relationships between the independent and dependent variables.

RESULT AND DISCUSSION

Descriptive analysis shows that all research variables fall into the high category. Green HRM has an average score of 3.74, Responsive Boundary-Spanning 3.79, Green Innovation 3.87, and Worker Productivity 3.91. These results indicate that green management practices, responsive boundary-spanning capabilities, and the implementation of environmentally friendly innovation are positively perceived by employees of five-star hotels in Tabanan. This condition also reflects that worker productivity is at a favorable level within the premium hotel environment.

The results of the model estimation using Structural Equation Modeling (SEM) indicate that the research model satisfies most goodness-of-fit criteria and is therefore suitable for hypothesis testing. All main path coefficients are statistically significant. First, Green HRM has a positive effect on Green Innovation ($\beta = 0.376$, $p < 0.05$), meaning that the stronger the implementation of green HR practices, the higher the level of sustainable innovation. Second, Responsive Boundary-Spanning also shows a positive effect on Green Innovation ($\beta = 0.483$, $p < 0.05$). This finding underscores the role of boundary-spanning capabilities in facilitating the development of environmentally friendly innovation.

Furthermore, Green Innovation has a positive effect on Worker Productivity ($\beta = 0.263$, $p < 0.05$), indicating that the adoption of environmentally friendly technologies and processes directly contributes to employee performance effectiveness. In terms of direct effects, Green HRM is found to enhance Worker Productivity ($\beta = 0.313$, $p < 0.05$), and Responsive Boundary-Spanning likewise exhibits a significant positive effect on productivity ($\beta = 0.318$, $p < 0.05$).

The mediation test results show that Green Innovation partially mediates the relationship between Green HRM and Worker Productivity ($\beta_{\text{indirect}} = 0.099$, $p < 0.05$), as well as the relationship between Responsive Boundary-Spanning and Worker Productivity ($\beta_{\text{indirect}} = 0.127$, $p < 0.05$). Thus, green innovation functions as an important mechanism that strengthens the impact of green management practices and boundary-spanning capabilities on worker productivity.

The Influence of Green HRM on Green Innovation. The findings of this study show that Green HRM has a significant positive effect on Green Innovation. This result is consistent with the findings of Gazi et al. (2025), Amrutha and Geetha (2021), and Housheya and Atikbay (2025), who emphasize that sustainability-oriented HR practices – including environmental training, ecology-based performance appraisal, and the integration of green values into recruitment – enhance organizations' capacity for innovation. In the hospitality context, the implementation of green HR training and policies fosters stronger environmental awareness, thereby encouraging the emergence of innovative ideas related to energy efficiency, waste reduction, and the use of environmentally friendly materials.

It implies that investment in sustainability-based human resources is crucial for maintaining the competitiveness of five-star hotels in Tabanan. These findings are in line with Tonay and Murwaningsari (2023), who state that Green HRM practices strengthen innovative behavior by enhancing environmental awareness, green training, and organizational support for sustainability initiatives. Such sustainability-based HR approaches create a work culture that is conducive to the emergence of environmentally friendly ideas, thereby reinforcing the relationship between Green HRM and Green Innovation.



The Influence of Responsive Boundary-Spanning on Green Innovation. In addition to green HR practices, Responsive Boundary-Spanning capabilities are also proven to enhance Green Innovation. Boundary-spanning facilitates the exchange of external knowledge, the monitoring of industry trends, and benchmarking against competitors. Sun et al. (2025) emphasize that cross-boundary knowledge search expands an organization's capacity to adopt environmentally friendly innovations. The findings of this study are also in line with Ma et al. (2022), who show that employee involvement in boundary-spanning activities enables organizations to respond more adaptively to sustainability demands. In the highly competitive hotel industry, the ability to work across boundaries becomes a strategic asset for acquiring more up-to-date ideas in the development of green technologies.

The Role of Green Innovation in Driving Worker Productivity. Green Innovation is found to have a positive effect on Worker Productivity, indicating that environmentally oriented innovation not only generates ecological benefits but also enhances performance effectiveness. This result is consistent with Yu et al. (2020) and Misik and Nagy (2025), who reveal that work environments supported by environmentally friendly technologies can reduce manual workload, improve work processes, and increase employee satisfaction. Therefore, the implementation of innovations such as energy-efficient technologies or environmentally friendly procedures can enhance the productivity of employees in five-star hotels.

Direct Influence of Green HRM on Worker Productivity. The direct effect of Green HRM on Worker Productivity indicates that sustainable human resource management practices can strengthen employees' commitment and motivation. Renwick et al. (2013) and Kim et al. (2020) emphasize that HR policies that highlight environmental responsibility create a positive perception of the organization, which ultimately enhances performance-related behavior. In the context of this study, employees who perceive strong organizational support for the development of green capabilities tend to exhibit higher productivity, both in terms of task accomplishment and in contributing innovative ideas.

Direct Influence of Responsive Boundary-Spanning on Worker Productivity. The findings also show that Responsive Boundary-Spanning has a significant effect on Worker Productivity. Employee interactions with external stakeholders and their ability to access market knowledge are proven to enhance operational agility and work effectiveness. Lee et al. (2023) and Wang et al. (2022) state that boundary-spanning behavior strengthens decision-making, creativity, and problem-solving capabilities. It underscores the need for actors in the hospitality industry to encourage boundary-spanning practices in order to sustain competitive advantage and productivity.

The Mediating Role of Green Innovation. Green Innovation functions as a partial mediator in the relationships between Green HRM and Responsive Boundary-Spanning and Worker Productivity. This finding supports previous theoretical models, which posit that sustainable innovation is a central mechanism linking green HR practices and boundary-spanning capabilities to performance outcomes (Bahmani et al., 2023; Sun et al., 2025). Without concrete innovation, green HR practices and boundary-spanning capabilities cannot be fully optimized to drive productivity. Accordingly, organizations need to ensure that sustainability strategies are translated into tangible innovations in work processes, technologies, and hotel operations.

CONCLUSION

This study aimed to analyze the effect of Green Human Resource Management (Green HRM) and Responsive Boundary-Spanning on Worker Productivity, with Green Innovation as a mediating



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variable, among employees of five-star hotels in Tabanan. Based on the results of Structural Equation Modeling (SEM), several key findings were obtained.

First, Green HRM is found to have a significant positive effect on Green Innovation, indicating that environmentally oriented HRM practices can stimulate the emergence of innovative ideas and processes within organizations. Second, Responsive Boundary-Spanning also has a significant positive effect on Green Innovation, confirming that the use of external information, benchmarking, and cross-boundary interactions can strengthen hotels' capability to develop environmentally friendly innovations. Third, Green Innovation significantly affects Worker Productivity, meaning that green innovation not only generates ecological benefits but also enhances employee effectiveness and performance.

Furthermore, both Green HRM and Responsive Boundary-Spanning are shown to have direct effects on Worker Productivity. It indicates that these practices not only enhance innovation capacity but also directly contribute to productivity by improving employees' motivation, task accuracy, and problem-solving capabilities.

Finally, Green Innovation is proven to act as a mediating variable in the relationship between Green HRM and Worker Productivity, as well as between Responsive Boundary-Spanning and Worker Productivity. This finding highlights innovation as a key mechanism linking sustainable management strategies to improved performance. Overall, this study affirms that the success of hotels in enhancing worker productivity is strongly influenced by the integration of sustainable HR practices, responsiveness to external environmental dynamics, and the ability to generate relevant and applicable green innovations.

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