An Investigation of the Hotel Industry's Green Innovation Adoption in Bangkok

การศึกษาและประเมินผลการสร้างนวัตกรรมสีเขียวของธุรกิจอุตสาหกรรมโรงแรมในเขตกรุงเทพมหานคร

Phairat Boonsuwan*
ไพรัช บุญสุวรรณ
Graduate School of Business, Siam University
บัณฑิตวิทยาลัยบริหารธุรกิจ มหาวิทยาลัยสยาม
Bing Zhu
บิง ซู
Martin de Tours School of Management and Economics, Assumption University
คณะบริหารธุรกิจและเศรษฐศาสตร์ มหาวิทยาลัยอัสสัมชัญ
Marissa Chantamas
มาริสา จันทมาศ
Faculty of Communication Arts, Assumption University
คณะนิเทศศาสตร์ มหาวิทยาลัยอัสสัมชัญ
*phairatbsw@gmail.com

Abstract

This research aimed to explore the influence of intrapreneurship, environmental collaboration, and sustainable human capital leadership on the adoption of green innovations within the hotel industry in Bangkok. An online survey was conducted from August 1 to September 15, 2021, utilizing snowball and convenient sampling techniques to gather responses from management–level employees at ten hotels. After the data was meticulously cleaned, 221 valid sets were identified for analysis using PLS–SEM and mediation effects analysis through bootstrapping techniques. The findings revealed that intrapreneurship and sustainable human capital leadership had a direct and significant impact on green innovation adoption, while environmental collaboration did not. Additionally, mediation analysis confirmed the mediating role of servant leadership and mindful leadership while rejecting the mediating role of environmental collaboration in the model. The study offers implications from theoretical, practical, and research perspectives.

Received : January 7, 2025 **Revised :** February 21, 2025 **Accepted :** March 22, 2025

Keywords : intrapreneurship, environmental collaboration, human capital sustainability leadership, green innovation adoption (GIA)

บทคัดย่อ

งานวิจัยนี้ มีวัตถุประสงค์เพื่อศึกษาความสัมพันธ์ระหว่างปัจจัยสำคัญที่ส่งผลต่อการนำนวัตกรรมสีเขียวมาใช้ในอุตสาหกรรมโรงแรมในเขตกรุงเทพมหานคร โดยมุ่งเน้นศึกษาบทบาทของภาวะผู้ประกอบการ ความร่วมมือด้านสิ่งแวดล้อม และภาวะผู้นำยั่งยืนของทุนมนุษย์ งานวิจัยนี้มุ่งวิเคราะห์ว่าปัจจัยดังกล่าวส่งผลโดยตรงต่อการสร้างนวัตกรรมสีเขียวในองค์กรหรือไม่อีกทั้งงานวิจัยยังสำรวจบทบาทของปัจจัยตัวกลางได้แก่ ภาวะผู้นำแบบผู้รับใช้ และภาวะผู้นำอุดมสติ ในการสนับสนุนการสร้างนวัตกรรมสีเขียว นอกจากนี้ยังทำการวิเคราะห์ว่าความร่วมมือด้านสิ่งแวดล้อมจะเป็นปัจจัยตัวกลางที่สำคัญหรือไม่ การเก็บข้อมูลในงานวิจัยนี้ดำเนินการผ่านการสำรวจออนไลน์ โดยมุ่งเน้นกลุ่มตัวอย่างที่เป็นผู้บริหารระดับสูง หัวหน้าแผนกหรือผู้จัดการจากโรงแรมและสถานประกอบการที่พักต่าง ๆ ในกรุงเทพมหานคร รวมทั้งหมด 10 แห่งและการเก็บข้อมูลได้รวมทั้งสิ้น 221 ชุด ซึ่งได้ใช้วิธีการสุ่มตัวอย่างแบบ Snowball Sampling และ Convenient Sampling ในช่วงระหว่างวันที่ 1 สิงหาคม ถึง 15 กันยายน 2564

ข้อมูลที่ได้ผ่านการวิเคราะห์เชิงสถิติแบบ PLS–SEM และการวิเคราะห์การไกล่เกลี่ย โดยใช้วิธี Bootstrapping การศึกษาเปิดเผยได้ว่า ภาวะผู้ประกอบการและภาวะผู้นำยั่งยืนเป็นปัจจัยสำคัญที่ส่งผลกระทบให้เกิดความร่วมมือในการสร้างนวัตกรรมสีเขียว โดยภาวะผู้นำแบบผู้รับใช้และภาวะผู้นำแบบสติเป็นตัวแปรสำคัญที่จุงใจให้เกิดความร่วมมือด้านสิ่งแวดล้อมในองค์กร ซึ่งผลการวิจัยนี้มีเป้าหมายเพื่อเสนอข้อสรุปที่มีคุณค่าในแง่ของการพัฒนานวัตกรรมสีเขียวผ่านภาวะผู้นำที่เหมาะสม และสอดคล้องกับทฤษฎีปฏิบัติ พร้อมทั้งข้อเสนอแนะจากงานวิจัยนี้ได้สนับสนุนการเสริมสร้างความเจริญเติบโตอย่างยั่งยืนในธุรกิจอุตสาหกรรมโรงแรมของประเทศต่อไป

คำสำคัญ : ภาวะผู้ประกอบการ ความร่วมมือด้านสิ่งแวดล้อม ภาวะผู้นำยั่งยืน การสร้างนวัตกรรมสีเขียว

Introduction

The success of the fourth industrial revolution and the digital economy hinges on an eco–friendly framework, where green innovation plays a crucial role (Nguyen & Nguyen, 2021; Wang et al., 2022). This approach involves sustainable manufacturing to minimize waste and emissions, thereby optimizing energy use (Takalo et al., 2021; Castellacci & Lie, 2017). On a macro level, green innovation helps countries foster sustainable growth (Xiang et al., 2022), while on a micro level, it aids companies in enhancing market presence and ensuring long–term success (Takalo et al., 2021). Successfully adopting green innovation can strengthen a firm's market position and provide a competitive edge (Gürlek & Tuna, 2018). Consequently, businesses increasingly incorporate sustainability principles to improve operating costs and performance (Chiou et al., 2011), particularly in the hotel industry.

In this sector, green innovation focuses on reducing energy consumption, utilizing renewable sources, and minimizing waste (Fatoki, 2021). Hotels are implementing environmental management systems and 3R practices to drive sustainable growth (Arena et al., 2018; Weng et al., 2015). Sustainability is paramount for the industry's growth, as pollution threatens development (Abou et al., 2020; Jones et al., 2014). Collaboration among hotels is vital for this growth. This study investigates how hotel management systems in the Bangkok Metropolitan Area influence green innovation through intrapreneurship, collaboration, and leadership. Although intrapreneurship is underexplored, especially in Thailand, it offers valuable insights into organizational activities (Antoncic & Hisrich, 2003).

Thailand's thriving hotel industry, boosted by its popularity as a tourist destination, presents an opportunity for exploration (Krungsri Research, 2021). This study employs the intrapreneurship framework by Antoncic & Antoncic (2011) to understand the impact of internal and external stakeholders on eco–friendly innovations in Bangkok's hotels. The findings will provide valuable insights for both academia and the hospitality sector.

The remainder of the manuscript is structured to provide a clear roadmap for the reader. The second section delves into a comprehensive literature review, examining existing research and theoretical frameworks relevant to the study. Following this, the third section outlines the research methodology employed, detailing the approach and techniques used to gather and analyze data. In the fourth section, the findings from the data analysis are presented, offering insights and evidence drawn from the research. This is followed by the fifth section, which engages in a thorough discussion of the implications of these findings, as well as drawing conclusions based on the research outcomes. The sixth section addresses the practical implications of the study's results, exploring how they can be applied in real–world contexts. Finally, the manuscript concludes with a discussion of the study's limitations, reflecting on potential constraints and suggesting avenues for future research.

Research Objective

This study aims to examine how hotel management systems in Bangkok's Metropolitan Area influence the adoption of green innovation through the interconnected roles of intrapreneurship, environmental collaboration, and leadership. By utilizing the intrapreneurship framework of Antoncic & Antoncic (2011), the research seeks to explore the contributions of internal and external stakeholders toward eco–friendly innovations. The objective is to provide valuable insights that address the gaps in the practical implications of promoting sustainability and enhancing operational success in the hospitality sector.

Literature Review

Intrapreneurship

Intrapreneurship is crucial in revitalizing businesses and enhancing organizational performance (Antoncic & Hisrich, 2003). It can be viewed through various lenses, including intrapreneuring (Pinchot, 1985), corporate entrepreneurship (Antoncic & Hisrich, 2004), and corporate venturing (Hass, 2015). It represents new organizational behaviors that differ from the norm (Antoncic & Hisrich, 2003). As noted by Antoncic & Antoncic (2011), intrapreneurship involves innovation and breaking conventions, highlighting its link to organizational innovation (Huang et al., 2021). Encouraging intrapreneurial attitudes is essential for fostering innovation in today's businesses (Falola et al., 2018).

Scholars have connected intrapreneurship with innovation, noting that it is a bottom–up innovation driven by employees (Huang et al., 2021). Antoncic & Antoncic (2011) identified four key components of intrapreneurship that spur innovation: new business ventures, product/service innovativeness, process/technology innovativeness, and self–renewal. The level of intrapreneurship within an organization significantly affects its innovative capacity. Studies show that intrapreneurship can even drive environmentally friendly practices in hotels (Boonsuwan & Zhu, 2023).

Based on previous research, we explore how intrapreneurship impacts green innovation adoption, focusing on the four dimensions outlined by Antoncic & Antoncic (2011): new business ventures (NBA), product/service innovativeness (PSI), process/technology innovativeness (PTI), and self–renewal (SR). These concepts are defined BY Antoncic & Antoncic (2011) as follows: new business venturing involves creating new units tied to existing products or markets, product/service innovativeness pertains to innovation in offerings, process/technology innovativeness relates to advancements in production techniques, and self–renewal denotes organizational transformation through key idea updates. Hence, we propose the following hypothesis:

H1: Intrapreneurship (NBA, PSI, PTI, SR) positively influence green innovation adoption.

Environmental Collaboration

Environmental collaboration encompasses a company's efforts to prevent pollution and reduce environmental issues within the supply chain (Vachon & Klassen, 2008). Research shows that such collaboration significantly enhances firm performance (Large & Thomsen, 2011), environmental capabilities (Lee & Klassen, 2008), and sustainable innovation (Adomako & Tran, 2022).

Successful environmental collaboration connects suppliers, customers, and companies to promote green practices across the value chain (Greem et al., 1996; Noci, 1997; Bowen et al., 2001). Vachon & Klassen (2006) noted that this approach minimizes the environmental impact

of production processes. Adomako (2020) emphasized that collaboration positively influences sustainable innovation in SMEs. Proactive partnerships can expedite green practices and lessen a firm's vulnerability to environmental challenges (Lorenzoni & Lipparini, 1999). Investment in environmental collaboration can lower costs (Hart, 1995), improve green capabilities (Paulraj, 2011), and foster green innovation (Grekova et al., 2016). Yousaf (2021) further investigated how collaboration facilitates green innovation in SMEs through green value co–creation.

In the hotel industry, an effective environmental management system promotes cooperation among suppliers (ECS) and customers (ECC) to reduce waste and energy consumption. Given the gap in understanding how collaboration influences green innovation in hospitality, the following hypothesis is proposed based on these insights:

H2: Environmental collaboration (ECS, ECC) positively affects green innovation adoption

Human Capital Sustainability Leadership

This study examines the impact of Human Capital Sustainability Leadership (HCSL) on sustainability and green innovation, based on a model by Di Fabio & Peiró (2018). The HCSL model integrates sustainability leadership (SL), ethical leadership (EL) (Gallagher & Tschudin, 2010), mindful leadership (ML) (George, 2012; Herold, 2013), and servant leadership (SEL) (Ehrhart, 2004; Wang & Cheng, 2010). Di Fabio & Peiró (2018) state that SUSL focuses on responsible decision–making and sustainable human resource development, EL promotes equitable goals and alignment with corporate values, ML emphasizes emotional awareness, especially under stress, and SEL prioritizes serving others and fostering their growth. HCSL has been linked to sustainable employee behaviors (Di Fabio & Peiró, 2018; Seok et al., 2021), work outcomes (Khalil et al., 2021), and economic growth at the provincial level (Wang et al., 2022). Based on these findings, we propose the following hypothesis:

H3: Human capital sustainability leadership (SL, EL, ML, SEL) significantly affects green innovation adoption

Intrapreneurship and Environmental Collaboration

Organizations that engage with stakeholders on environmental issues likely improve their reputations and perform better (Carter et al., 2000; Golgeci et al., 2019; Bouguerra et al., 2022). As tourism in Thailand grows, hotels must take urgent actions to reduce environmental damage and meet qualification standards. Boonsuwan & Zhu (2023) found that intrapreneurship significantly accelerates hotel environmental collaboration (Jenkins & Karanikola, 2014). This study aims to explore the relationship between intrapreneurship and environmental collaboration quantitatively, as it helps hotels enhance environmental awareness and performance by collaborating with suppliers and customers (Gold et al., 2013). Thus, the following hypothesis is proposed:

H4: Intrapreneurship (NBA, PSI, PTI, SR) positively influence environmental collaboration (ECS, ECC).

Intrapreneurship and human capital sustainability leadership are essential for companies to gain a competitive advantage and achieve sustainability goals (Slupska et al., 2022). In Thailand, industries face challenges in fostering creativity and adopting green innovations (Kate, 2022). In this context, intrapreneurship is viewed as a strategic capability that enhances job performance (Ahmad et al., 2012; Urbano et al., 2013; Huang et al., 2021). Organizations that prioritize intrapreneurship are likely to invest in human capital management to promote sustainable practices among employees (Huang et al., 2021). Therefore, we propose the following hypothesis:

H5: Intrapreneurship (NBA, PSI, PTI, SR) positively affects human capital sustainability leadership (SL, EL, ML, SEL).

Research Method

Data was collected from 10 hotels in Bangkok between August and September 2021. Due to the COVID–19 pandemic, various sampling techniques were used, including snowball, purposive, and convenient sampling, focusing on respondents with relevant experience and involvement in policymaking.

The questionnaire comprised three sections: hotel profile, measurement items on primary constructs, and demographic details, utilizing a five–point Likert scale for responses. Measurement items included 23 for intrapreneurships (Antoncic & Antoncic, 2011), 10 for environmental collaboration (Vachon & Klassen, 2006), 16 for human capital sustainability leadership (Di Fabio & Peiró, 2018), and four for green innovation adoption (Sobaih et al., 2020). A pilot test involving 30 respondents ensured the internal consistency of constructions, achieving Cronbach's alpha values above 0.7 (Nunnally & Bernstein, 1994).

The sample size was determined using A-priori analysis, recommending a minimum of 123 participants for PLS–SEM analysis (Soper, 2020; Memon et al., 2020). We distributed a total of 250 questionnaires evenly across 10 hotels, with each hotel receiving 25 questionnaires. It seems 221 were valid responses after data cleaning. PLS–SEM analysis was employed to examine path coefficients and mediation effects, suitable for the study's exploratory nature (Hair et al., 2017; Ramayah et al., 2018).

Findings

Exploratory Factor Analysis

It consolidated the four dimensions of human capital sustainability leadership into servant leadership (SEL) and mindful leadership (ML). SEL was redefined to encompass servant and ethical leadership, reflecting the high ethical standards of servant leaders (McCuistion, 2022). Additionally, two sustainability leadership items were combined with mindful leadership, three PTI items and one NBA item were grouped under PSI, and two sustainability leadership items were grouped under GIA. This led to modifications in our research model.

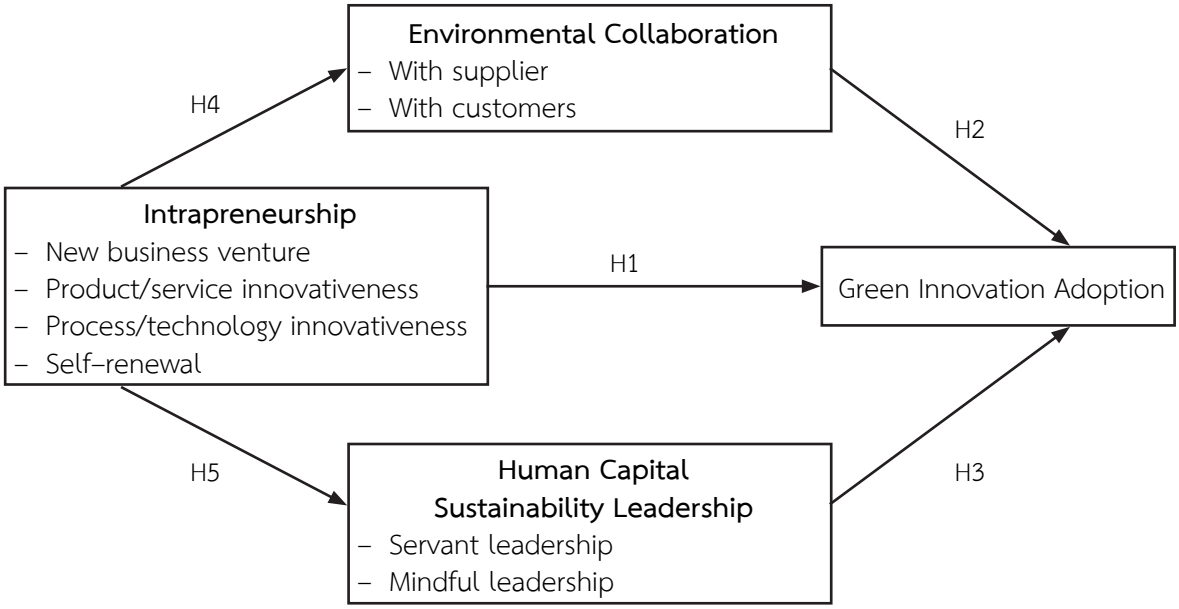


Figure 1 Modified conceptual framework

Source: Developed by authors (2022) based on Vachon & Klassen (2006); Antoncic & Antoncic (2011); Di Fabio & Peiró (2018); Sobaih et al. (2020)

Partial–Least Squares Structural Equation Model Analysis (PLS–SEM)

PLS–SEM analysis consists of two parts: evaluation of the measurement model and evaluation of the structural model. The analysis was conducted on Smart PLS 3 (Henseler et al., 2015).

1. Evaluation of the Measurement Model

The evaluation of the measurement model includes assessments of convergent validity, internal consistency, and discriminant validity. Convergent validity is demonstrated by factor loadings above 0.5, as recommended by Bagozzi & Yi (1988) & Hair et al. (2017). Cronbach's alpha values between 0.842 and 0.954 indicate strong internal consistency, exceeding the 0.7 threshold suggested by Nunnally & Bernstein (1994). Composite reliability (CR) and

Dijkstr & Henseler's rho_A were also assessed, with CR values around 0.7 (Dijkstr & Henseler, 2015; Hair et al., 2019). Rho_A is highlighted by Ramayah et al. (2018) as a key measure of internal consistency in PLS-SEM analysis, confirming our data's reliability and consistency. In addition, discriminant validity was assessed using the Heterotrait–Monotrait (HTMT) ratio, with values expected to be below 0.95 (Henseler et al., 2015; Hair et al., 2017; Hutabarat & Anggraini, 2024). As shown in Table 1, the HTMT values for ECC, ECS, GIA, ML, NBA, PSI, PTI, SEL, and SR range from 0.811 to 0.929, confirming the constructs' discriminant validity.

Table 1 Heterotrait–Monotrait Ratio of Correlations (HTMT)

	ECC	ECS	GIA	ML	NBA	PSI	PTI	SEL	SR
ECC	**0.882**								
ECS	0.699	**0.891**							
GIA	0.626	0.672	**0.841**						
ML	0.643	0.621	0.784	**0.833**					
NBA	0.565	0.615	0.650	0.605	**0.909**				
PSI	0.610	0.683	0.701	0.641	0.756	**0.814**			
PTI	0.515	0.636	0.626	0.545	0.633	0.811	**0.929**		
SEL	0.673	0.674	0.808	0.808	0.633	0.691	0.586	**0.811**	
SR	0.593	0.627	0.640	0.640	0.702	0.753	0.671	0.681	**0.870**

2. Evaluation of Structural Model

Table 1 shows the results of collinearity and path coefficients. All VIF values are under 5, indicating no multicollinearity issues (Hair et al., 2019). Confidence intervals reveal that zero is absent in several paths, confirming significant effects, including NBA → ECC, NBA → ECS, PSI → ECS, PSI → ECC, PTI → ECS, SR → ECC, SR → ECS, NBA → SEL, NBA → ML, PSI → SEL, PSI → ML, SR → SEL, SR → ML, SEL → GIA and ML → GIA. Ultimately, environmental collaboration and intrapreneurship do not significantly influence green innovation adoption, nor does process technology innovation directly impact environmental collaboration with customers or servant leadership.

Table 2 Collinearity and structural model path coefficient

	Path	VIF	Path Coefficient	t–value	ρ –value	95% C.I.	Results
H1a	NBA → GIA	2.682	0.059	1.030	0.303	[–0.048, 0.175]	Reject
H1b	PSI → GIA	4.807	0.037	0.448	0.654	[–0.127, 0.207]	Reject
H1c	PTI → GIA	3.098	0.080	1.018	0.309	[–0.068, 0.23]	Reject
H1d	SR → GIA	2.888	0.083	1.126	0.261	[–0.075, 0.213]	Reject
H2a	ECS → GIA	2.696	0.095	1.387	0.166	[–0.042, 0.225]	Reject
H2b	ECC → GIA	2.404	–0.018	0.318	0.751	[–0.125, 0.086]	Reject
H3a	SEL → GIA	3.74	0.379	5.352	***	[0.248, 0.520]	Support
H3b	ML → GIA	3.149	0.274	3.738	***	[0.142, 0.422]	Support
H4a	NBA → ECS	2.576	0.166	1.929	*	[0.011, 0.340]	Support
H4b	PSI → ECS	4.501	0.260	2.649	***	[0.061, 0.441]	Support
H4c	PTI → ECS	2.995	0.198	2.250	**	[0.017, 0.365]	Support
H4d	SR → ECS	2.609	0.182	1.944	*	[–0.032, 0.341]	Support
H4e	NBA → ECC	2.576	0.161	1.683	*	[–0.041, 0.363]	Support
H4f	PSI → ECC	4.501	0.291	2.356	**	[0.048, 0.514]	Support
H4g	PTI → ECC	2.995	0.003	0.029	0.977	[–0.187, 0.213]	Reject
H4h	SR → ECC	2.609	0.258	2.661	***	[0.053, 0.429]	Support
H5a	NBA → ML	2.576	0.186	2.017	**	[0.010, 0.358]	Support
H5b	PSI → ML	4.501	0.265	2.168	**	[0.022, 0.491]	Support
H5c	PTI → ML	2.995	0.008	0.076	0.939	[–0.19, 0.197]	Reject
H5d	SR → ML	2.609	0.305	2.975	***	[0.095, 0.507]	Support
H5e	NBA → SEL	2.576	0.159	1.806	*	[–0.014, 0.319]	Support
H5f	PSI → SEL	4.501	0.321	2.427	**	[0.036, 0.546]	Support
H5g	PTI → SEL	2.995	0.010	0.103	0.918	[–0.173, 0.215]	Reject
H5h	SR → SEL	2.609	0.320	4.067	***	[0.169, 0.479]	Support

Overall, the results presented in Table 2 show that

1) Hypotheses Related to Green Innovation Adoption (GIA)

• H1a–d (Intrapreneurship → GIA): None of the four components of intrapreneurship (NBA, PSI, PTI, SR) directly influence green innovation adoption, as all paths were rejected based on non–significant results (ρ –value > 0.05).

• H2a–b (Environmental Collaboration → GIA): Similarly, both environmental collaboration dimensions (ECS, ECC) do not directly affect green innovation adoption, as these paths were also rejected.

• H3a–b (Leadership → GIA): Servant Leadership (SEL) and Mindful Leadership (ML) have significant positive effects on green innovation adoption (ρ –value< 0.001). These results indicate that leadership styles emphasizing mindfulness and service are key drivers of GIA.

2) Hypotheses Related to Environmental Collaboration (ESC/ECC)

• H4a–d (Intrapreneurship → ECS): All intrapreneurship elements, except PTI, have significant positive effects on ECS, suggesting that NBA, PSI, and SR are essential for fostering environmental collaboration.

• H4e–h (Intrapreneurship → ECC): Again, PTI does not significantly influence ECC, but the other components (NBA, PSI, SR) do, showing their importance in driving cross–organizational collaboration.

3) Hypotheses Related to Leadership (ML/SEL)

• H5a–d (Intrapreneurship → ML): NBA, PSI, and SR positively affect mindful leadership (ML), including that these elements of intrapreneurship contribute to leadership that is thoughtful and aware of environmental goals. PTI does not have a significant effect here.

• H5e–h (Intrapreneurship → SEL): Similar to ML, NBA, PSI, and SR positively influence servant leadership (SEL), while PTI does not.

The three key results of this empirical study are as follows.

1) Leadership dimensions (SEL and ML) are the only factors directly influencing green innovation adoption (GIA).

2) Entrepreneurship components (NBA, PSI, SR) strongly affect environmental collaboration (ECS/ECC) and leadership styles (ML/SEL), but their influence on GIA is indirect.

3) PTI consistently fails to show significant effects across most paths.

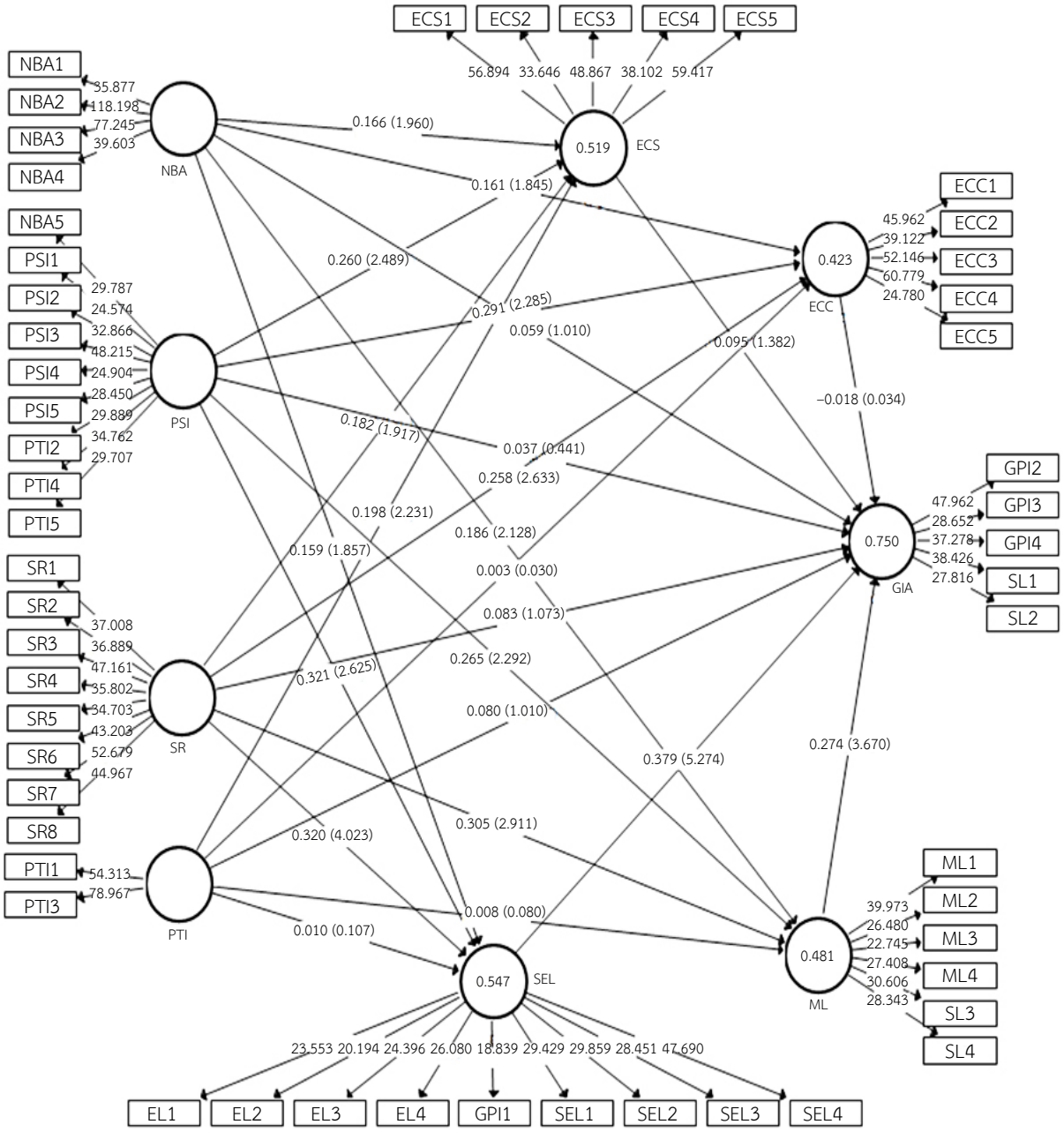


Figure 2 Structural model presenting t–values

In–sample Prediction

In PLS–SEM analysis, R2 indicates in–sample predictive power (Hair et al., 2019; Rigdon, 2012). Hair et al. (2019) categorize R2 values of 0.75, 0.50, and 0.25 as substantial, moderate, and weak, respectively. Based on this, R2 values of 0.423 for environmental collaboration with customers (ECC), 0.519 for suppliers (ECS), 0.481 for moral leadership (ML), and 0.547 for servant leadership (SL) suggest moderate predictive power. Notably, the R2 of 0.75 for green innovation adoption (GIA) indicates substantial predictive power.

Mediation Effect Test

The mediation effects of environmental collaboration and human capital sustainability leadership were examined using the Bootstrapping technique. Results show that mindful leadership (ML) significantly mediates the relationships between product/service innovativeness (PSI) and green innovation adoption (GIA) (β = 0.073, t = 1.978), as well as between new business venture (NBA) and GIA (β = 0.051, t = 1.715), and self–renewal (SR) and GIA (β = 0.084, t = 2.314). Servant leadership (SEL) also mediates the relationships between NBA and GIA (β = 0.060, t = 1.792) and SR and GIA (β = 0.121, t = 3.211). However, environmental collaboration with suppliers (ECS) and customers (ECC) shows no mediation effect on these relationships.

Discussion and Conclusion

The exploratory factor analysis reveals two dimensions under the HCSL construct, differing from previous studies (e.g., Di Fabio & Peiró, 2018; Khalil et al., 2021; Seok et al., 2021). Hypothesis testing shows that environmental collaboration (ECS, ECC) and intrapreneurship (NBA, PSI, PTI, SR) do not directly influence green innovation adoption. However, a significant relationship exists between intrapreneurship and environmental collaboration, except for the PSI and ECC relationship. NBA, PSI, and SR significantly impact mindful leadership (ML) and servant leadership (SEL), excluding PTI.

As mentioned in the introduction, our study reaffirms that intrapreneurship positively impacts environmental collaboration, aligning with prior research (e.g., Di Fabio & Peiro, 2018; Khalil et al.., 2021). The importance of our results using such dimensions as the significance of NBA, PSI, and SR on mindful leadership (ML) and servant leadership (SEL) also mirrors earlier findings. Unfortunately, unlike previous studies, our research did not find a direct influence of environmental collaboration (ECS, ECC) and Intrapreneurship on green innovation adoption. This deviates from studies that reported a positive relationship. Thus, the mediating role of ECS and ECC in the link between intrapreneurship and green innovation adoption was not supported, suggesting a disconnect not commonly emphasized in earlier work.

Mediation effect testing indicates that ECS and ECC do not mediate the relationship between intrapreneurship and green innovation adoption. The findings highlight the hotel industry's disconnect regarding environmental collaboration, contrasting with studies that affirm its positive link to green innovation. This suggests a lack of cooperation between hotels, suppliers, and customers on sustainability issues, possibly due to insufficient information exchange. Hotels should focus on supply chain integration to enhance communication and leverage collective efforts toward green innovation. Additionally, while hotels identify sustainability as a goal, suppliers may not share this commitment, and customers often perceive their role in sustainability as limited.

Implications

Theoretical implications: This research offers updated insights into the adoption of green innovation by hotels in the Bangkok Metropolitan Area, enriching existing literature. Unlike previous studies, intrapreneurship indirectly influences green innovation through human capital sustainability leadership. Notably, environmental cooperation plays a mediating role in this relationship. The roles of suppliers and customers in green innovation adoption were not addressed, differing from prior studies, which may stem from varying corporate values that affect understanding and collaboration (Tan et al., 2006). Cooperation can be hindered without a consensus on values, leading to increased management costs. Additionally, insufficient information sharing may create misunderstandings about green innovation implementation (Hudnurkar et al., 2014). This study reduced the HCSL framework from four to two dimensions, highlighting implications for future research in Southeast Asia's emerging markets.

Managerial implications: Hotels can enhance employees' intrapreneurship by fostering an innovative environment and encouraging the contribution of new ideas. This approach can lead to business growth and improved operational performance, as employee engagement is vital. By strengthening training, clarifying roles, and promoting a pioneering atmosphere, employees will be empowered to implement green innovations, benefiting both the hotel and its workforce. In addition, establishing a resource-sharing platform for environmental collaboration is essential for effective communication among hotels, suppliers, and customers, fostering transparency and promoting green innovation. Hotels can highlight eco–friendly suppliers, while customers can provide feedback on sustainability efforts, helping them to refine practices based on their insights. Moreover, for sustainable human capital leadership, hotel management must identify the needs of both internal and external stakeholders to create targeted development plans. Aligning human resource strategies with the hotel's sustainability policy is crucial for effectively implementing sustainability goals and encouraging green innovation.

Limitations

This study faces several notable limitations that may impact the generalizability of its findings. Primarily, the research is concentrated within the Bangkok Metropolitan Area, which restricts the diversity of hotel types and demographics in the analysis. As a result, the sample may not fully represent the broader hospitality landscape across Thailand or other regions. Additionally, the data collection process was significantly hindered by the COVID–19 pandemic, which limited access to a broader array of participants and reduced the study's outreach efforts. These challenges also resulted in variations regarding hotel scale,

including large luxury establishments versus smaller boutique hotels—as well as differences in hotel policies and management practices. Furthermore, the geographic location of each hotel in the sample introduced additional complexities, contributing to a lack of uniformity in the data collected.

Recommendations

This study concludes that we emphasize how our study expands on and challenges existing literature.

1) Our research highlights a lack of collaboration between hotels, suppliers, and customers regarding sustainability efforts. This aspect underlines the limited exchange of information and divergent goals and will continue to be studied.

2) The findings could reflect industry–specific challenges, cultural factors, or varying definitions of sustainability goals compared to previous studies.

References

Abou, H. A., Hassan, H. T. & El Dief, M. M. (2020). A Description of Green Hotel Practices and Their Role in Achieving Sustainable Development. *Sustainability*, 12(22), 9624.

Adomako, S. & Tran, M. D. (2022). Environmental Collaboration, Responsible Innovation, and Firm Performance: the Moderating Role of Stakeholder Pressure. *Business Strategy and the Environment*, 31(4), 1695–1704.

Adomako, S. (2020). Environmental Collaboration, Sustainable Innovation, and Small and Medium–sized Enterprise Growth in Sub–Saharan Africa: Evidence from Ghana. *Sustainable Development*, 28(6), 1609–1619.

Ahmad, N. H., Nasurdin, A. M. & Zainal, S. R. M. (2012). Nurturing Intrapreneurship to Enhance Job Performance: the Role of Pro–intrapreneurship Organizational Architecture. *Journal of Innovation Management in Small & Medium Entreprise*, 2012, 1–9.

Antocic, B. & Hisrich, R. D. (2003). Clarifying the Intrapreneurship Concept. *Journal of Small Business and Enterprise Development*, 10(1), 7–24.

Antoncic, A. J. & Antoncic, B. (2011). Employee Satisfaction, Intrapreneurship and Firm Growth: a Model. *Industrial Management & Data Systems*, 111(4), 589–607.

Antoncic, B. & Hisrich, R. D. (2004). Corporate Entrepreneurship Contingencies and Organizational Wealth Creation. *Journal of Management Development*, 23(6), 518–550.

Arena, C., Michelon, G. & Trojanowski, G. (2018). Big Egos can be Green: a Study of CEO Hubris and Environmental Innovation. *British Journal of Management*, 29(2), 316–336.

Bagozzi, R. P. & Yi, Y. (1988). On the Evaluation of Structural Equation Models. *Journal of Academy of Marketing Science*, 16(1), 74–94.

Boonsuwan, P. & Zhu, B. (2023). The Role of Intrapreneurship and Environmental Collaboration in Fostering Green Innovation Adoption in the Hotel Industry in Bangkok. *Journal of Thai Hospitality and Tourism*, 18(1), 98–110.

Bouguerra, A., Hughes, M., Cakir, S. M. & Tatoglu, E. (2022). Linking Entrepreneurial Orientation to Environmental Collaboration: a Stakeholder Theory and Evidence from Multinational Companies in an Emerging Market. *British Journal of Management*, 34(1), 1–25.

Bowen, F. E., Cousins, P. D., Lamming, R. C. & Faruk, A. C. (2001). The Role of Supply Management Capabilities in Green Supply. *Production and Operations Management*, 10(2), 174–189.

Carter, C. R., Kale, R. & Grimm, C. M. (2000). Environmental Purchasing and Firm Performance: An Empirical Investigation. *Transportation Research Part E: Logistics and Transporation Review*, 36(3), 219–228.

Castellacci, F. & Lie, M. (2017). A Taxonomy of Green Innovators: Empirical Evidence from South Korea. *Journal of Cleaner Production*, 143, 1036–1047.

Chiou, T. Y., Chan, H. K., Lettice, F. & Chung, S. H. (2011). The Influence of Greening the Suppliers and Green Innovation on Environmental Performance and Competitive Advantage in Taiwan. *Transportation Research Part E: Logistics and Transporation Review*, 47(6), 822–836.

Di Fabio, A. & Peiro, M. J. (2018). Human Capital Sustainability Leadership to Promote Sustainable Development and Healthy Organizations: a New Scale. *Sustainability*, 10(7), 2413.

Dijkstra, T. K. & Henseler, J. (2015). Consistent Partial Least Squares Path Modeling. *MIS Quarterly*, 39(2), 297–316.

Ehrhart, M. G. (2004). Leadership and Procedural Justice Climate as Antecedents of Unit–Level Organizational Citizenship Behavior. *Personnel Psychology*, 57(1), 61–94.

Falola, H. O., Salau, O. P., Olokundun, M. A., Oyafunke-Omoniy, C. O., Ibidunni, A. S. & Oludayo, O. A. (2018). Employee's Intrepreneurial Engagement Initiatives and Its Influence on Organizational Survival. *Business: Theory and Practive*, 19, 9–16.

Fatoki, O. (2021). Sustainable Finance and Small, Medium and Micro–Entreprises in South Africa. *Academy of Accounting and Financial Studies Journal*, 25(7), 1–7.

Gallapher, A. & Tschudin, V. (2010). Educating for Ethical Leadership. *Nurse Education Today*, 30(3), 224–227.

George, B. (2012). Mindfulness Helps You Bacome a Better Leader. *Harvard Business Review*, 26, 21–32.

Gold, S., Hahn, R. & Seurig, S. (2013). Sustainable Supply Chain Management in "Base of the Pyramid" Food Projects – a Path to Triple Bottom Line Approaches for Multinationals. *International Business Review*, 22, 784–799.

Golgeci, I., Gligor, D. M., Tatoglu, E. & Arda, O. A. (2019). A Relational View of Environmental Performance: What Role Do Environmental Collaboration and Cross–functional Alighment Play? *Journal of Business Research*, 96, 35–46.

Greem, K., Morton, B. & New, S. (1996). Purchasing and Environmental Management: Interactions, Policies and Opportunities. *Business Strategy and the Environment*, 5, 188–197.

Grekova, K., Calantone, R. J., Bremmers, H. J., Trienekens, J. H. & Omta, S. W. F. (2016). How Environmental Collaboration with Suppliers and Customers Influences Firm Performance: Evidence from Dutch Food and Bevarage Processors. *Journal of Cleaner Production*, 112, 1861–1871.

Gürlek, M. & Tuna, M. (2018). Reinforcing Competitive Advantage through Green Organizational Culture and Green Innovation. *Service Industries Journal*, 38(7–8), 467–491.

Hair, J. F., Hult, M. T. G., Ringle, C. M. & Sarstedt, M. (2017). **A Primer on Partial Least Squares Structural Equation Modeling (PLS–SEM).** Sage Publications.

Hair, J. F., Risher, J. J., Sarstedt, M. & Ringle, C. M. (2019). When to Use and How to Report the Results of PLS–SEM. *European Business Review*, 30(1), 2–24.

Hart, S. L. (1995). A Natural–Resource–Based View of the Firm. *Academy of Management Review*, 20, 874–907.

Hass, B. H. (2015). Intrapreneurship and Corporate Venturing in the Media Business: a Theoretical Framework and Examples from the German Publishing Industry. *Journal of Media Business Studies*, 8(1), 47–68.

Henseler, J., Ringle, C. M. & Sarstedt, M. (2015). A New Criterion for Assessing Discriminant Validity in Variance–Based Structural Equation Modeling. *Journal of the Academy of Marketing Sciences*, 43(1), 115–135.

Herold, I. M. H. (2013). The Mindful Library Leader. *Library Issues: Briefings for Faculty and Administrators*, 33(6), 1–4.

Huang, L. Y., Lin, Y. S. M. & Hsieh, Y. J. (2021). Cultivation of Intrapreneurship: a Framework and Challenges. *Frontiers in Psychology*, 12.

Hudnurkar, M., Jakhar, S. & Rathod, U. (2014). Factors Affecting Collaboration in Supply Chain: a Literature Review. *Procedia–Social and Behavioral Sciences*, 133(15), 189–202.

Hutabarat, M. L. P. & Anggraini, S. T. (2024). The Antecedents of Food Variety–Seeking Behavior. *Business and Entrepreneurial Review*, 24(1), 47–62.

Jenkins, N. R. & Karanikola, L. (2014). Do Hotel Companies Communicate Their Environmental Policies and Practices More than Independent Hotels in Dubai, UAE? *Worldwide Hospitality and Tourist Themes*, 6, 362–380.

Jones, P., Hillier, D. & Comfort, D. (2014). Susatinable in the Global Hotel Industry. *International Journal of Comtemporary Hospitality Management*, 26(1), 5–17.

Kate, T. P. (2022). **Thai Businesses Must Move HR to the Cloud to Stay Relevant.** https://www.pwc.com/th/en/press–room/press-release/2022/press–release–22–07–22–en.html

Khalil, H. S., Shah, A. M. S. & Khalil, M. S. (2021). Sustaining Work Outcomes through Human Capital Sustainability Leadership: Knowledge Sharing Behaviour as an Underlining Mechanism. *Leadership & Organization Development Journal*, 42(7), 1119–1135.

Krungsri Research. (2021). **Industry Outlook 2021–2023.** https://www.krungsri.com/en/research/industry/industry–outlook/Services/Hotels/IO/io–hotel–21

Large, R. O. & Thomsen, C. G. (2011). Drivers of Green Supply Management Performance: Evidence from Germany. *Journal of Purchasing and Supply Management*, 17(3), 176–184.

Lee, S. Y. & Klassen, R. D. (2008). Drivers and Enablers that Foster Environmental Management Capabilities in Small and Medium–sized Suppliers in Supply Chains. *Production and Operations Management*, 17(6), 573–586.

Lorenzoni, G. & Lipparini, A. (1999). The Leveraging of Interfirm Relationships as a Distinctive Organizational Capability: a Longitudinal Study. *Strategic Management Journal*, 20(4), 317–338.

McCuistion, D. (2022). **What's Servant Leadership? 7 Leadership Ideals.** https://aboutleaders.com/whats–servant–leadership/

Memon, A. M., Ting, H., Cheah, J. H., Thurasamy, R., Chuah, F. & Cham, H. T. (2020). Sample Size for Survey Research: Review and Recommendations. *Journal of Applied Structural Equation Modeling*, 4(2), i–xx.

Nguyen, T. T. & Nguyen, V. C. (2021). Financial Development and Renewables in Southeast Asian Countries The Role of Organic Waste Materials. *Sustainability*, 13(16), 8748.

Noci, G. (1997). Designing 'Green' Vendor Rating Systems for the Assessment of a Supplier's Environmental Performance. *European Journal of Purchasing and Supply Management*, 3(2), 103–104.

Nunnally, J. C. & Bernstein, I. H. (1994). **Psychometric Theory.** McGraw–Hill.

Paulraj, A. (2011). Understanding the Relationships between Internal Resources and Capabilites, Sustainable Supply Management, and Organizational Sustainability. *Journal of Supply Chain Management*, 47(1), 19–37.

Pinchot, G. (1985). **Intrapreneuring.** Harper & Row.

Ramayah, T., Cheah, J., Chuah, F., Ting, H. & Memon, A. M. (2018). **Partial Least Squares Structural Equation Modeling (PLS–SEM) Using Smart PLS 3.0: An Updated and Practical Guise to Statistical Analysis.** Pearson Malaysia.

Rigdon, E. E. (2012). Rethinging Partial Least Squares Path Modeling: in Praise of Simple Methods. *Long Range Planning*, 45(5/6), 341–358.

Seok, C. B., Ching, P. L. & Ismail, R. (2021). Human Capital Sustainablity Leadership Scale: Psychometric Proprieties of the Malaysian Version, in Di Fabrio, A. (ed.). **Cross–Cultual Perspectives on Well–Being and Sustainablity in Organizations.** Springer.

Slupska, U., Rewniak, Z., Drewniak, R. & Karaszewski, R. (2022). Building Relations between the Company and Employees: The Moderating Role of Leadership. *Sustainability*, 14(14), 8840.

Sobaih, A. E. E., Gharbi, H., Hasanein, M. A. & Abu Elnasr, E. A. (2020). The Mediating Effects of Green Innovation and Corporate Social Responsibility on the Link between Transformational Leadership and Performance: An Examination Using SEM Analysis. *Mathematics*, 10(15), 2685.

Soper, D. S. (2020). **A–Priori Sample Size Calculator for Structural Equation Models (Software).** http://www.danielsoper.com/statcalc

Takalo, K. S., Tooranloo, S. H. & Parizi, S. Z. (2021). Green Innovation: a Systematice Literature Review. *Journal of Cleaner Production*, 279(4), 122474.

Tan, W. L., Williams, J. N. & Tan, T. M. (2006). Altruism and Entrepreneurship: Partners in Social Entrepreneurship. *Research Collection School of Social Sciences*, 3, 8–11.

Urbano, D., Alvarez, C. & Turro, A. (2013). Organizational Resources and Intrapreneurial Activities: An International Study. *Management Decision*, 51(4), 854–870.

Vachon, S. & Klassen, R. D. (2006). Extending Green Practices Across the Supply Chain: the Impact of Upstream and Downstream Integration. *International Journal of Operations & Production Management*, 26(7), 795–821.

Vachon, S. & Klassen, R. D. (2008). Environmental Management and Manufacturing Performance: the Role of Collaboration in the Supply Chain. *International Journal of Production Economics*, 111(2), 299–315.

Wang, A. C. & Cheng, B. S. (2010). When Does Benovolent Leadership Lead to Creativity? the Moderating Role of Creative Role Identity and Job Autonomy. *Journal of Organizational Behavior*, 31(1), 106–121.

Wang, S. , Lin, X., Xiao, H , Bu, N. & Li, Y. (2022). Empirical Study on Human Capital, Economic Growth and Sustainable Development: Taking Shandong Province as an Example. *Sustainability*, 14(12), 7221.

Weng, H. H. R., Chen, J. S. & Chen, P. C. (2015). Effects of Green Innovation on Environmental and Corporate Performance: a Stakeholder Perspective. *Sustainability*, 7(5), 4997–5026.

Xiang, X. J., Liu, C. J. & Yang, M. (2022). Who is Financing Corporate Green Innovation? *International Review of Economics & Finance*, 78(March), 321–337.

Yousaf, Z. (2021). Go for Green: Green Innovation through Green Dynamic Capabilities: Accessing the Mediating Role of Green Practices and Green Value Co–creation. *Environmental Science and Pollution Research*, 28(39), 54863–54875.