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ENHANCING SUSTAINABLE PERFORMANCE THROUGH GREEN HRM: THE MODERATING AND MEDIATING ROLES OF GREEN SKILLS AND COMPETENCIES IN INDONESIA'S PUBLIC BROADCASTING SECTOR

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Abstract

This study examines the role of Green Human Resource Management (GHRM) in enhancing Sustainable Performance within a public broadcasting institution, focusing on the mediating role of Green Competencies and the moderating effect of Green Skills. Grounded in the Ability–motivation–opportunity (AMO) framework, this study uses SmartPLS 4 to analyze data collected from 162 employees of TVRI, Indonesia's national public broadcaster. The results show that GHRM has a positive and significant effect on Sustainable Performance, both directly and through Green Competencies ($\beta = 0.251$; $p = 0.0419$), although the effect sizes remain modest. Green Skills significantly moderated the relationship between GHRM and both Sustainable Performance ($\beta = 0.207$; $p = 0.046$) and Green Competencies ($\beta = 0.191$; $p = 0.031$), reinforcing their strategic importance in translating HR policies into measurable environmental outcomes. The findings contribute theoretically by positioning Green Competencies as both outcomes and mechanisms within sustainability-focused HR models and offer managerial insights for integrating green HR practices into public sector strategies. The limitations and directions for future research are also discussed.

Keywords: Green Human Resource Management (GHRM), Green Competencies; Green Skills; Sustainable Performance; AMO Framework.

1. Introduction

In recent years, sustainability has become a global priority across sectors, urging organizations to adopt strategies that align with their environmental goals. Green Human Resource Management (GHRM) has emerged as a pivotal framework that incorporates environmental sustainability into core human resource (HR) practices, such as recruitment, training, performance evaluation, and compensation, to foster green behavior and enhance Sustainable Performance (SP)(Jabbour, C. J. C., & Santos, 2020; Paillé et al., 2020; N. T. Pham, Chiappetta Jabbour, et al., 2020). Public broadcasting organizations, such as TVRI, hold a dual mandate: to inform and educate the public and to model sustainable practices in their operations. Despite this strategic positioning, the effectiveness of GHRM within such institutions remains underexplored, especially in relation to individual-level drivers such as Green Skills and Green Competencies. Prior studies have emphasized the direct effects of GHRM on sustainability outcomes Howe et al.. J. C., & Santos, 2020; D. W. S. Renwick, 2020) yet little is known about the moderating influence of employee-level capabilities within this relationship (Ghosh, 2024; Noor et al., 2023; Tirno et al., 2023).

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Green Skills refer to the technical knowledge and operational proficiencies necessary to support environmentally sustainable tasks, whereas Green Competencies include a broader range of capabilities, such as attitudes, values, and behavioral intentions aligned with environmental responsibility (Ababneh, 2021; Agarwal & Kapoor, 2023; Rustiarini et al., 2022; Shoaib et al., 2022a). These elements are particularly critical in state-owned enterprises (SOEs) such as TVRI, where institutional mandates often align with national environmental objectives.

This study employs the Ability-Motivation-Opportunity (AMO) theory to explore the interlinkages between organizational practices and employee behavior. In this framework, Green Skills and Green Competencies are positioned within the "ability" component and are hypothesized to strengthen the relationship between GHRM practices and Sustainable Performance (R. Iqbal et al., 2023; Marin-Garcia & Tomas, 2019). Despite its applicability, AMO theory has rarely been extended to include green constructs in public-sector HRM contexts.

Thus, this study addresses three major gaps in the literature: First, it introduces Green Skills and Green Competencies as dual moderators rather than as mediators or control variables in the relationship between GHRM and SP, an approach that has not yet been widely adopted. Second, it focuses on TVRI as a unique public broadcasting entity, offering a new context for examining GHRM's strategic value of GHRM in the public sector (Amrutha & Geetha, 2020; Zihan & Makhbul, 2024). Third, it contributes to the literature by broadening the AMO model through the integration of environmental abilities, advancing our understanding of how individual readiness influences strategic HR outcomes.

The urgency of this research is underscored by TVRI's pivotal role in the national sustainability discourse. As a government-owned broadcaster, TVRI not only disseminates messages aligned with the Sustainable Development Goals (SDGs) but also bears the responsibility of institutionalizing these principles internally. Understanding how GHRM practices can be augmented by Green Skills and Competencies provides essential insights for developing HR strategies that support long-term environmental sustainability in the public sector.

By investigating the moderating effects of Green Skills and Green Competencies, this study fills a crucial gap in the literature and offers a theoretically grounded, empirically validated contribution to sustainable HRM research. The findings are expected to inform both academic inquiry and organizational policy, particularly in state-owned and mission-driven institutions such as TVRI.

Green Skills refer to employees' knowledge and abilities in sustainable work practices, such as energy efficiency, waste management, and environmentally friendly decision-making (ILO, 2022). Green Competencies encompass a range of behavioral, technical, and strategic skills that enable individuals to contribute to environmental initiatives (Chiappetta Jabbour et al., 2019). These competencies are crucial for achieving the transformational impact of GHRM. As organizations shift to more sustainable models, the workforce's ability to internalize and operationalize green values becomes a key determinant of success. In the context of GHRM, Green Skills and Green Competencies embody the "ability" dimension, influencing the extent to which individuals engage with green HR policies. Therefore, understanding their moderating role is crucial for assessing the actual impact of GHRM on organizational sustainability (Appelbaum et al., 2020).

This research focuses on Public Television Media in Indonesia, a broadcasting institution, both public and private, with a unique position in shaping public perception and societal values. Despite having a public mandate, television media in Indonesia faces modern challenges such as declining viewership, limited content innovation, and increased competition from digital platforms such as YouTube and

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TikTok. In this context, aligning internal capabilities with environmental and social missions has become not only desirable but also necessary for the survival and relevance of institutions. Moreover, the urgency for public organizations to lead sustainable development has never been greater (He et al., 2021). By examining the moderating effects of Green Skills and Green Competencies on the relationship between GHRM practices and sustainable performance, this study aims to bridge the theoretical gap and provide actionable insights for public institutions seeking to optimize human resources to support sustainability goals.

2. Literature Review

The Ability-Motivation-Opportunity (AMO) theory (Carballo-Penela et al., 2023; Marin-Garcia & Tomas, 2019) posits that individual performance is driven by ability, motivation, and opportunity (AMO). In this study, Green Skills and Green Competencies represent the "ability" component, serving as key moderators that enhance the impact of Green HRM practices on Sustainable Performance. Green Skills include technical knowledge, such as energy efficiency and waste management (He et al., 2021; Shaha Faisal, 2023), whereas Green Competencies encompass broader behavioral attributes supporting environmental responsibility (Ababneh, 2021). The model is applied to TVRI, a public broadcaster, to explore HRM's strategic alignment of HRM with sustainability goals in the public sector.

2.1 Sustainable Performance

Sustainable Performance (SP) refers to an organization's ability to achieve excellence not only in economic terms but also in its environmental and social responsibilities(Sakharina et al., 2020). This is strongly aligned with the Triple Bottom Line (TBL) framework, which integrates profit, people, and planet dimensions to deliver a balanced performance outcome (Ali et al., 2023). Wongleedee (2020) emphasized that SP enables organizations to meet current stakeholder needs without compromising future generations. Yadav, R., & Rahman (2020) highlighted SP as a long-term strategy that integrates innovation and environmental adaptation to create sustainable value.

The strategic management of SP involves not only economic goals but also social responsibility and environmental stewardship (Muñoz-Pascual et al., 2020). It reflects the synergy between operational efficiency, environmental sustainability, and social impact (Shoaib et al., 2022b), incorporating CSR, green innovation, and sustainable strategies (Acosta-Prado et al., 2023; Inthavong et al., 2023). Companies focusing on SP enhance eco-friendly innovation, resource efficiency, and stakeholder relationships (Q. Iqbal et al., 2021). Supply chain integration is essential for simultaneously improving economic, environmental, and social value (M. H. Khan & Muktar, 2024).

Furthermore, Obeidat et al. (2023) and Olaleye et al. (2023) noted that sustainable performance is measured using holistic indicators such as the Sustainability Balanced Scorecard, operational resource efficiency, and environmental impact. SP emphasizes long-term resilience in the face of climate change and regulatory shifts while maintaining business efficiency (Awwad Al-Shammari et al., 2022; Shameem et al., 2023). In the GHRM context, SP is associated with improved employee productivity and environmental awareness (Ali et al., 2023). SP includes innovation and social impact through technological advancement and CSR efforts (Hmeedat & Albdareen, 2022; Kurniawan et al., 2023; Malik et al., 2021a; Tanveer et al., 2023).

A wide range of indicators is used to assess Sustainable Performance. These include the Triple Bottom Line(Goh et al., 2020), which evaluates economic, social, and environmental outcomes; the Global Reporting Initiative (Cachón-Rodríguez et al., 2022; Oppong, 2022), which promotes transparent sustainability reporting; and ISO 14001(Szabó et al., 2023), which provides a framework for effective

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environmental management. The United Nations' Sustainable Development Goals (Achi et al., 2022) serve as benchmarks for sustainability across various dimensions. CSR reporting (Iglesias et al., 2020), Environmental Performance Indicators(Ababneh, 2021), Social Indicators(Sipahi Dongul & Artantaş, 2023), and Economic Indicators (JJean Claude Mutiganda et al., 2022) further contribute to comprehensive sustainability assessments. Moreover, stakeholder engagement (Verma, 2023)(Purnamawati et al., 2022) and innovation metrics (Annamalah et al., 2022; Khalil et al., 2022) provide insights into organizational responsiveness, inclusivity, and progress in sustainable innovation.

2.2 Green competencies

Green competencies refer to the knowledge, skills, and attitudes necessary to support and implement environmentally friendly practices and promote sustainability within organizations (Sakharina et al., 2020). These competencies enable individuals to engage in clean technology innovation and develop a deep understanding of sustainability principles across all sectors. Specifically, green competencies highlight the sustainable management of natural resources, including the adoption of eco-friendly agricultural practices (Mirˇceti et al., 2022).

Green competencies, defined as the ability to incorporate environmental considerations into organizational decision-making, contribute to the formulation of environmentally and socially responsible business strategies (Ogunmokun & Eniola, 2020). In the construction sector, for instance, these competencies encompass the skills and knowledge essential for designing and constructing energy-efficient and environmentally sustainable buildings (Tanveer et al., 2024).

Moreover, green competencies include ecological awareness, environmental education, sustainable living practices, and the application of sustainability principles in everyday work(Cabral & Jabbour, 2020). Within the management domain, they involve the integration of sustainability into business strategies and operational processes, as well as the ability to measure and report environmental impacts (Hosain & Rahman, 2020). These competencies are vital for fostering innovation and creating environmentally conscious products and services, which can be developed through formal education, training programs, and relevant hands-on experiences (Hussain & Pani, 2021).

As labor markets shift towards greener economies, green competencies are increasingly in demand across various sectors, from manufacturing to services(Pinzone et al., 2020). Education plays a crucial role in developing these competencies, equipping individuals with the ability to understand complex environmental challenges and create sustainable solutions (M. K. Khalil & Muneenam, 2021). Therefore, green competencies are essential for supporting green economic transitions and sustainable employment. They improve environmental awareness and corporate sustainability performance, as well as working conditions and organizational competitiveness (Paillé et al., 2020; D. W. S. Renwick, 2020; Yafi et al., 2021). Accordingly, human capital development strategies must prioritize sustainability-focused training and capacity-building (Ogbeibu et al., 2021).

In the television media industry, green competencies include specific knowledge and technical abilities designed to embed sustainability into broadcasting operations (Abdelkareem et al., 2024; Dalla Valle et al., 2024; Nugroho et al., 2022). These involve understanding environmental issues, adopting greenn production practices, leveraging energy-efficient technologies, and creating sustainability-oriented content. Media professionals are also expected to engage with communities, promote environmental campaigns, and collaborate with environmental NGOs. Assessing green competencies in media organizations, especially television, has become increasingly critical in evaluating the environmental integrity of operations. Measurement indicators include sustainability training programs, employee

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participation in green workshops, and the use of eco-friendly production technologies (Abdelkareem et al., 2024)(Ali et al., 2023). Other dimensions include sustainable content creation, environmental audits, employee engagement in green initiatives, and implementation of internal environmental policies (Bombiak, 2020; Cabral & Jabbour, 2020; Hosain & Rahman, 2020; Ogbeibu et al., 2021; Tanveer et al., 2024).

Furthermore, green competencies are reflected in stakeholder engagement, carbon footprint monitoring, participation in community-based environmental activities and recognition through sustainability awards and audience feedback (Dalla Valle et al., 2024; Nugroho et al., 2022; Yafi et al., 2021). These indicators provide a comprehensive framework for evaluating green competencies and ensuring continuous organizational improvement in sustainability goals.

Green Human Resource Management (GHRM) plays a fundamental role in fostering green competencies by enhancing employees' environmental awareness, skills, and behavior. This is achieved through green recruitment, training programs, and sustainability-oriented performance assessments (Aust et al., 2020; Tanveer et al., 2024). For instance, green training programs aim to improve technical competencies related to environmentally responsible practices and technologies (Bombiak 2020). In addition, GHRM promotes a supportive organizational climate by rewarding employees who contribute to environmental targets (Agarwal & Kapoor, 2023; Fauzi et al., 2023), thus nurturing competencies related to green consumer behavior and environmental responsibility. This encourages a culture of innovation and sustainability values that are aligned with corporate goals (Abdelkareem et al., 2024; Yafi et al., 2021). Several empirical studies confirm the significant impact of GHRM on green competencies, reinforcing its relevance in achieving sustainable organizational performance (Fauzi et al., 2023; Mirˇceti et al., 2022; Yafi et al., 2021; Yang & Li, 2023).

2.3 Green Skills

Green skills encompass the knowledge, abilities, values, and attitudes that support the transition to a green economy, with an emphasis on reducing environmental impact, increasing resource efficiency, and ensuring long-term sustainability (Kandil, 2023; Vuk Mirˇceti et al., 2022). These skills include technical competencies such as renewable energy management, green technological innovation, and waste recycling, as well as soft skills such as collaboration, leadership, and sustainability-based decision-making (Awwad Al-Shammari et al., 2022). Importantly, green skills are essential not only in green sectors but also across all industries aiming to implement sustainable practices (Gardas et al., 2020; Ogunmokun & Eniola, 2020; Setyaningrum & Muafi, 2023).

In the television industry, green skills are crucial for promoting sustainable operations, production, and distribution. These competencies enable workers to utilize energy-saving technologies, sustainably manage production waste, and adopt recyclable materials (Kandil, 2023; Yafi et al., 2021). Furthermore, green skills contribute to digitalization practices that minimize physical resource consumption, enhancing the industry's environmental accountability(Jasovska and Logue, 2021; Subramanian et al., 2020). Green skills also facilitate the creation of environmental awareness content and campaigns, strengthening public engagement while boosting corporatee reputation (Afzal et al., 2023; Hussai, & Pani, 2021). Nevertheless, challenges remain, including the high cost of green technology investment and limited awareness among media workers (Jabbour, C. J. C., & Santos, 2020). Thus, employee training, collaboration with environmental institutions, and renewable energy adoption are critical steps toward the effective integration of green skills (Subramanian et al., 2020).

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The measurement of green skills in the television media industry involves several key indicators. Technical competencies include energy-efficient technology use, waste management, and green equipment adoption. Environmental awareness reflects employees' understanding of sustainability and carbon footprint reduction strategies (Marques, 2020; Ren et al., 2018). Innovation and adaptability are measured by the adoption of AI-driven streaming systems and content that promotes environmental awareness (Li et al., 2022; Mian, 2023; Soesilo et al., 2023; Tolliver et al., 2021). Sustainability-related soft skills are represented by interdepartmental collaboration, green leadership, and the number of employee-led environmental initiatives (Kuncoro, 2020; Lepeley et al., 2021; Xuecheng et al., 2022). Operational efficiency is evaluated through energy/resource consumption reduction and a decline in non-recyclable materials (Chafekar et al., 2022; Nayak et al., 2021). Public impact is assessed through audience feedback and sustainability messages in media campaigns (Farooq et al., 2021; O'Neil, 2020). Compliance with environmental regulations is measured by adherence to national and global green standards (Zhang & Zhao, 2022).

Employee development is another major component, encompassing participation in green training programs and skills improvement (Bamfo et al., 2020; Lika, 2020; Provvidenza et al., 2020). Environmental Technical Skills (Yi & Ellis, 2023), Environmental Awareness (Abdelghani, 2020; Bugdol et al., 2021), Social Responsibility (Abu Zayyad et al., 2021; Kraus et al., 2020; Lee et al., 2020), and Adaptive Competencies (Abdelkareem et al., 2024; Spada et al., 2025) are integrated into green skills assessment to ensure environmentally conscious and regulation-compliant broadcasting practices. Collectively, these indicators form a strategic framework for evaluating and enhancing green skills in the television media sector, ensuring operational sustainability, and positioning the industry as a leading force in green transformation.

2.4 Green Human Resourche Manamagement

Green Human Resource Management (Green HRM) is a strategic approach to human resource practices that integrates environmental sustainability principles into organizational policies and procedures (Shoaib et al., 2021). It aims to minimize environmental impacts and foster employee awareness and active participation in sustainability initiatives. Green HRM encompasses various dimensions, including green recruitment, training, performance evaluation, and environmentally responsible compensation systems (Sukardi et al., 2023; Wongleedee, 2020). D. Renwick (2020), defines Green HRM as a set of policies designed to promote pro-environmental behavior among employees across all HRM functions. Malik et al., (2021b) emphasize that Green HRM encourages employee involvement in environmental initiatives, product innovation, and operational efficiency. It is not limited to internal policies but extends to shaping employee habits and environmental behavior (Tweneboa Kodua et al., 2022). Furthermore, Wongleedee (2020) highlights Green HRM as a transformative strategy for cultivating an environmentally conscious organizational culture.

Green human resource management (HRM) plays a crucial role in raising environmental awareness among employees. Carballo-Penela et al. (2023) and Saifudin et al. (2021) argue that sustainability-oriented training helps embed green values into corporate culture. Al-Ghazali and Afsar (2020) and Ansari et al. (2021) underscore the integrationn of sustainability in all HR processes, from hiring to performance management. Khatoon et al (2021) further stress Green HRM's contribution to mitigating environmental impacts through eco-friendly workplace policies and natural resource management training. Amjad et al (2021) assert that Green HRM involves embedding green practices throughout the HR cycle, from recruitment to rewards. Ana Labella-Fernández and Javier (2023) highlight the role of HRM in educating and motivating employees to support organizational sustainability goals. Agarwal

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and Kapoor (2023) added that Green HRM promotes green skills development to achieve ecological and social targets. Muisyo et al (2022) find that Green HRM enhances environmental performance by encouraging behaviors such as energy saving and waste reduction. Gharibeh (2019) supports this view, suggesting that it fosters environmental awareness as a core component of the organizational culture.

3. Hypotheses Development

3.1 Green Human Resourche Management And Sustainable Performance

Green Human Resource Management (GHRM) has emerged as a strategic driver of organizational sustainability by aligning human resource practices with environmental objectives. The integration of GHRM into organizational systems is strongly associated with the enhancement of Sustainable Performance, as both constructs are interdependent and synergistically support the realization of long-term sustainability goals (Bahmani et al., 2023; Wongleedee, 2020). Core GHRM practices, including green recruitment, environmental training, sustainability-aligned performance appraisals, and incentive systems based on ecological behavior, are designed to cultivate green competencies, stimulate environmental consciousness, and foster pro-environmental behavior among employees (Chaudhary, 2020).

Such initiatives facilitate a systemic shift toward environmental responsibility, leading to tangible outcomes, such as reduced carbon emissions, resource optimization, and the promotion of eco-innovation (Alhashmi et al., 2024; Awwad Al-Shammari et al., 2022; M. S. Malik et al., 2021a). The effectiveness of GHRM in achieving sustainable performance is further influenced by mediating constructs such as employee green competence and motivation, and moderated by contextual factors such as organizational culture that supports sustainability values (R. Iqbal et al., 2023; Yang & Li, 2023).

For example, targeted green training enhances employees' technical and behavioral capabilities in implementing environmentally efficient processes, whereas top management commitment reinforces the institutionalization of sustainability-oriented strategies across departments. These dynamics contribute to improved performance across environmental, social, and economic dimensions, which are hallmarks of sustainable development (Chaudhary, 2021; Freitas et al., 2020).

Empirical studies consistently affirm the positive association between GHRM practices and various sustainability outcomes, thus strengthening the theoretical foundation for their integration into strategic human capital development (Hmeedat & Albdareen, 2022; Khaskhely et al., 2022; Malik et al., 2021; Mousa & Othman, 2020). Given this background, the following hypothesis is proposed for empirical validation.

Hypothesis 1 (H1): Green Human Resource Management positively affects SP..

3.2 Grand Human Resourche Management And Green Competencies

Green Human Resource Management (GHRM) is fundamentally linked to the development of Green Competencies within organizations, as it plays a pivotal role in shaping the skills, attitudes, and behaviors necessary for environmental sustainability. Through key practices such as green recruitment, environmental training, and sustainability-oriented performance appraisal systems, GHRM facilitates the cultivation of employees' ecological knowledge and capabilities that are aligned with corporate sustainability objectives (Aust et al., 2020; Tanveer et al., 2024). For instance, green training programs are strategically designed to introduce environmentally friendly technologies and encourage the adoption of resource-efficient work practices, directly influencing the enhancement of employees' green competencies (Bombiak 2020).

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Moreover, GHRM fosters a supportive organizational climate for the development of green competencies by implementing reward and recognition systems that value employees' contributions to environmental goals (Agarwal & Kapoor, 2023; Fauzi et al., 2023). These mechanisms not only strengthen individual competencies, such as understanding eco-conscious consumer behavior and waste management skills, but also contribute to building an organizational culture that champions green innovation. Consequently, organizations benefit from a workforce that is not only technically proficient but also environmentally conscious and value-driven, thereby reinforcing long-term sustainability efforts (Abdelkareem et al., 2024; Agarwal and Kapoor, 2023; Fauzi et al., 2023; Yafi et al., 2021).

Empirical evidence corroborates the positive influence of GHRM on the development of green competencies in diverse organizational contexts (Fauzi et al., 2023; Vuk Mirˇceti, 2022; Yafi et al., 2021; Yang & Li, 2023). Based on this theoretical and empirical foundation, the following hypothesis is proposed:

Hypothesis 2 (H2): Green Human Resource Management positively affects Green Competencies.

3.3 Green Skills, GHRM and Green Competencies

Green Human Resource Management (GHRM) serves as a strategic enabler in developing Green Competencies through various environmentally focused HR practices, including green training, sustainable recruitment, and eco-based reward systems (Revianto, 2023; Shoaib et al., 2022b). These practices are intended to enhance employees' environmental knowledge, skills, and behaviors that align with the organization's sustainability agenda. However, the effectiveness of GHRM in fostering green competencies is not solely dependent on the design and implementation of organizational policies it also hinges on individual readiness and the existing level of environmental capability, commonly referred to as Green Skills (Huo et al., 2022; M. S. Malik et al., 2021a)

Green Skills are a critical moderating variable in the GHRM Green Competencies nexus. That is, the capacity of GHRM to enhance Green Competencies is significantly amplified when employees already possess a foundational understanding of sustainable practices and green technologies. For instance, employees with prior exposure to environmental technologies or resource management strategies are more likely to absorb and apply the content delivered through GHRM initiatives, thus accelerating their competency development (Huo et al., 2022; M. S. Malik et al., 2021a; Nureen et al., 2023; T. M. D. Pham, 2020; Tan et al., 2020; Tirno et al., 2023). Conversely, when Green Skills are underdeveloped, GHRM programs may face greater challenges in generating the desired outcomes, requiring additional investment in basic skill-building.

Therefore, Green Skills do not merely complement the development of Green Competencies but actively strengthen the impact of GHRM in achieving environmental objectives and broader organizational sustainability goals (Mobarez 2020; Terry et al. 2023). Recent empirical studies reinforce this perspective, indicating a significant moderating effect of Green Skills on the relationship between GHRM and Green Competencies (Abid et al., 2024; Dalla Valle et al., 2024; Herrador-Alcaide et al., 2024; Zihan & Makhbul, 2024). Based on these insights, the following hypothesis is proposed.

Hypothesis 3 (H3): Green Skills moderate the relationship between Green Human Resource Management and green competencies.

3.4 Green Skills , of GHRM and Sustainable Performance

Green Human Resource Management (GHRM) serves as a foundational mechanism in enhancing employee capacity to support organizational sustainability objectives (Al-Minhas et al., 2020; Awwad

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Al-Shammari et al., 2022). By embedding environmental values into HR functions such as green recruitment, eco-centric training programs, and environmentally driven reward systems, GHRM equips employees with the necessary knowledge and skills to perform environmentally responsible tasks (R. U. Khan et al., 2023; Shoaib et al., 2022a; Sukardi, et.al, 2023). Within this framework, Green Skills emerge as a crucial moderator that can intensify the influence of GHRM on Sustainable Performance.

Green Skills encompass a set of technical and soft competencies that enable employees to effectively understand, integrate, and operationalize sustainable practices in their daily work (Ahmed et al., 2023; Malik et al., 2021a; Munawar et al., 2022). These competencies not only amplify the efficiency of GHRM initiatives but also serve as direct contributors to Sustainable Performance, including resource efficiency, environmental compliance, and operational sustainability.

Organizations that prioritize the development of Green Skills through GHRM initiatives are better positioned to foster green innovation and generate environmental value aligned with long-term sustainability goals (Terry et al., 2023). For instance, comprehensive green training programs can improve employees' understanding of energy conservation, waste management, and eco-efficiency, resulting in measurable gains in sustainable performance. Accordingly, the synergy between robust GHRM strategies and high levels of Green Skills among employees plays a decisive role in achieving sustainable outcomes (Mobarez, 2020; Ur et al., 2021).

Recent empirical studies have confirmed the moderating role of Green Skills in the relationship between GHRM and Sustainable Performance (Alhashmi et al., 2024; Khaskhely et al., 2022; Islam, 2021). Based on this conceptual foundation, the following hypothesis is proposed.

Hypothesis 4 (H4): Green Skills moderate the relationship between Green Human Resource Management and sustainable performance.

3.5 Green Competencies and Sustainable Performance

Green Competencies refer to the integration of environmentally conscious knowledge, skills, and behaviors that enable employees to perform tasks aligned with ecological sustainability within the workplacee context (Sakharina et al., 2020; Vuk Mirˇceti, Tatjana Ivanovi, Snežana Kneževi, Vesna Bogojevi Arsi´, Tijana Obradovi, Darjan Karabaševi, Svetlana Vukoti, Tomislav Brzakovi, Miljan Adamovi, Stefan Milojevi, Marko Milašinovic, 2022). These competencies are increasingly recognized as strategic assets that contribute to Sustainable Performance, defined as an organization's ability to simultaneously achieve economic, social, and environmental objectives (Cabral & Jabbour, 2020; Tanveer et al., 2024). The core elements of Green Competencies include capabilities in resource management, eco-innovation, and practical understanding of environmental regulations and compliance standards.

Strengthening Green Competencies enhances an organization's ability to minimize ecological harm while improving operational effectiveness (Abdelkareem et al., 2024; Wahyuni et al., 2023). For example, employees with well-developed green competencies can identify actionable opportunities to reduce waste, optimize energy consumption and utilize more sustainable materials (Huo et al., 2022; Ismail, 2022; Wang et al., 2022). These behaviors not only support environmental goals but also contribute to improved performance outcomes such as cost reduction, enhanced brand reputation, and strengthened long-term viability.

Organizations that actively promote the development of Green Competenciesthrough structured learning, upskilling, and capacity-building initiatives are more capable of delivering on their

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Sustainable Performance commitments (Huo et al., 2022; Ismail, 2022; Joshi & Dhar, 2020; Kiranantawat & Ahmad, 2022; Wang et al., 2022). Empirical findings further reinforce this relationship, indicating that Green Competencies significantly contribute to achieving sustainable business results (Abdelkareem et al., 2024; Ali et al., 2023; Gull & Idrees, 2022; Subramanian & Suresh, 2023).

Based on this theoretical and empirical foundation, the following hypothesis is proposed:

Hypothesis 5 (H5): Green Competencies positively influence Sustainable Performance.

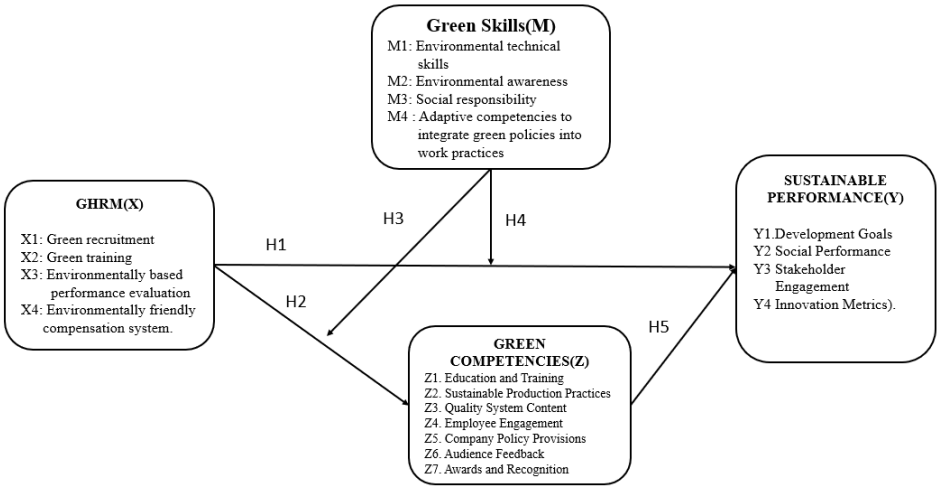
4. Research methods

4.1 Sample and data collection

This study adopts a quantitative research approach that relies on numerical data to objectively examine the relationships among variables. Data were collected and processed using statistical procedures to provide measurable explanations for the observed phenomena. The population of this study consists of all staff and employees at the state-owned enterprise TVRI, totaling 6,823 individuals (Syahza, 2020). The sampling technique employed was non-probability sampling, specifically saturated sampling, and the sample size was calculated using the Slovin formula with a 5% margin of error, resulting in a sample of 162 respondents. The sample distribution included 13 participants from the staff division, 5 from customer service, 14 from the technical department, and 5 from the security unit of the organization. According to Sugiyono(2020), a representative sample must accurately reflect the characteristics of the population. Noor (2020) further suggested that if the population exceeds 100 individuals, a sample size of 10–25% is considered acceptable. The collected data were analyzed using SmartPLS version 4 to evaluate the measurement model and assess the structural relationships among the variables.

5. Results and Discussion of Empirical Evidence

5.1 Model of Variable Measurement



Gambar 1 : Research Framework

The reflective measurement model was evaluated using four key psychometric criteria: indicator reliability, internal consistency, convergent validity, and discriminant validity, in accordance with established guidelines (Hair et al., 2020). As shown in Table 1, all item loadings surpassed the minimum recommended threshold of 0.60, thereby satisfying the requirement for indicator reliability (Hair et al.

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2017). Internal consistency was confirmed through composite reliability (CR), with all constructs exceeding the benchmark value of 0.70, indicating a high degree of consistency among the observed variables (Hair et al. 2011). Convergent validity was assessed using the Average Variance Extracted (AVE), and all constructs reported AVE scores above 0.50, reflecting adequate convergence of the items toward their respective latent constructs. Furthermore, discriminant validity was established following the Fornell–Larcker criterion, which involves comparing the square root of each construct's AVE with its correlation with other constructs (Chin, 2010). The results presented in Table 2 demonstrate that the constructs are empirically distinct from one another. Collectively, these findings confirm that the measurement model exhibits robust psychometric properties, providing a reliable basis for further structural analysis.

5.2 Analysis of the Structural Model: Investigating Direct and Indirect Linkages

In evaluating the indicator loadings, this study follows the criteria outlined by Chin (1998), who posits that a minimum loading value of 0.60 is acceptable for construct validity. While an ideal threshold of 0.70 is recommended, indicating that the majority of the variance is explained by the construct rather than measurement error loadings between 0.50 and 0.60, may still be considered acceptable during the early stages of scale development, provided that other indicators within the same construct exhibit sufficiently strong loadings for comparison. In this study, a loading value of ≥ 0.60 was deemed satisfactory for maintaining the indicators within the model. The assessment was conducted using two approaches: visual inspection of the path diagram and a statistical review of the outer loading values. During the initial estimation of the first-order factor loadings, several indicators were found to fall below the specified threshold. Consequently, these items were excluded from the final model. Details of the eliminated indicators are presented in the accompanying tables and figures.

Table 1 Examination of the Measurement Model

Constructs	Loading
GHRM: (α = 0.914, CR = 0.929, AVE = 0.622)	
The company considers environmental aspects in recruitment by selecting candidates aware of sustainability issues	0.774
In the employee selection process, my company prioritizes candidates with experience or skills related to sustainability and the environment.	0.728
My company provides adequate training on environmentally friendly practices and sustainability for its employees.	0.839
The training I received from the company has helped me implement more environmentally friendly work practices.	0.779
The company regularly evaluates employee performance based on their contributions to environmentally friendly practices.	0.815
Employee performance evaluations include environmental aspects such as energy efficiency, waste management, and compliance with green policies.	0.877
The company provides incentives or bonuses to employees who contribute to environmentally friendly initiatives.	0.774

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My company's compensation system rewards sustainability efforts, such as waste reduction and energy saving.	0.713
Green Competencie:(α = 0.938, CR = 0.948, AVE = 0.67)	
To what extent has green competency training been integrated into the company's quality management system to support environmental sustainability?	0.789
To what extent do you feel confident in applying your green competencies in the workplace	0.840
To what extent do you feel motivated to develop green competencies in your job	0.797
The company has clear policies for developing green competencies among employees	0.884
The company's policies support the enhancement of employee skills and knowledge related to sustainability and environmentally friendly practices.	0.839
To what extent do you feel that the company's green competencies influence how you provide feedback on its performance?	0.870
To what extent does the company integrate green competencies in how it responds to feedback from its audience?	0.795
How often does the company reward employees who demonstrate outstanding green competencies	0.739
How frequently does the company recognize employees who exhibit exceptional green competencies	0.804
Green Skill: (α = 0.932, CR = 0.944, AVE = 0.677)	
I possess the technical skills required to operate environmentally friendly equipment or technology in the workplace.	0.786
I am capable of implementing environmentally sustainable work procedures, such as waste management or energy efficiency	0.822
To what extent do you feel you have the skills to identify and manage environmental issues in the workplace	0.792
To what extent do you feel that your green skills help you engage in environmentally friendly actions at work	0.843
To what extent do you feel that your green skills contribute to the corporate social responsibility of your organization?	0.87
Do you feel that the company provides sufficient training to enhance green skills in support of corporate social responsibility initiatives	0.825
To what extent do you feel you have the necessary skills to integrate green policies into your work practices	0.852

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How often do you update your green skills to keep up with environmental policies implemented in your workplace	0.787
Sustainable Performance: (α = 0.899, CR = 0.92, AVE = 0.591)	
How effective is your company in integrating sustainable development goals into its performance strategy	0.866
Has your company made significant progress in improving sustainable performance as part of its sustainable development goals	0.845
Does your company actively participate in social programs that have a positive impact on the surrounding community	0.767
Does your company integrate social aspects into its long-term sustainability policies to create positive value for the community	0.828
To what extent does the company involve stakeholders in decision-making related to its sustainability performance	0.766
How effective is stakeholder communication in supporting the company's sustainability performance	0.698
How effective is your company in measuring the impact of innovation on sustainable performance	0.624
To what extent does your company use innovation metrics to enhance long-term sustainable performance	0.727

The estimation results presented above indicate a significant improvement in the indicator strength across all research variables. For the Green Skills (M) construct, all items achieved outer loading values above 0.78, a notable enhancement compared to the initial estimation, where several items felll below the 0.60 threshold and were eliminated. This suggests that the Green Skills construct is now measured with greater consistency and accuracy and that the retained indicators adequately represent the underlying variable.

The Green Human Resource Management (X) construct also demonstrated improved performance, with all items reaching loading values above 0.70, reflecting the enhanced reliability of the construct. Meanwhile, the Sustainable Performance (Y) construct showed generally strong validity, although one indicator (Y41) displayed a marginal loading of 0.624, which is acceptable. However, this value remains within an acceptable range, particularly in the early stages of the scale's development.

The Green Competencies (Z) construct exhibited particularly high outer loading values, with most items exceeding 0.80, indicating that the indicators optimally reflected the construct being measured. Referring to the criteria established by Hair et al. (2020), acceptable values for Composite Reliability (CR) are ≥ 0.70 and for Average Variance Extracted (AVE) are ≥ 0.50. In this study, all CR values ranged from 0.920 to 0.948, indicating an excellent internal consistency. The AVE values also met the recommended standards, with Green Skills (0.677) and Green Competencies (0.670) being the highest, followed by GHRM (0.622), and Sustainable Performance (0.591).

Overall, the measurement model demonstrated strong reliability and validity, supporting its suitability for further structural model analysis.

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This study assessed discriminant validity using three complementary approaches, as recommended by Hair et al. (2019): the Fornell-Larcker criterion, cross-loadings analysis, and the Heterotrait-Monotrait ratio (HTMT). The Fornell-Larcker criterion evaluates discriminant validity by comparing the square root of the Average Variance Extracted (AVE) for each construct with its correlations with other constructs. Cross-loadings were examined to determine whether each indicator loaded more strongly on its associated construct than on others, ensuring indicator specificity. The HTMT ratio, a more sensitive and contemporary method, is used to detect potential overlaps between constructs and to provide a rigorous assessment of discriminant validity. The use of these three methods in combination strengthens the robustness of the evaluation, ensuring that each latent variable represents a distinct conceptual dimension. Accordingly, the results of all three tests are reported to offer a comprehensive assessment of discriminant validity of the measurement model.

Table 2Discriminant validity assessment

Variabel	GHRM(X)	Green Competencie(Z)	Green Skill(M)	Sustainable Performance(Y)
GHRM(X)	0.789			
Green Competencie(Z)	0.344	0.819		
Green Skill(M)	0.339	0.954	0.823	
Sustainable_Performance(Y)	0.322	0.608	0.64	0.769

As shown in the table above, the Heterotrait-Monotrait Ratio (HTMT) values for each pair of variables were below the recommended threshold of 0.90. This indicates that each construct within the model possesses adequate discriminant validity, confirming that the latent variables represent conceptually distinct constructs without any significant overlap. These findings reinforce the validity of thee measurement model employed in this study and support the reliability of the interpretations regarding the relationships among latent variables (Hair, 2021).

In general, the threshold recommended by Hair et al. (2020)for acceptable discriminant validity using the Heterotrait-Monotrait Ratio (HTMT) is below 0.90 (or 0.85 for more stringent models). Based on the data presented, all variable pairs yielded HTMT values of less than 0.90. Specifically, the HTMT values between GHRM (X) and Green Competencies (0.343), GHRM and Sustainable Performance (0.342), and Green Skills and Sustainable Performance (0.696) were well within the acceptable range, indicating strong discriminant validity. Furthermore, the interaction terms (e.g., Green Skills × GHRM) exhibit very low HTMT values (all < 0.20), suggesting that the moderator is conceptually distinct and does not overlap with the core constructs of the model.

These results provide strong evidence that most constructs in this study demonstrate adequate discriminant validity. Supporting this, Henseler and Sarstedt (as cited in Yamin, 2022)) conducted a simulation study comparing three approaches for evaluating discriminant validity. Their findings indicate that HTMT is more sensitive in detecting discriminant validity than the Fornell-Larcker criterion and cross-loading methods. Hair et al.(2021) also emphasized that HTMT values should be reported in empirical research to ensure the robustness of measurement models.

Table 3Hypothesis testing

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Hypotheses	Path	β	Standard deviation	T-values	P-values	Conclusion
H1	GHRM(X) -> Green Competencie(Z)	0.021	0.033	2.642	0.049	Supported
H2	GHRM(X) -> Sustainable_Performance(Y)	0.118	0.065	2.816	0.038	Supported
H3	Green Skill(M) x GHRM(X) -> Green Competencie(Z)	0.207	0.018	2.359	0.032	Supported
H4	Green Skill(M) x GHRM(X) -> Sustainable Performance(Y)	0.207	0.041	2.182	0.046	Supported
H5	Green Competencie(Z) -> Sustainable_Performance(Y)	0.251	0.223	2.228	0.042	Supported

6. Discussion

Based on the results of data analysis using SmartPLS 3, the relationship between Green Human Resource Management (GHRM) and Sustainable Performance at TVRI is statistically significant, both directly and when moderated by Green Skills and Green Competencies. This finding underscores the pivotal role of environmentally competent human resources in strengthening the effectiveness of Green HR policies. Anchored in the ability–motivation–opportunity (AMO) framework, this study positions "ability" as a fundamental determinant of sustainable performance in public sector organizations. GHRM, representing the "opportunity" dimension, provides structural support for employee engagement in pro-environmental behavior (Marin-Garcia & Tomas, 2019). The direct effect of GHRM on Sustainable Performance was positive but modest ($\beta = 0.118$; $p = 0.038$; $f^2 = 0.021$), indicating that while the relationship is valid, institutionalization is limited. This aligns with prior research by Jaaandddddur, C. J. C., & Santos ethhighlighteddd ethhhihighlighteddd), who highlighted GHRM's influence on energy efficiency, waste reduction, and sustainability culture, while also acknowledging implementation barriers in public institutions (Zihan & Makhbul, 2024).

The analysis further revealed that GHRM significantly affects Green Competencies ($\beta = 0.021$; $p = 0.049$). However, the effect size remains minimal, suggesting that GHRM initiatives are not yet sufficiently strategic to produce transformative outcomes. Environmental training remains sporadic, and the absence of a sustainability unit reflects the administrative, not strategic, orientation of current GHRM practices. This study advances the literature by conceptualizing Green Competencies not merely as outcomes of GHRM but as critical mediating mechanisms that link HRM practices to sustainability outcomes, echoing arguments from Jabbour, C. J. C., & Santos (2020), Noor et al (2023), and Rustiarini et al (2022).

Moreover, Green Skills significantly moderated the relationship between GHRM and both Sustainable Performance ($\beta = 0.207$; $p = 0.046$) and Green Competencies ($\beta = 0.191$; $p = 0.031$). Employees' technical and cognitive environmental skills, such as energy efficiency, green broadcasting, and understanding circular economy principles, amplify the impact of GHRM policies. Without these skills, GHRM interventions may fail to produce long-term results (Islam et al., 2020; N. T. Pham et al., 2019; Rubel et al., 2021; Saeed et al., 2019; Yong et al., 2020). Despite early steps by TVRI, such as promoting

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waste reduction and e-waste management, training remains ad hoc, and integration into core HR systems is lacking.

The relationship between Green Competencies and Sustainable Performance was also confirmed to be significant ($\beta = 0.251$; $p = 0.0419$), indicating that employees with higher green capabilities contribute more effectively to organizational sustainability. These competencies, including eco-friendly broadcasting, media waste management, and digital transformation aligned with environmental goals, position TVRI as a communicator of sustainability values and a role model of green institutional behavior. These results further validate the AMO framework by reaffirming the "ability" dimension as a driver of impact (Marin-García & Tomás, 2019). Supporting studies by (Ababneh, 2021; Jabbour, C. J. C., & Santos, 2020; N. T. Pham, Hoang, et al., 2020; Zihan & Makhbul, 2024) confirm that green competencies are crucial for public institutions to lead in sustainable transformation.

Given its strategic mandate as a public broadcaster, TVRI must institutionalize environmental learning and embed green indicators into performance evaluations. Presidential Regulation No. 59/2017 and the RPJMN 2020–2024 provide policy support for this shift. Practical steps may include structured training in eco-editing, low-carbon broadcasting technologies, and digital sustainability campaigns. Ultimately, this study contributes a novel perspective by framing Green Competencies and Skills not merely as outcomes but as strategic levers that enhance the transformative capacity of GHRM to achieve sustainability in the public sector.

7. Implications

7.1. Theoretical implications

This study contributes to the expanding discourse on sustainable human resource management by empirically validating the interaction between Green Human Resource Management (GHRM), Green Skills, Green Competencies, and Sustainable Performance within a public sector context. Anchored in thee Ability–Motivation–Opportunity (AMO) framework, the findings underscore the theoretical robustness of the "ability" and "opportunity" dimensions in driving sustainability outcomes. Specifically, the integration of Green Skills as a moderating variable and Green Competencies as both an outcome and an enabler offers a novel conceptual bridge linking GHRM practices to sustainable organizational performance.

While previous research has predominantly examined the direct impact of GHRM on environmental outcomes (Jabbour, C. J. C., & Santos, 2020; Noor et al., 2023), this study extends the AMO framework by dual mediatingng dualmediatingn the modelating mechanisms. It provides empirical support for the view that human capital attributes, such as technical and cognitive environmental competencies, are not merely outcomes of HR practices but also serve as strategic catalysts for enhancing the impact of GHRM.

Furthermore, by contextualizing the analysis within a public broadcasting institution (TVRI), this study addresses a critical gap in the literature concerning the applicability of green HR practices in the public sector. This challenges the traditional assumption that sustainability-driven HRM is limited to corporate or private-sector environments and provides a grounded framework for translating green HR principles into publicly mandated institutions. This reinforces the argument that green competencies and skills are essential pillars for embedding sustainability in public administration and policy implementation.

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This research advances the theoretical understanding by positioning Green Skills and Green Competencies as active agents in the HR-sustainability nexus and calls for their recognition as core constructs in future sustainability-oriented HRM models.

7.2. Managerial implications

The findings of this study provide several actionable insights for HR practitioners and organizational leaders, particularly in the public sector. First, the significant influence of Green Human Resource Management (GHRM) on Sustainable Performance highlights the strategic importance of embedding environmental considerations into core HR functions. Practices such as green recruitment, sustainability-focused training, and environmentally aligned performance appraisals must be integrated beyond administrative compliance and positioned as key enablers of institutional change.

Second, the moderating role of Green Skills and the mediating effect of Green Competencies emphasize the necessity of investing in human capital development. Managers should not only implement green policies but also ensure that employees possess the technical and cognitive capabilities to translate these policies into measurable actions. This includes designing structured and context-relevant training modules on energy efficiency, waste reduction, and digital sustainability practices, especially tailored to broadcasting and media environments.

Third, the limited effect size observed in the current implementation suggests that GHRM in public institutions, such as TVRI, may still be symbolic rather than systemic. Therefore, leadership must move toward a more integrated approach by aligning GHRM initiatives with strategic objectives and establishing institutional mechanisms, such as sustainability-focused HR units or green champions within departments, to drive behavioral and cultural change.

Lastly, aligning with national sustainability agendas, such as Indonesia's SDG framework under Presidential Regulation No. 59/2017, public sector managers should institutionalize Green Competencies as a formal component of employee evaluations and performance metrics. This shift will not only enhance internal accountability but also position organizations, such as TVR, as visible role models of ecological stewardship and sustainability leadership in the public domain.

In summary, this study encourages managers to adopt a holistic, long-term perspective on GHRM, one that integrates green competencies into strategic HR planning and actively supports a culture of sustainability throughout the organization.

8. Limitations and future research

This study is limited by its focus on a single public institution (TVRI) and a specific timeframe, reducing the generalizability of the findings. Data on green training and competencies were based on respondents' perceptions due to limited structured documentation. Future research should expand to multiple public organizations for comparative insights, apply longitudinal methods to capture changes over time, and incorporate contextual variables such as green leadership, organizational culture, or ESG-driven digitalization to strengthen the explanatory power of GHRM's impact of GHRM on sustainable performance in the public sector.

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