



A serial mediation model of high-performance work systems: Does intrinsic religiosity matter?

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ARTICLE INFO

Keywords:

High-performance work systems
Green voice behavior
Green work engagement
Hotel employees
Intrinsic religiosity
Thriving at work

ABSTRACT

A novel moderated serial mediation model of high-performance work systems (HPWS) is developed and tested with data gathered from hotel employees via a time lag of two months. Our model is derived from the ability-motivation-opportunity theoretical framework, job demands-resources, social information processing, and conservation of resources theories. All the hypotheses were supported, and the model we proposed was viable. The results suggested that green work engagement (GWENG) was a mediator between HPWS and green voice behavior (GVB). Thriving at work (TAW) mediated the impacts of HPWS on GVB. GWENG and TAW serially mediated the effects of HPWS on GVB. More importantly, intrinsic religiosity strengthened the effects of HPWS on GWENG, while it moderated the indirect effects of HPWS on GVB via GWENG and TAW. The aforesaid results enhance the hospitality literature and ensure useful implications for business practice.

1. Introduction

In a competitive marketplace where sustainability has become a priority for businesses worldwide (Karatepe et al., 2024), environmental issues have heightened firms' awareness of the necessity to meet regulatory obligations, market demands, and customer expectations (Abualigah and Badar, 2024; Tabrizi et al., 2023). This awareness is important for service firms such as hotels and restaurants because the hospitality industry utilizes excessive amounts of water and energy (Karatepe et al., 2022). Employees play a substantial role in greening hospitality firms, and their eco-initiatives can significantly promote environmental sustainability (Karatepe et al., 2022, 2024). Therefore, enhancing ecologically conscious behavior is essential to the attainment of environment sustainability goals (Karatepe et al., 2024).

Prior research has brought human resource management (HRM) into the discourse as one of the instrumental organizational strategies to advance sustainable development (e.g., López-Gamero et al., 2023).

López-Gamero et al. (2023) claimed that HRM practices could engender green outcomes if they operate as a system. In other words, considering the complementarities among HRM practices, these practices tend to be more effective and lead to better outcomes when working together (López-Gamero et al., 2023). Such a combination of HRM practices (e.g., selective staffing, training, empowerment, and recognition and rewards) denotes high-performance work systems (HPWS) (Kloutsiniotis and Mihail, 2020a), which reflect "...systems of human resource practices designed to enhance employee's skills, commitment and productivity in such a way that employees become a source of sustainable competitive advantage" (Datta et al., 2005, p. 136).

One of the critical green outcomes is green voice behavior (GVB) that is defined as "...making novel suggestions for environmentally friendly activities and recommending changes to standard procedures designed for green activities even when others disagree" (Ari et al., 2020, p. 2). It is a critical green behavior where workers provide recommendations and solutions to mitigate ecological problems and promote sustainable

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<https://doi.org/10.1016/j.ijhm.2025.104403>

Received 29 November 2024; Received in revised form 30 April 2025; Accepted 19 July 2025

Available online 25 July 2025

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development. Surprisingly, few studies have explored the antecedents of GVB, especially in hospitality settings (Nourafkan et al., 2024; Tabrizi et al., 2023). With this recognition, we explore the effects of HPWS on GVB.

In addition, past writings have examined the effects of HPWS on employees' different work outcomes (Gürlek, 2021; Kloutsiniotis and Mihail, 2020a). Despite these pieces, recent papers have stressed the need to explore the mechanisms underlying the impacts of HPWS on desirable consequences, including green-related outcomes (Benítez-Núñez et al., 2024; Dorta-Afonso et al., 2023; Lin et al., 2023). In response to this, we gauge the mediating effects of green work engagement (GWENG) and thriving at work (TAW) on the HPWS-GVB linkage. GWENG is defined as "...employees' willingness to exert efforts in and full concentration on environmental and green tasks as well as their experience of a sense of enthusiasm, pride, and inspiration about these tasks" (Karatepe et al., 2022, p. 3085), while TAW reflects "...a psychological state in which individuals experience both a sense of vitality and learning at work" (Spreitzer et al., 2005, p. 538).

The aforesaid relationships could be moderated by personal resources. One of the significant underexplored personal resources in the hospitality literature and sustainability knowledge base is religiosity, which denotes "...a belief in God accompanied by a commitment to follow principles believed to be set forth by God" (McDaniel and Burnett, 1990, p. 103). More specifically, intrinsic religiosity, which highlights the core values and inherent goals of a religion, is a significant factor that shapes people's norms, values, and behaviors (Koburtay and Syed, 2021). Although past writings have examined the influence of intrinsic religiosity in mitigating unethical pro-behaviors (Alqhaiwi et al., 2024), reducing work-related stress (Weiß and Süß, 2019), minimizing proclivity to quit (Wu et al., 2017), decreasing deviant workplace behavior (Ahmad et al., 2023), and promoting staff well-being (Abualigah et al., 2024), there is a scarcity of research pertaining to the effect of intrinsic religiosity in fostering employee green behaviors in the broader environmental management literature and hospitality knowledge base. While some recent papers provide evidence for the effect of religiosity in promoting green behavior (e.g., Elhoushy and Jang, 2021), they have mainly concentrated on consumer-centric contexts. However, the effect of religiosity on ecological behavior within organizational settings remains largely underexplored (Casidy et al., 2024). This is surprising because intrinsic religiosity can shape employees' behavior and may fuel their motivation to engage in environmentally friendly tasks. Therefore, intrinsic religiosity as a moderator of the influence of HPWS on GWENG has yet to be examined.

Taking note of the aforesaid information, we surmise that HPWS combined with high intrinsic religiosity would increase GWENG. This is consistent with the "resource caravan pathways" tenet in conservation of resources (COR) theory (Hobfoll et al., 2018), which proposes that resources (e.g., HPWS) "co-travel and mutually interact" with additional contextual or personal resources (e.g., intrinsic religiosity) to influence individual behavior at work. According to Nasir et al. (2022), individuals with elevated intrinsic religiosity view green work as a religious obligation and a worship to please God, which is likely to trigger their environmental conservation attitudes. From an Islamic perspective, the two main teachings, namely, "the Quran and the Hadith of Prophet Muhammad", emphasize the significance of protecting the environment. Considering this, we examine intrinsic religiosity as a moderator of the impacts of HPWS on GWENG.

Against this background, our study tests a moderated serial mediation model of HPWS. Specifically, we gauge: (1) the effects of HPWS on GVB; (2) GWENG as a mediator between HPWS and GVB; (3) TAW as a mediator linking HPWS to GVB; (4) the serial mediation of GWENG and TAW on the said relationships; (5) intrinsic religiosity as a moderator of the influences of HPWS on GWENG; and (6) intrinsic religiosity as a moderator of the indirect effects of HPWS on GVB through GWENG and TAW.

By examining the abovementioned links, our paper augments the

existing hospitality literature. First, with a few exceptions (Nourafkan et al., 2024; Tabrizi et al., 2023), there is a scarcity of research appertaining to the antecedents of GVB in the hospitality knowledge base. Recent calls have also highlighted the need for investigating the intervening mechanisms linking HPWS to employee attitudinal/behavioral consequences (Benítez-Núñez et al., 2024; Dorta-Afonso et al., 2023; Lin et al., 2023). More specifically, our thorough exploration of the current literature denotes a lack of studies regarding the serial mediating mechanisms linking HPWS to GVB. With this realization, we investigate the effects of HPWS on GVB through serial mediation pathways of GWENG and TAW. This is important because it ensures a more nuanced theoretical understanding of the psychological mechanisms relating HPWS to GVB. That is, the availability of resources enabled by HPWS would boost employees' potential to be engaged in eco-friendly tasks and enhance their learning and vitality, which is crucial for nurturing an atmosphere conducive to GVB. Furthermore, addressing the *aforesaid research gap* is significant as it would help develop specific human resource strategies aimed at fostering green initiatives among employees and promoting hotels' environmental agendas. Our investigation is the first to test the serial mediation of GWENG and TAW in the interface between HPWS and GVB.

Second, our research responds to recent calls to expand the existing understanding of the role of personal resources as boundary conditions in the HPWS paradigm (e.g., Akhtar et al., 2024). Broadly speaking, we add to the compendium of knowledge on *intrinsic religiosity* by gauging the moderating effect of intrinsic religiosity, one of least investigated personal resources, on the linkage between HPWS and GWENG. This is an important void in the hospitality and sustainability literature because religious beliefs and values, which highlight the importance of protecting the environment, significantly shape and influence employee behavior at work (Abualigah and Badar, 2024). Apparently, this is the first empirical piece gauging the moderating effect of intrinsic religiosity, from an Islamic lens, on the linkage between HPWS and GWENG. In addition, we assess another *novel path* that highlights intrinsic religiosity as a moderator of the indirect link of HPWS to GVB via GWENG and TAW.

2. Background and hypotheses

2.1. High-performance work systems and green voice behavior

The notion of HPWS represents a set of interrelated human resource practices that promote workers' skills, knowledge, and motivation to maintain competitive edge (Jiang et al., 2012). Among others, these practices comprise selective staffing, training, rewards and recognition, performance assessment, empowerment, participation in decision-making, job security, promotions, and career opportunities (Ari et al., 2020; Zhang et al., 2014). However, a single human resource practice is not sufficient to contribute significantly to the firm's performance (Kloutsiniotis and Mihail, 2020b). Instead, a bundle of human resource practices (i.e., "ability, motivation, and opportunity") is essential to foster employee skills, motivation, and engagement. Therefore, utilizing the ability-motivation-opportunity (AMO) framework, we argue that HPWS nurture workers' GVB.

AMO theory proposes that three factors are essential to promote employee performance, namely, "ability, motivation, and opportunity" (Appelbaum et al., 2000). The ability factor reflects HRM practices that are intended to develop workers' skills, knowledge, and capabilities such as training (Lepak et al., 2006; Paauwe, 2009). The motivation factor denotes HRM practices, such as rewards and performance management, that stimulate workers to perform better (Jiang et al., 2012; Sun et al., 2007). The opportunity factor represents practices (e.g., information sharing, empowerment) that give workers the opportunity to leverage their skills and knowledge and contribute to organizational goals (Jiang et al., 2012). In light of this, HPWS can boost extra-role behavioral consequences and contribute to the achievement of

organizational goals. This can be done by cultivating employees' skills via training programs ("ability-enhancing human resource practices"), giving rewards to employees and offering competitive compensation ("motivation-enhancing human resource practices"), and delegating authority to employees for decision-making ("opportunity-enhancing human resource practices") (Edgar et al., 2021).

GVB is primarily concerned with the generation of fresh ideas for environmentally conscious activities and recommending improvements to existing practices dedicated to sustainable practices (Ari et al., 2020). Specifically, the ability-enhancing practices (e.g., effective recruitment and training) can promote workers' skills and capabilities (Mowbray et al., 2021), allowing them to contribute to the firms' environmental agenda (López-Gamero et al., 2023) through communicating their ideas about green-related issues. The motivation-enhancing practices (e.g., rewards, performance appraisal, promotion) aim to boost employees' desire and passion to accomplish their work (Bos-Nehles et al., 2023). These endeavors may spark employees' prosocial motivation and commitment to exhibit discretionary behaviors (Ashiru et al., 2022; Dimple, Kuriakose, 2025) such as GVB. In addition, the opportunity-enhancing practices such as participation in decision-making and knowledge-sharing would enable workers to participate in the firm's (environmental) sustainability initiatives (López-Gamero et al., 2023) by producing novel ideas and solutions. Accordingly, it is plausible to expect that HPWS would nurture workers' GVB.

In empirical terms, recent research illustrated that HPWS triggered voice behavior (Badru et al., 2024). López-Gamero et al. (2023) also disclosed that HRM practices fostered environmental management. Research on the antecedents of GVB is scarce, and inconsistent findings across the studies have been reported (e.g., Aboramadan et al., 2022; Tabrizi et al., 2023). However, no studies, to our knowledge, have examined the relationship between HPWS and GVB so far. Thus, we advance that:

H1. HPWS positively relate to GVB.

2.2. Green work engagement as a mediator

There are numerous empirical pieces that have explored the factors influencing work engagement (Bakker and Demerouti, 2017). However, research on the mediating effect of GWENG is scarce (Abualigah and Badar, 2024; Karatepe et al., 2022). Hence, in light of job demands-resources (JD-R) theory (Bakker and Demerouti, 2017), we posit that GWENG mediates the HPWS-GVB linkage. According to the JD-R framework, job characteristics can be divided into two categories, namely, "job demands" and "job resources" (Demerouti et al., 2001). Job demands denote "...those physical, social, or organizational aspects of the job that require sustained physical or mental effort and are therefore associated with certain physiological and psychological costs" (Demerouti et al., 2001, p. 501). Job resources reflect "...those physical, psychological, social, or organizational aspects of the job that may do any of the following: (a) be functional in achieving work goals; (b) reduce job demands at the associated physiological and psychological costs; (c) stimulate personal growth and development" (Demerouti et al., 2001, p. 501). The theory proposes that job demands and resources activate two distinct processes such as the health impairment process and the motivational process. Whereas the former posits that job demands predict burnout and lead to undesirable consequences, the latter suggests that job resources predict work engagement and lead to better performance (Bakker and Demerouti, 2017). Specifically, the motivational pathway of the JD-R framework postulates that job resources may have both intrinsic and extrinsic motivational roles because they stimulate individuals' growth and development and help them accomplish their goals (Bakker and Demerouti, 2017). Such individuals are work engaged because of the availability of job resources (e.g., performance feedback, training) and therefore display positive outcomes. In other

words, job resources (e.g., HPWS) would trigger workers' motivation to be engaged in their work, leading to organizationally valued behavioral consequences (e.g., GVB).

In view of the motivational pathway of the JD-R framework, we postulate that GWENG is an important mechanism linking HPWS to GVB. Broadly speaking, working within a resourceful environment where there are HPWS is likely to develop a positive perception among staff members because they feel supported and appreciated by their organization (Karadas and Karatepe, 2019). Such an environment is likely to fuel employees' motivation and foster their engagement in work tasks. Those employees with elevated engagement levels experience positive emotions and are happily engrossed in their job and, as a consequence, exhibit positive work-related behaviors (Bakker, Demerouti, 2017) such as participating in addressing environmental issues and displaying green behaviors. That is, the presence of job resources (e.g., training) facilitated by HPWS can help employees meet their basic needs such as skill development and personal growth through providing them with the necessary skills and knowledge (Dorta-Afonso and Romero-Domínguez, 2025). This, in turn, would activate a motivational mechanism that activates their energy and enthusiasm to be engaged in work-related activities (e.g., green tasks). Green work engaged organizational members are dedicated and absorbed in their green jobs (Aboramadan, 2022), are willing to contribute to the firms' environmental initiatives, and are inclined to suggest green ideas to address environmental issues (Nourafkan et al., 2024). Furthermore, keeping an open communication with workers and providing opportunities to partake in decision-making are likely to transmit the firm's goals (e.g., environmental agenda) to them and promote their engagement in green activities (López-Gamero et al., 2023). In such an environment, workers feel valued and supported to speak up and offer recommendations to protect the environment (Nourafkan et al., 2024).

Empirically, the role of GWENG as a mediator has been subjected to limited examination so far. For example, Kim et al. (2023) reported that the relationship between green HRM and green competitive advantage was mediated by GWENG. Abualigah et al. (2023a) suggested that GWENG mediated the green HRM-green creativity linkage. Surprisingly, in the hospitality literature, there is no research denoting that non-green HPWS may foster employees' GWENG that would result in elevated GVB. Accordingly, we posit that:

H2. GWENG mediates the effects of HPWS on GVB.

2.3. Thriving at work as a mediator

Whilst learning reflects the acquisition and application of new skills and knowledge, vitality signifies the positive feelings of having energy and being alive at work (Porath et al., 2012). According to Alothmany et al. (2023), when vitality and learning are present, a state of thriving is indicated, whereas the absence of either dimension demonstrates a lack of thriving. Hence, joint learning and vitality experiences are essential for employees to exhibit TAW. Utilizing social information processing (SIP) theory (Salancik and Pfeffer, 1978), we contend that TAW may serve as an underlying mechanism relating HPWS to GVB.

According to SIP theory, "individuals, as adaptive organisms, adapt attitudes, behavior, and beliefs to their social context" (Salancik and Pfeffer, 1978, p. 226). The theory proposes that individuals apprehend the workplace utilizing a social construction process in which they seek to decipher the social cues in the firm. These social cues, in turn, can shape their attitudes, perceptions, and behaviors (Salancik and Pfeffer, 1978). HPWS may send strong signals to employees that their firm supports them and values their efforts, promoting their TAW. More specifically, the presence of HPWS enables workers to avail themselves of opportunities to develop their skills and knowledge, bolstering their learning (Alothmany et al., 2023). The variety of job resources offered to workers through HPWS (e.g., rewards, promotion) may function as signs of the firm's recognition of their contributions, thus fostering their

enthusiasm and energy, and promoting vitality (Zhang et al., 2019). The learning and vitality dimensions of thriving enabled by HPWS may give rise to the enhancement of GVB.

In addition, empowerment and participation in decision-making may enhance workers' capabilities and make them feel active, hence accelerating their learning and vitality (Shahid et al., 2021). Those workers who experience TAW would presumably display extra-role behaviors (Akhtar et al., 2024) such as suggesting solutions to promote sustainable development and boosting GVB. HPWS help fuel TAW through fostering social interactions between employees and their supervisors (Zhang et al., 2019). Employees who thrive at work are active, passionate, and motivated to put in more effort to contribute to the organization's environmental agenda (Zafar et al., 2023) and therefore display GVB.

Empirically, Sahadev et al. (2024) demonstrated that TAW mediated the psychological empowerment-creative performance linkage. Akhtar et al. (2024) denoted that TAW mediated the nexus between HPWS and innovative behavior. The abovementioned studies present evidence regarding TAW as a mediator between different antecedents and extra-role behaviors. However, except for very few investigations, research about TAW as a mediator of the impacts of HPWS on GVB remains unexplored. Specifically, Zafar et al.'s (2023) work revealed that TAW mediated the connection between ecocentric leadership and voluntary green behavior. To fill in the lacuna in the hospitality literature, we postulate that:

H3. TAW mediates the effects of HPWS on GVB.

2.4. 2.4. Green work engagement and thriving at work as the serial mediators

Based on said hypotheses, we propose that GWENG and TAW serially mediate the influences of HPWS on GVB. As demonstrated earlier, HPWS represent a set of interrelated human resource practices such as incentives, performance feedback, empowerment, participation in decision-making, and job security. The effective implementation of these practices within the HPWS paradigm is likely to bolster workers' engagement in green-related activities. Such individuals who are green work engaged are dedicated, energized, and have a sense of affective connection with their job tasks. Hence, they feel vital and alive (Kleine et al., 2019). In addition, Billett (2001) suggests that the intensity of workers' engagement in their tasks can influence the quality of their learning experiences. This is because engagement at work offers workers continuous access to goal-directed tasks and support, hence promoting ongoing personal development (Kleine et al., 2019) and enabling them to build stockpile of skills and knowledge, contributing to their learning (Gyensare et al., 2025). Given this, individuals with heightened GWENG are happily immersed and concentrated in their green work and open to new experiences (Abualigah et al., 2023a), which can enhance their knowledge and skills, thereby impelling their learning (Rahaman, 2022). This revitalized spirit may motivate them to display extra-role green behaviors (Zafar et al., 2023), such as GVB. Accordingly, HPWS drive GVB by fostering employee engagement in green tasks that promote their vitality and learning to suggest ideas and solutions for safeguarding the environment. This prompts the hypothesis that:

H4. GWENG and TAW serially mediate effects of HPWS on GVB.

2.5. The moderating role of intrinsic religiosity

Religiosity reflects the belief in God and the dedication and commitment to behave as per God's principles (McDaniel and Burnett, 1990). Allport and Ross (1967) highlighted two sorts of religiosities, i.e. "intrinsic and extrinsic". Intrinsic religiosity denotes a religion's inherent goals and core values, whereas extrinsic religiosity illustrates utilizing religion for personal and social benefits (Chowdhury, 2018; Koburtay and Syed, 2021). This study focuses on intrinsic religiosity because it represents the fundamental principles and underlying

objectives of a religion.

Prior research suggested that religiosity could influence individuals' attitudes and behaviors at work (e.g., Abualigah et al., 2023b). According to Abualigah et al. (2021), Muslims adhere to Islamic teachings (Quran and Hadith of Prophet Muhammad) to satisfy God. These two primary sources underscore the importance of work and environmental protection. For example, the Quran says: "Work (righteousness): Soon will Allah observe your work, and His Messenger and the Believers" (9:105). Other Quranic verses emphasize the importance of environmental sustainability: "And do not do mischief on the earth, after it has been set in order. And call upon Him with hope and fear. Indeed, Allah's mercy is always close to the good doers" (7:56). In addition, the Prophet Muhammad (PBUH) laid the foundation for individuals to safeguard the environment and utilize natural resources wisely. For example, the Prophet said: "Don't waste water even if you are on a flowing river". The Islamic teachings considered people as "Khalifa" (stewards) of God upon the earth, and they should avoid the misuse of natural resources, take care of the environment, and maintain ecological balance (Koehrsen, 2021). These teachings also emphasize that preserving the environment is considered as a moral obligation to God (Chan and Islam, 2015). This is further supported by the notion of "Amanah" (entrusted duty) from God, which highlights that the environment needs to be protected for future generations (Sumi et al., 2024). In view of the aforementioned information, we surmise that employees with high intrinsic religiosity are likely to be more devoted to green practices at work, which may enhance GWENG. Therefore, guided by COR theory, we postulate that intrinsic religiosity may moderate the nexus between HPWS and GWENG.

The COR framework suggests that individuals strive to acquire and protect their valuable resources, such as social, personal, or psychological resources (Hobfoll et al., 2018). According to COR theory, "people must invest resources in order to protect against resource loss, recover from losses, and gain resources" (Hobfoll, 2001, p. 349). The theory also contends that the accessibility of resources motivates workers to maximize gains by investing additional resources (Hobfoll, 1989, 2011). That is, workers with more resources are less prone to resource loss and can better manage their resources to generate additional ones by adopting a "proactive resource gain strategy" (Hobfoll, 2011). Conversely, workers with limited resources tend to employ a "defensive resource preservation strategy" to protect their existing resources from potential resource loss (Halbesleben et al., 2014; Hobfoll, 2001). One of the tenets in COR theory is "resource caravan pathways", which postulates that "resources do not exist individually but travel in packs, or caravans, for both individuals and organizations" (Hobfoll et al., 2018, p. 106). That is, resources (e.g., job resources) "co-travel and mutually interact" with other resources (e.g., personal resources) to shape workers behavior (Badar et al., 2023). Following this tenet, we surmise that the interaction between HPWS (as job resources) and intrinsic religiosity (personal resource) may enhance GWENG. In other words, intrinsically religious individuals view environmental protection as a worship to God (Nasir et al., 2022). This may stimulate them to leverage the available resources enabled by HPWS (e.g., training) and engage in eco-friendly behaviors as they help accumulate additional resource gains, such as inner satisfaction and personal fulfillment derived from meeting God's will, thereby nurturing GWENG. Furthermore, employees with elevated levels of intrinsic religiosity consider environmental stewardship as a moral commitment arising from their faith and therefore tend to be more environmentally conscious. These employees are likely to view organizations' investment in HPWS, such as empowerment and involvement, as an opportunity to invest more energy and effort and engross themselves in green-related tasks to satisfy God, thus enhancing GWENG. This suggests that the combination of HPWS (e.g., training, job autonomy) in conjunction with the environmental ideals instilled by intrinsic religiosity, can help cultivate an environmentally friendly culture, promoting GWENG. The integration of HPWS and intrinsic religiosity may boost GWENG because workers

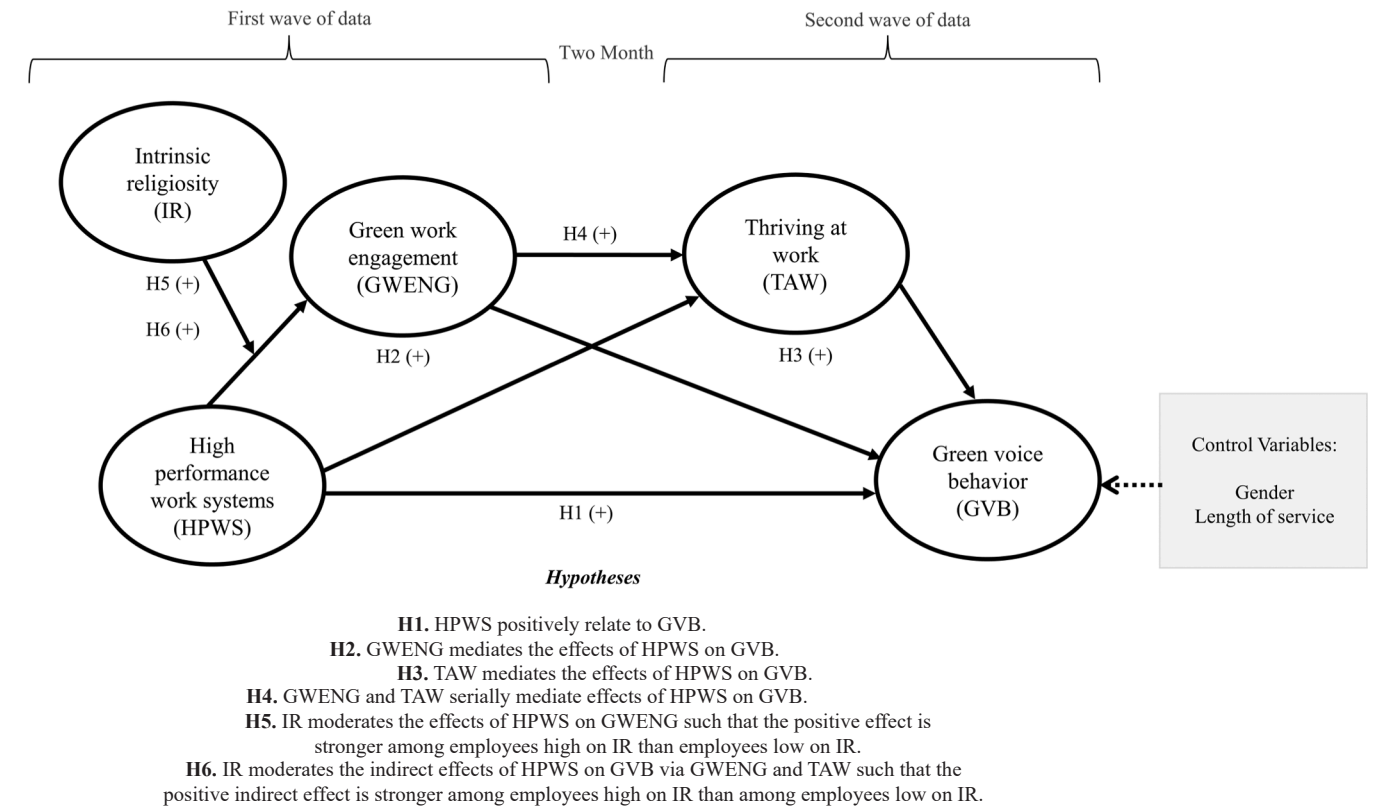


Fig. 1. Research model.

sense they are empowered and morally committed to help promote sustainable development. High levels of intrinsic religiosity along with the effective implementation of HPWS are more likely to engender GWENG.

Empirically, [Abualigah et al. \(2023b\)](#) reported that religiosity moderated the link of supervisor support to work engagement. [Elhoushy and Jang \(2021\)](#) found that consumers' religiosity predicted food waste reduction through personal norms. [Casidy et al. \(2024\)](#) reported that religious identification positively influenced green marketing orientation. In this research, we contribute to this line of inquiry by investigating the moderating role of intrinsic religiosity on the linkage between HPWS and GWENG. Hence, we hypothesize that:

H5. Intrinsic religiosity moderates the effects of HPWS on GWENG such that the positive effect is stronger among employees high on intrinsic religiosity than employees low on intrinsic religiosity.

The abovementioned hypotheses suggest a moderated serial mediation effect. Concordant with JD-R and SIP theories, employees' perceptions of the availability of resources enabled by HPWS (e.g., skill development and empowerment) may augment their engagement in green tasks ([López-Gamero et al., 2023](#)). Green work engaged individuals are likely to exhibit TAW because of the firm's investment to foster their skills and knowledge. Such motivational resources may encourage workers to display GVB ([Nourafkan et al., 2024](#)).

In light of COR theory ([Hobfoll et al., 2018](#)), we posit that at higher levels of intrinsic religiosity (personal resource), it is projected that HPWS (job resources) positively influence GVB through GWENG and TAW. Workers with high levels of intrinsic religiosity view environmental protection as a religious duty ([Nasir et al., 2022](#)). This fuels their motivation to contribute to environmental sustainability and proactively advocate and suggest eco-friendly practices to please God. That is, at higher levels of intrinsic religiosity, the indirect effects of HPWS on GVB via GWENG and TAW will be amplified. Based on the preceding discussion, we hypothesize that:

Table 1
Respondents' profile (n = 374).

	Frequency	%
Gender		
Male	270	72.2
Female	104	27.8
Age		
Up to 25	134	35.8
26–45	183	48.9
46–55	47	12.6
56 and above	10	2.7
Education		
Bachelor's	133	35.6
Master's	203	54.3
Other	38	10.1
Length of service		
Up to 1 year	41	11.0
2–5 years	87	23.3
6–10 years	148	39.5
11 years and above	98	26.2
Nature of employment		
Contractual	83	22.2
Permanent	291	77.8

H6. Intrinsic religiosity moderates the indirect effects of HPWS on GVB via GWENG and TAW such that the positive indirect effect is stronger among employees high on intrinsic religiosity than among employees low on intrinsic religiosity. [Fig. 1](#) shows the hypothesized links.

3. Method

3.1. Sample and data collection

Data were gathered from employees in the 4- and 5-star hotels in Pakistan, a key sector driving the country's economic growth ([Akhtar et al., 2024](#)). Environmental sustainability is crucial in cities facing

Table 2
Composite reliability and validity.

Construct/ Item	Mean	SD	Kurtosis	Skewness	Outer loadings	α	ρ_A	ρ_C	AVE
High-Performance Work Systems						0.922	0.926	0.933	0.540
HPWS01	3.882	1.073	-0.072	-0.766	0.632				
HPWS02	4.061	1.018	-0.194	-0.841	0.665				
HPWS03	4.217	0.950	0.708	-1.122	0.663				
HPWS04	4.027	0.978	0.261	-0.880	0.791				
HPWS05	4.016	1.011	0.683	-1.016	0.769				
HPWS06	3.946	1.038	-0.126	-0.757	0.746				
HPWS07	4.070	1.003	0.252	-0.955	0.740				
HPWS08	4.176	0.887	1.083	-1.068	0.743				
HPWS09	3.909	1.066	-0.128	-0.802	0.762				
HPWS10	3.885	1.168	-0.270	-0.837	0.777				
HPWS11	3.818	1.186	-0.605	-0.669	0.743				
HPWS12	3.922	1.117	-0.573	-0.690	0.767				
Green Work Engagement						0.904	0.910	0.922	0.598
GWENG01	3.904	1.073	0.482	-0.968	0.844				
GWENG02	3.987	0.985	0.558	-0.934	0.797				
GWENG03	3.730	1.116	-0.158	-0.692	0.763				
GWENG04	3.588	1.173	-0.525	-0.523	0.687				
GWENG05	3.725	1.143	-0.143	-0.707	0.806				
GWENG06	3.920	1.002	0.646	-0.943	0.780				
GWENG07	3.762	1.072	0.198	-0.809	0.734				
GWENG08	3.775	1.108	0.132	-0.814	0.765				
GWENG09	dropped								
Thriving at Work						0.853	0.876	0.886	0.529
TAW01	3.946	0.926	1.089	-0.987	0.608				
TAW02	dropped								
TAW03	dropped								
TAW04	3.976	0.903	0.957	-0.916	0.604				
TAW05	3.671	1.286	-0.681	-0.633	0.813				
TAW06	3.678	1.262	-0.894	-0.506	0.787				
TAW07	3.975	1.103	-0.161	-0.863	0.736				
TAW08	3.946	1.141	-0.055	-0.912	0.740				
TAW09	3.920	1.208	-0.200	-0.915	0.773				
TAW10	dropped								
Green Voice Behavior						0.658	0.735	0.811	0.592
GVB01	3.893	1.114	0.050	-0.873	0.894				
GVB02	3.869	1.105	-0.818	-0.527	0.681				
GVB03	3.674	1.204	-0.510	-0.662	0.717				
Intrinsic Religiosity						0.911	0.930	0.936	0.751
IR01	3.756	1.141	-0.354	-0.682	0.887				
IR02	3.810	0.997	-0.909	-0.393	0.931				
IR03	3.920	0.886	0.479	-0.768	0.600				
IR04	3.631	1.125	-0.351	-0.573	0.906				
IR05	3.762	1.099	-0.234	-0.670	0.960				

Notes: Outer loadings significance= *** p-value < 0.001 based on 10,000 two-tailed bootstrapping test; α = coefficient alpha; ρ_A = Composite reliability (rho_a); ρ_C = Composite reliability (rho_c); AVE = Average variance extracted.

severe pollution. We reached out to 150 hotels in major cities (Rawalpindi, Islamabad, and Lahore), and 103 agreed to participate. The human resource management departments helped compile the list of participants.

Time-lagged data were collected over a 2-month interval. In the first wave, 850 surveys were distributed to hotel employees, yielding 395 responses. The participants provided information on HPWS, intrinsic religiosity, GWENG, and demographic details. In the second wave, 395 surveys were sent to the same respondents to collect data on TAW and GVB. Three hundred and ninety-five surveys were returned. However, 374 valid responses were used for analysis, resulting in a 44 % response rate. The sample size adequacy and its statistical power were confirmed using the inverse square root method (Kock, 2018). Table 1 presented the demographic characteristics.

3.2. Common method bias and endogeneity

The data collection process was designed to address common method bias (CMB) by using time-lagged data (Podsakoff et al., 2003). A 2-month interval between independent and dependent variables helps reduce the risk of biased responses influenced by questionnaire cues or recall of prior answers. Based on the AMO model and JD-R theory, a

two-month lag could allow sufficient time for HPWS perceptions to influence employees' psychological states and subsequent discretionary behaviors. Moreover, as other researchers have acknowledged prior to our study (e.g., Meirun et al., 2024; Tuan, 202, 2022), this lag strikes a balance: it is sufficiently long to reduce cognitive overlap between measures and prevent consistency biases, while remaining short enough to minimize participant attrition and preserve contextual stability within the organization.

We assessed CMB with two statistical tests. First, Harman's single-factor test included all measurement items in an unrotated factor analysis. The single factor accounted for 39 % of the variance. This was < the 50 % threshold, denoting minimal CMB. Due to its limitations, we supplemented Harman's test with additional methods. We used the random dependent variable technique by Kock and Lynn (2012) to detect CMB in PLS-SEM. This method links all variables to a randomized dependent variable (0–1) and checks for Variance Inflation Factor (VIF) values > 3.3, denoting problematic CMB. The VIF values ranged from 1.64 to 3.30, suggesting no significant CMB. Combined with Harman's test, the results confirmed that CMB was not a concern.

To further ensure the robustness of our findings, we implemented the Gaussian copula approach to test the potential endogeneity, in line with the procedures outlined by Hult et al. (2018). As a preliminary step, we

applied the Cramér-von Mises test, which indicated non-normality in the distribution of the independent composites—a prerequisite for this technique. Subsequently, we performed a two-tailed bootstrap procedure with 10,000 iterations, the percentile bootstrap as the confidence interval method, and a significance level of 0.05, to estimate the copula effects. Copula terms were sequentially incorporated into each structural path leading to the model's outcome variable. The analysis revealed that none of the copula terms reached statistical significance at the 0.05 level ($GC_{(HPWS \rightarrow GVB)} \rightarrow GVB: \beta = -0.0147, p_{two-tailed} > 0.826$; $GC_{(TW \rightarrow GVB)} \rightarrow GVB: \beta = 0.017, p_{two-tailed} > 0.773$; $GC_{(GWE \rightarrow GVB)} \rightarrow GVB: \beta = 0.050, p_{two-tailed} > 0.342$), suggesting that endogeneity is unlikely to pose a threat to the validity of our results (Hair et al., 2024).

3.3. Measurement

The research variables were defined as reflective composites using validated scales, with responses measured on 5-point scales. A pre-test with three academics and two hotel employees resulted in minor adjustments to enhance clarity.

We gauged HPWS via 12 items developed by Zhang et al. (2014). A sample item is "Employees have clear career paths within the company". Abualigah et al. (2023a) adapted 9 work engagement items from Schaufeli et al. (2006) to assess GWENG. For example, "I am proud of the work I do" was adapted to "I am proud of the environmental work that I do". In this paper, these nine items were used to operationalize GWENG.

TAW was assessed using 10 items developed by Porath et al. (2012). An example item is "At work, I am developing a lot as a person". GVB was gauged using Aboramadan et al.'s (2022) 3-item scale previously adapted from Van Dyne and LePine (1998). An example item is "I communicate my opinions about green work issues to others even if my opinions are different and others at work disagree with me". Intrinsic religiosity was assessed using 5 items adapted from Chowdhury (2018). An example item is "I try hard to live all my life according to my religious beliefs".

Employees' voice and pro-environmental behaviors can be influenced by their demographic characteristics (Tabrizi et al., 2023). Therefore, the control variables contained gender (2 categories) and length of service (4 categories).

3.4. Strategy for data analysis

Following Hair et al. (2019), we utilized a predictive approach to evaluate the theoretical framework, focusing on the model's ability to generate accurate cross-sectional predictions. Given its predictive strengths, we used Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS v.4. Based on Hair et al. (2020), the analysis was conducted in stages: first, assessing the measurement model's quality; next, evaluating the structural model; and finally, testing the model's predictive power.

4. Results

4.1. Measurement model quality

The reliability of each measure was evaluated through loadings and significance, using the criteria of loadings > 0.708 and p -values < 0.05 (Hair et al., 2020). Most items met these criteria (see Table 2), but a few did not. According to Hair et al. (2022), items with loadings < 0.4 should be removed. In light of this, 1 GWENG item and 3 TAW items were excluded. For items with loadings between 0.4 and 0.687, a case-by-case evaluation was conducted. As a result, 8 items were retained, all with significant values > 0.000 for a two-tailed test at the 5 % level.

Construct reliability was assessed using Cronbach's alpha (α) and composite reliability (p_A and p_C), with values expected to range between 0.70 and 0.95 (Hair et al., 2020). All values were below 0.95, demonstrating no redundancy issues (see Table 2). Most values

Table 3
Discriminant validity check using the HTMT₈₅ criterion.

Construct	Heterotrait-Monotrait Criterion				
	1	2	3	4	5
(1)High-performance work systems	-				
(2)Green work engagement	0.594	-			
(3)Thriving at work	0.714	0.721	-		
(4)Green voice behavior	0.581	0.642	0.835	-	
(5)Intrinsic religiosity	0.582	0.821	0.828	0.662	-

Notes: HTMT= Heterotrait-monotrait ratio based on PLS algorithm and path weighting scheme.

exceeded the 0.70 threshold, except for GVB, which had $\alpha = 0.658$, while $p_A = 0.735$ and $p_C = 0.811$. According to Hair et al. (2019), α values > 0.6 are acceptable, especially when composite reliability exceeds 0.7, as α is less precise and tends to produce lower values. Therefore, all measures were reliable.

Convergent validity was assessed using Average Variance Extracted (AVE), with values ≥ 0.5 indicating validity (Hair et al., 2020). The AVE values varied from 0.529 to 0.751, confirming convergent validity for the study variables.

Discriminant validity was gauged via the heterotrait-monotrait ratio of correlations (HTMT_{ratio}) (Hair et al., 2020). HTMT values < 0.85 indicate that the AVE within a composite exceeded the variance between composites (Henseler et al., 2015). None of the HTMT_{ratio} values exceeded 0.85 (see Table 3), confirming discriminant validity.

The standardized root mean square residual (SRMR) was utilized to assess approximate model fit from both structural and saturated perspectives. Although fit measures are typically used in confirmatory studies (Hair et al., 2019; Henseler, 2018), we included the SRMR as part of our quality analysis. SRMR values below 0.080, denoting a good fit (Henseler, 2018). The SRMR for our saturated model was 0.064, and for the estimated model, it was 0.070, both within acceptable fit parameters.

4.2. Structural model results

To gauge multicollinearity in the structural model, we used the Variance Inflation Factor (VIF), following Hair et al. (2020), with a threshold of 3.0. The VIF values for all construct pairs ranged from 1.423 to 2.299 (see Table 4), showing that multicollinearity was unlikely to affect the structural model analysis.

We began evaluating the structural model following the guidelines for the mediation analysis (Cepeda-Carrion et al., 2017). The analysis started by testing the direct effects, which included:

- c' effect= HPWS→GVB
- a_1 effect= HPWS→GWENG
- a_2 effect= HPWS→TAW
- a_3 effect= GWENG→TAW
- b_1 effect= GWENG→GVB
- b_2 effect= TAW→GVB

We deployed a "bootstrapping test with 10,000 subsamples" to gauge the significance and magnitude of direct effects. Fig. 2 presented the path coefficients and p -values based on "bias-corrected confidence intervals" computed via the bootstrap percentile method.

The evaluation of specific and total indirect effects in the model helped us to assess the proposed hypotheses (see Table 4). Specifically, the link between HPWS and GVB did not have a significant value ($\beta=0.011, p_{one-tailed}>0.431$) and the confidence interval contained zero. Hence, hypothesis 1 was not supported. However, a positive indirect effect between HPWS and GVB via GWENG ($\beta=0.025, p_{one-tailed}<0.032$) was demonstrated, supporting hypothesis 2. Similarly, a positive indirect relationship was confirmed between HPWS and GVB via TAW ($\beta=0.264, p_{one-tailed}<0.000$), which provided empirical support for hypothesis 3. Finally, the association between HPWS and GVB was positively mediated by GWENG and TAW serially ($\beta=0.060, p_{one-tailed}<0.000$).

Table 4
Structural model test results.

	VIF	Path Coefficient (p-value)	t-values	CI	Conclusion
Direct effects test					
H1:HPWS→GVB(<i>c'</i>)	1.843	0.011(0.431)	0.173	[−0.095;0.113]	H1 Rejected
HPWS→GWENG(<i>a1</i>)	1.423	0.230(0.000)	5.095	[0.154;0.302]	
HPWS→TAW(<i>a2</i>)	1.431	0.425(0.000)	9.645	[0.351;0.495]	
GWENG→TAW(<i>a3</i>)	1.431	0.422(0.000)	9.163	[0.344;0.494]	
GWENG→GVB(<i>b1</i>)	1.841	0.109(0.022)	2.005	[0.023;0.203]	
TAW→GVB(<i>b2</i>)	2.299	0.654(0.000)	12.761	[0.536;0.696]	
Mediating effects test					
H2:HPWS→GWENG→GVB(<i>a1b1</i>)		0.025(0.032)	1.850	[0.007;0.052]	H2 supported
H3:HPWS→TAW→GVB(<i>a2b2</i>)		0.264(0.000)	7.792	[0.206;0.325]	H3 supported
H4:HPWS→GWENG→TAW→GVB(<i>a1a3b2</i>)		0.060(0.000)	4.932	[0.041;0.083]	H4 supported
TOTAL indirect effects HPWS on GVB		0.350(0.000)	9.895	[0.294;0.409]	
TOTAL effects HPWS on GVB		0.360(0.000)	6.694	[0.268;0.446]	
Moderating effects test					
H5:HPWS*IR→GWENG		0.071(0.002)	2.864	[0.035;0.116]	H5 supported
H6:HPWS*IR→GWENG→TAW→GVB		0.018(0.002)	2.855	[0.009;0.031]	H6 supported
Control Variables					
Gender→GVB	1.016	0.055(0.499)	0.676	[−0.105;0.214]	No effect
Length of service→GVB	1.033	0.062(0.104)	1.625	[−0.009;0.139]	No effect
Endogenous variable		R ²		Adjusted R ²	
GWENG		0.608		0.604	
TAW		0.556		0.553	
GVB		0.498		0.494	

Notes: HPWS= High-performance work systems; GWENG= Green work engagement; TAW= Thriving at work; GVB= Green voice behavior; IR= Intrinsic religiosity. CI= Confidence interval bias corrected based on 10,000 samples and one-tailed bootstrapping test; Control variable test based on 10,000 bootstrapping, two-tailed and confidence interval bias corrected.

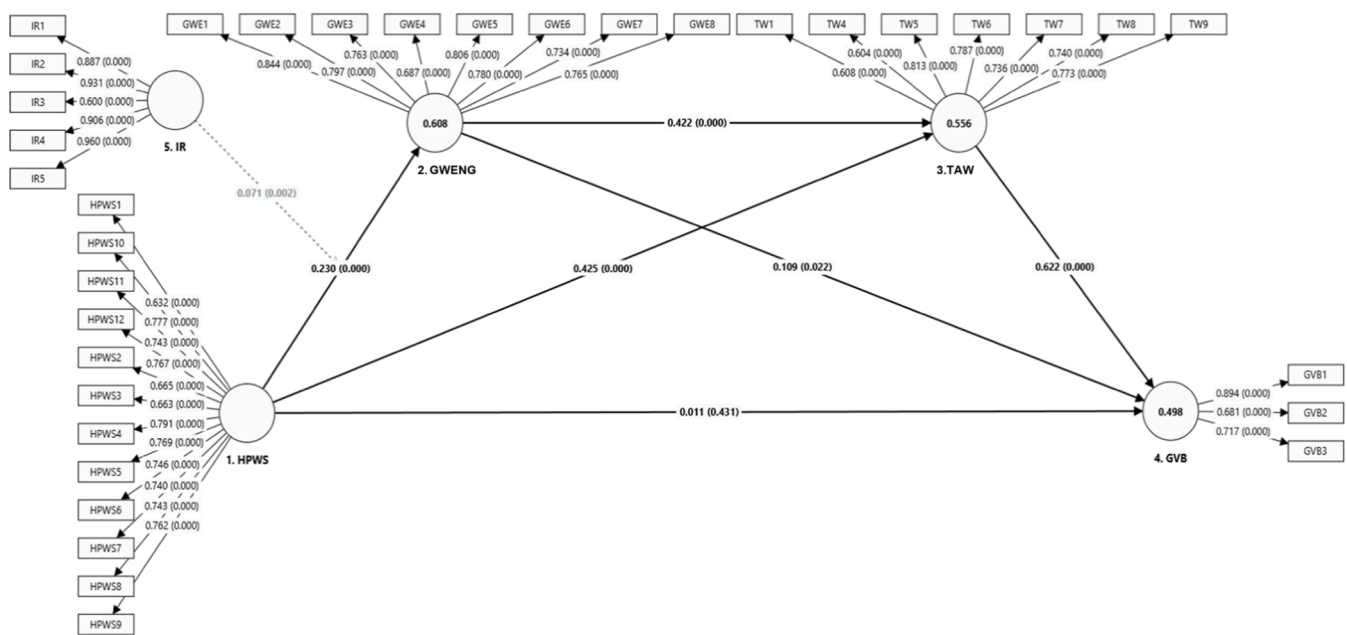


Fig. 2. Direct effects structural model results.

Notes: HPWS= High-performance work systems; GWENG= Green work engagement; TAW= Thriving at work; GVB= Green voice behavior; IR= Intrinsic religiosity. Graphic output from SmartPLS.4 software; Inner model: paths and (p-values); Outer Model: item loadings and (p-values); Based on one-tailed bootstrapping test and 10,000 samples; Confidence interval Method=Percentile bootstrap; Significance level= 0.05.

tailed<0.000), which allowed us to confirm hypothesis 4.

We assessed the moderation effects in hypotheses 5 and 6, using graphs for clarity (Hair et al., 2022). Hypothesis 5, which suggested that intrinsic religiosity moderated the HPWS-GWENG relationship, showed a positive effect ($\beta=0.071$, $p_{\text{one-tailed}}<0.002$). The hypothesis proposed that high intrinsic religiosity would strengthen the HPWS-GWENG link.

Slope graphs illustrated this, with Fig. 3 showing a steeper positive slope for high intrinsic religiosity (dotted line) compared to low intrinsic religiosity (solid line). These findings supported hypothesis 5.

Similarly, hypothesis 6 proposed that intrinsic religiosity would function as a moderator of the indirect link of HPWS to GVB through GWENG and TAW. The results confirmed a significant moderation effect

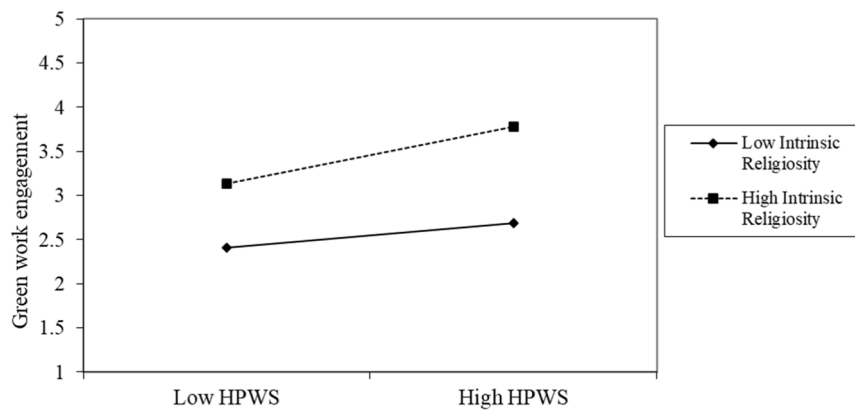


Fig. 3. Moderating effect of intrinsic religiosity on the direct relationship between high-performance work systems (HPWS) and green work engagement (H5).

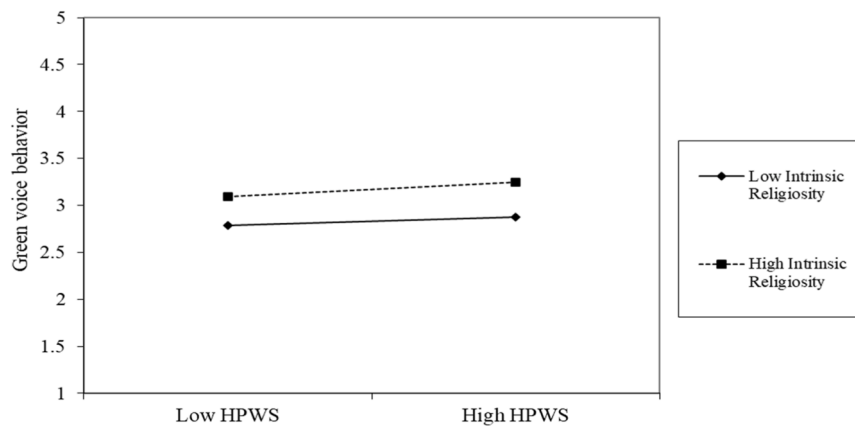


Fig. 4. Moderating effect of intrinsic religiosity on the indirect relationship between high-performance work systems (HPWS) and green voice behavior through green work engagement and thriving at work (H6).

Table 5
Out-of-sample predictive power assessment.

Indicators of Green Voice Behavior	Q ² _{predict}	PLS RMSE	LM RMSE	PLS-LM differential	Conclusion
GVB01	0.335	0.912	0.921	−0.009	High predictive power
GVB02	0.076	1.066	1.078	−0.012	
GVB03	0.143	1.117	1.120	−0.003	

Notes: PLS RMSE=Root mean square error for a PLS model solution; LM RMSE=Root mean square error for a linear regression model solution; PLS-LM= Differential between the PLS solution and the linear regression model solution.

PLS_{predict} routine based on 7 subgroups (k) and 10 repetitions (r).

of the indirect relationship ($\beta=0.018$, $p_{\text{one-tailed}} < 0.002$). The hypothesis suggested that high intrinsic religiosity would strengthen the indirect effect between HPWS and GVB via GWENG and TAW. Fig. 4 showed a steeper positive slope for high intrinsic religiosity (dotted line) compared to low values (solid line). In short, hypothesis 6 was confirmed.

4.3. Predictive capacity of the out-of-sample model

Consistent with our approach, we assessed the model's predictive capacity, which reflected its ability to generate accurate predictions for new or out-of-sample observations. High predictive power strengthens the conclusions drawn from the model (Hair et al., 2019). We used the PLS_{predict} procedure (Shmueli et al., 2019) to measure predictive validity

with holdout samples. PLS_{predict} was based on k-sections = 7 cross-validation, while the number of repetitions was set at 10. RMSE (root mean square error) was used to measure prediction error, as skewness values were below 1 in absolute value. A linear regression (LM) model was built to predict the endogenous indicator (GVB), and the results were compared with those from the PLS model (see Table 5). For a strong predictive capacity, RMSE values should be lower for the PLS model than for LM. Each indicator showed a lower RMSE for PLS. Based on Shmueli et al. (2019), this confirmed the model's high predictive power.

4.4. Evaluation of model robustness

To test for nonlinear relationships, a key robustness check (Hair et al., 2019), we built a polynomial model by adding a quadratic interaction term (QE) to each pattern, as outlined by Hair et al. (2024). Given that QEs are the most common test for nonlinearity, non-significant QEs in a two-tailed bootstrap test would indicate no nonlinear relationships. The findings in Table 6 illustrated that the interaction terms for both direct and indirect effects were not significant, supporting the robustness of the linear relationships in our model.

We did not find empirical support for hypothesis 1, leading us to explore a nonlinear explanation (Rescalvo-Martin et al., 2024). We added a quadratic interaction term to the c' effect and tested it with a bootstrap test (10,000 samples, two-tailed) (Hair et al., 2024). The significant positive quadratic term ($\beta_{QE}=0.157$, $p_{\text{two-tailed}} < 0.000$) suggests that the HPWS→GVB relationship may be nonlinear, not linear. A graphical representation of the QE (Fig. 4) showed a convex curve,

Table 6

Testing for possible non-linear effects in confirmed hypotheses.

	Path Coefficient (p-value)	t-values	CI	f ²	Conclusion
Quadratic effect (QE) on direct path					
QE _{(HPWS*HPWS)→GWENG}	0.023(0.499)	0.676	[−0.028;0.107]	0.001	No effect
QE _{(HPWS*HPWS)→TAW}	0.018(0.464)	0.733	[−0.038;0.061]	0.001	No effect
QE _{(GWE*GWE)→GVB}	0.014(0.752)	0.316	[−0.066;0.112]	0.000	No effect
QE _{(TW*TW)→GVB}	−0.060(0.159)	1.410	[−0.139;0.028]	0.006	No effect
Quadratic effect (QE) on indirect path					
QE _{(HPWS*HPWS)→GWENG→GVB}	0.002(0.598)	0.528	[−0.002;0.016]		No effect
QE _{(HPWS*HPWS)→TAW→GVB}	0.011(0.461)	0.737	[−0.023;0.036]		No effect
QE _{(HPWS*HPWS)→GWENG→TAW→GVB}	0.005(0.508)	0.662	[−0.006;0.024]		No effect
TOTAL QE _{HPWS} indirect on GVB	0.018(0.275)	1.091	[−0.016;0.050]		No effect

Notes: QE= quadratic effect; HPWS= High-performance work systems; GWENG= Green work engagement; TAW= Thriving at work; GVB= Green voice behavior; IR= Intrinsic religiosity.

CI= Confidence interval bias corrected based on 10,000 samples and two-tailed bootstrapping test

indicating a nonlinear effect (Hair et al., 2024). While confirming a nonlinear effect rather than a linear one helps explain the unexpected result, we recommend considering this in future research with a relevant theoretical framework.

5. Discussion

5.1. General findings

The findings supported all hypotheses except the direct effects of HPWS on GVB. The lack of support for this direct relationship suggests that it may be nonlinear and could become significant when an intervening mechanism, grounded in a theoretical framework, is included. Our results indicate that GWENG acts as a motivational mechanism through which HPWS positively influence GVB, aligning with the JD-R framework (Bakker, Demerouti, 2017) and recent investigations (Abualigah et al., 2023a). In line with SIP theory (Salancik and Pfeffer, 1978), TAW was reported to mediate the linkage between HPWS and GVB. This supports recent research (Akhtar et al., 2024), suggesting that HPWS provide resources like skill development and empowerment, which enhance learning and energy at work, motivating employees to contribute to the company's agenda via eco-friendly ideas.

Our findings further support the idea that GWENG and TAW function as serial mediators. Employees who receive resources through HPWS become more engaged in green work, which enhances TAW, ultimately leading to GVB. This exploration of GWENG and TAW as serial mediators provides a more nuanced understanding of how organizational strategies influence workers' attitudes and behaviors. Thus, our study contributes to the growing but still limited research on sequential mediating effects within the hospitality knowledge base. Although we recognize that these results may be viewed as incremental extensions of established frameworks, we believe they address an important theoretical gap regarding the mechanisms by which HPWS affect discretionary green behavior.

Our findings indicate that intrinsic religiosity strengthens the HPWS-GWENG relationship. Employees with high intrinsic religiosity view green work as a religious duty, motivating them to protect the environment as part of their moral obligation to God (Nasir et al., 2022). This aligns with COR theory, which suggests that job resources interact with personal resources to influence employee behavior (Badar et al., 2023). Notably, intrinsic religiosity also moderates the indirect effects of HPWS on GVB through GWENG and TAW, highlighting the important role of personal resources in shaping environmentally conscious behavior at work. This moderation effect, while grounded in existing theoretical assumptions, responds to a specific gap in the literature concerning the role of spiritual values in sustainability-focused HRM research—particularly in organizational contexts.

5.2. Theoretical implications

Our paper augments the current knowledge base by assessing the interrelationships of HPWS, GWENG, TAW, GVB, and intrinsic religiosity. First, the results are generally supportive of the hypothesized associations. Specifically, GWENG and TAW are the antecedents to hotel employees' GVBs, and HPWS heighten GVB through GWENG or TAW. As advanced by JD-R theory (Bakker, Demerouti, 2017), hotel workers who avail themselves of job resources resulting from HPWS would cultivate their knowledge and skills. Such employees would be more green work engaged and thereby would contribute to the firm by making recommendations regarding environmental issues. These findings are new additions to the literature that GWENG or TAW are the intervening mechanisms relating HPWS to GVB (e.g., Benítez-Núñez et al., 2024; Tabrizi et al., 2023).

Second, more importantly, the findings suggest that GWENG and TAW are the sequential mediators of the impacts of HPWS on GVB. Previous studies on GVB have mainly focused on assessment of the influence of one mediator (e.g., Aboramadan et al., 2022; Tabrizi et al., 2023). Our study advances the existing understanding through examining GWENG and TAW as serial mediators, offering a more nuanced theoretical understanding of the mechanisms relating HPWS to GVB. A detailed examination of the existing literature delineates no empirical evidence regarding the abovementioned paths. Hotel employees with sufficient job resources associated with HPWS would be highly green work engaged. Such employees would in turn possess a heightened sense of vitality and learning at work, giving rise to GVB at elevated levels.

Third, religiosity can affect workers' attitudes and behaviors (Abualigah et al., 2023b). According to COR theory (Hobfoll et al., 2018), intrinsic religiosity can be considered as a personal resource. Hotel employees high on intrinsic religiosity would take advantage of HPWS and therefore would feel happy when they work intensely on green issues. While past writings have investigated the effect of religiosity on behavioral ethics (Alqhaiwi et al., 2024), work-related stress (Weiß and Süß, 2019), and consumer behavior (Elhoushy and Jang, 2021), little is known about the influence of intrinsic religiosity in promoting employee green behavior. Thus far no studies, to our knowledge, have examined the effect of intrinsic religiosity as a moderator on the linkage between HPWS and GVB in the general environmental management literature and hospitality setting. Testing intrinsic religiosity as a moderator between HPWS and GWENG is an important addition to the literature.

Lastly, the results provide support for our proposed conceptualization of moderated serial mediation model of HPWS. These are *novel* paths, suggesting that intrinsic religiosity as a personal resource is a moderator of the indirect effects on HPWS on GVB via GWENG and TAW. In other words, our paper highlights the moderating role of intrinsic religiosity on the indirect relationship of HPWS to GVB via GWENG and TAW.

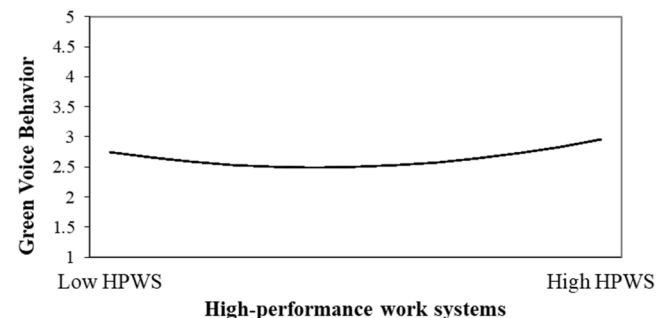


Fig. 5. Curvilinear effects of high-performance work systems on green voice behavior.

5.3. Practical implications

Our study provides useful implications for managers and human resource professionals. First, intrinsic religiosity is a significant factor in enhancing the achievement of sustainable goals. Therefore, management should support intrinsic religiosity at work by integrating it thoroughly into institutional values and policies. This is particularly important in Muslim-majority countries like the one under study (i.e., Pakistan), where religious values and beliefs significantly shape employee attitudes and behaviors (Abualigah and Badar, 2024).

Second, organizations are advised to offer training programs that focus on the importance of protecting the environment from an Islamic standpoint by considering Islamic teachings, values, and principles. This is likely to foster employees' engagement in green activities, make them feel vital and alive, and stimulate them to speak up and offer recommendations to promote sustainability. Third, organizations can motivate employees to display environmentally conscious behavior through rewards and incentives. Management can create a supportive atmosphere to boost sustainable development by introducing eco-initiatives (e.g., eco-champion) (Karatepe et al., 2024). This could lead to promoting green behavior at work and encouraging high performers to contribute to the attainment of green goals.

Fourth, management should utilize strict selective staffing procedures to hire the most suitable candidates for open positions. This is so critical for the ones who are supposed to be green work engaged. Promoting the availability of HPWS such as delegation of authority, intense training and development programs, recognition and rewards, and job security would attract the talented candidates to the firm. However, management should make sure that the abovementioned HPWS are in place and can be managed.

5.4. Limitations and future lines of research

Though our paper fills in lacunas in the hospitality literature by gauging the interrelationships of HPWS, GWENG, TAW, GVB, and intrinsic religiosity, there are several limitations that should be highlighted. First, we utilized time-lagged data. This presents some evidence

for temporal causality (e.g., Grandey and Cropanzano, 1999). However, it is not enough. With this realization, to overcome this limitation, future studies could use cross-lagged panel design to make firm casual inferences. Second, we collected time-lagged data and utilized several additional procedures to minimize the menace of CMB and performed statistical analyses to control CMB. Although CMB was not a problem in this study, it would be better if researchers in the future could obtain data such as supervisor ratings of employees' GVBs.

Third, GVB was used as an organizationally valued green consequence that was subjected to limited inquiry (e.g., Nourafkan et al., 2024). Tapping other critical outcomes such as green recovery performance and green adaptive performance and testing intrinsic religiosity as a moderator of the indirect links of HPWPS to these green outcomes and GVB through GWENG and TAW would enhance the compendium of knowledge in the hospitality literature.

Fourth, the results in our study are based on data gathered from employees in a Muslim country (i.e., Pakistan). Therefore, assessing our model through gathering data from Muslim and non-Muslim employees would allow for comparative analysis pertaining to the effect of intrinsic religiosity at work. In closing, assessing said associations based on cross-national data would expand the database for further generalizations.

Furthermore, one may argue that organizations with and without formal environmental sustainability policies may differ in the mechanisms linking HPWS to green behavioral outcomes, particularly in the case of GWENG or GVB. While this concern was ruled out in our dataset through a FIMIX-PLS analysis to evaluate the presence of unobserved heterogeneity within our sample (Hair et al., 2024), future research should explicitly capture the presence of green policies at the organizational level and examine their potential role as moderators or control variables in models linking HRM practices to pro-environmental behavior. For instance, a multigroup analysis (MGA) comparing firms with formally adopted environmental policies versus those without could provide further insight into the contextual dependencies of HRM-behavior linkages.

CRediT authorship contribution statement

Osman M. Karatepe: Writing – original draft, Methodology, Conceptualization. Qasim Ali Nisar: Writing – original draft, Resources, Data curation, Conceptualization. Elisa Rescalvo-Martin: Writing – original draft, Methodology, Formal analysis, Conceptualization. Ahmad Abualigah: Writing – original draft, Project administration, Methodology, Conceptualization.

Declaration of Competing Interest

None

Acknowledgment

Data used in this paper came from part of a larger project.

Appendix

Table A1
Latent variable correlations matrix and summary statistics

	1	2	3	4	5	6	7
1. High-Performance Work Systems	-						
2. Green Work Engagement	0.549***	-					
3. Thriving at Work	0.657***	0.655***	-				

(continued on next page)

Table A1 (continued)

	1	2	3	4	5	6	7
4. Green Voice Behavior	0.478***	0.522***	0.700***	-			
5. Intrinsic Religiosity	0.525***	0.754***	0.732***	0.542***	-		
6. Gender	-0.053	-0.058	-0.019	0.006	-0.060	-	
7. Length of service	0.067	0.056	0.141**	0.152*	0.075	-0.096	-
Mean	3.994	3.799	3.873	3.812	3.776	0.280	2.810
Standard deviation	0.766	0.839	0.825	0.879	0.910	0.449	0.948

Notes: ***p < 0.001 (two-tailed); **p < 0.01 (two-tailed); *p < 0.05 (two-tailed).

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