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The Green Pulse of Hospitality: Assessing Green Supply Chain Practices on Organisational Performance in the Sri Lankan Hotel Industry

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ABSTRACT

In the modern competitive business environment, sustainability has become the key theme in organisational performance (OP), compelling organisations to adopt environmentally friendly operations in the business world. The hotel industry is a significant contributor to national economies, and it is steadily incorporating green practices to improve operational efficiency and reduce environmental impact. Though green supply chain management (GSCM) has been a subject of significant interest in manufacturing and logistic settings, GSCM in the hospitality industry, particularly in developing nations such as Sri Lanka, is still a largely unexplored area. To bridge this gap, the current study investigates the relationship between GSCM practices and OP with a particular focus on the moderating effects of hotel star classification. A cross-sectional, deductive research design was used, and Partial Least Squares Structural Equation Modelling (PLS-SEM) was the method of analysis. A web-based survey of 167 star-class hotels in Sri Lanka gained a high response rate of 88.44%. GSCM practices were represented as a second-order construct with five dimensions: eco design, green purchasing, internal environment management, investment recovery, and reverse logistics. The findings reveal that GSCM practices have a significant positive impact on OP. However, the star ratings of the hotels had no significant effect on this relationship, meaning the positive impact of GSCM practices are consistent across the industry. This finding indicates the need to investigate additional moderating variables such as ownership patterns and environmental certifications. Future comparative studies in various Asian nations with different cultural, legislative, and market settings may advance our understanding of GSCM practices in hospitality industry.

Introduction

In response to growing worldwide concerns about environmental damage, particularly in emerging economies, adopting sustainable business practices has become a need rather than a choice (Al-Shammari & Al-Maathidi, 2024; Geng et al., 2017). In an era where travellers do not only hope for comfort but further for conscience, the hotel industry is at a crossroad. Today's guests demand that hotels have an environmental conscience to go along with it. About 90% of hotel guests are keen on green hotels and 30% of these are willing to pay more for green services (Alipour et al., 2019). In a wider context, customer culture and government backed sustainability policy initiatives rank as the top UAE hotel concerns, indicating that environmental concern is now an integral aspect of consumers' concerns and even strategic hotel operations (Alameeri et al., 2018). To meet these evolving sustainability requirements, organisations across different sectors are widely embracing Green Supply Chain Management (GSCM) practices that balance environmental stewardship and strategic prosperity. To minimise waste, lower carbon emissions, and to enhance resource efficiency along the product life cycle, GSCM involves a variety of practices such as Eco Design (ED), Reverse Logistics (RL), Internal Environmental Management (IEM), Green Purchasing (GP), Investment Recovery (IR), and cooperation with stakeholders (Mahar et al., 2025; Sahoo & Vijayvargy, 2021).

These practices are being increasingly known to help achieve better financial, operational, and reputational performance and environmental performance (Al-Shammari & Al-Maathidi, 2024; Junaid et al., 2022; Laosirihongthong et al., 2013). According to recent *meta*-analytic

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research, there exists a favourable relationship between GSCM practices and Corporate Environmental Performance (CEP). The most effective tools are IR and ED (Nureen et al., 2023; Vijayvargy et al., 2017). Additionally, internal processes such as resource recovery and environmental management systems, tend to contribute more to performance improvement than external processes, including customer or supplier cooperation (Fernando et al., 2022; Plaza-Úbeda et al., 2021). Aligning and contextual fit of the strategic process are essential to achieving the maximum benefits of sustainability initiatives, as a prior study indicate that the effectiveness of GSCM practices is determined by the degree to which internal and external environmental activities enhance the strategic goals and the firm's operating environment (Saeed et al., 2018). Furthermore, various studies show internal and external GSCM practices have an interactive effect on environmental, operational, and economic performance (Rehman et al., 2025). While Sahoo and Vijayvargy (2021) elucidate, business size, institutional setting, and measuring method of performance plus influence the efficiency of GSCM. Although GSCM is increasingly gaining popularity, many organisations continue to struggle in implementing it due to limited resources, undefined strategies, and issues about which practices make the greatest impacts. Founded upon growing body of empirical work, recent research highlights the measurable performance gain of GSCM practices in environmental, operational, and financial terms. Because ED and RL are associated with concrete improvement in the form of resource efficiency and waste reduction, for example, it was observed that performance measurement is thus an urgent agenda of GSCM research (Tseng et al., 2019). However, as highlighted in transition literature, shifting to sustainability is required since it can prevent climate change as well as bridge inequality gaps while ensuring public health. Beyond manufacturing, GSCM practices in the hospitality sector, such as energy-positive hotels, waste circular economies, and community procurement, integrate ways in which industries can bring environmental and social value creation mainstream in their business and thus contribute to Sustainable Development Goals (SDGs) 3, 8, 11, and 12. Mahoney et al. (2022) suggest, such strategies support global efforts towards energy transition and equity goals through policy convergence and innovation. Featuring such transitions in the SDG model guarantees that peace, justice, and institutional resilience remain conditions for sustainable attainment (Khorram-Manesh, 2023).

Furthermore, a study notes that life-cycle analysis and supplier management practices offer win–win possibilities, enhancing cost-effectiveness and compliance. Seuring and Müller (17) suggest that the impact of Sustainable Supply Chain Management (SSCM) practices on operations performance is further mediated through big data analytics capabilities, which offers proof of digital infrastructure to amplify the impact of sustainability initiatives (Camila et al., 2025). Galdos-Urbizu et al. (2024), confirm by *meta*-analysis, that IR and ED are the most influential predictors of corporate environmental performance, and internal practices occur more frequently than external practices. A study illustrate that green Human Resource Management (HRM) practices contribute to improved operational performance by strengthening IEM (Gelagay & Werke, 2024). Finally, Khan et al. (2023) validate an extensive GSCM scale, demonstrating that green procurement, logistics acceptability and top management commitment are significant drivers in transforming supply chain connectedness and information sharing into effective GSCM performance.

These findings demonstrate that GSCM is not a symbolic action but rather a strategic driver of performance improvement, especially when practices are contextualised and backed by managerial commitment and digital competences. A systematic economic empirical analysis of apparel manufacturers in Sri Lanka to find that green design, buying, and end-of-life practices of manufacturing improve economic, social, and environmental performance (Susitha & Nanayakkara, 2023). Although an increasing international focus is evident on sustainable operations, there are significant gaps in environmental management in Sri Lankan hotels. According to empirical research, organised waste-segregation and recycling systems are still relatively immature, and most establishments use informal methods instead of officialised systems (Alvis et al., 2014). Resource inefficiencies are also the norm, with hotels registered rooms being highly consumptive of both water and energy, and a few utilising systematic methods for environmental management accounting to make sustainability decisions (Peiris et al., 2014). Hotels in Sri Lanka still face issues of waste segregation, food-wastes management, and recycling capacity, meaning that sustainable practices can be enhanced. These areas of operational concern are in line with hotel industry trends globally, where such issues as resource inefficiencies and lapses in waste management are frequently reported. These repetitive problems are seen, especially, with the high rates of food waste observed in hotels (Lee & Huang, 2023). The present research answers contemporary calls for sectoral diversification and theory integration by targeting the hotel industry in Sri Lanka. This provides a new insight into how GSCM practices can be complementary in enhancing Organisational Performance (OP).

Ghanaian hotel GSCM driven by innovation has been implemented through installation of new technologies and service reengineering to meet customers' demands as well as to boost profitability (Danso et al., 2020). Kenyan hotels report that GSCM works best when paired with structural flexibility and strategic distinctiveness with organic and mechanistic models both produce quantifiable competitive advantages (Nyokabi et al., 2019). Saudi Arabian GSCM is not compliance alone, together with economic and environmental dimensions of GSCM directly enhance the competitiveness of hotels, while social dimensions influence through environmental performance as a mediating variable (Aljoghaiman et al., 2024). Indifferent to adoption challenges, Indian hotels are increasingly cognisant of the contribution of green procurement and supplier assessment towards providing cost advantages and brand differentiation (Marwad & Zagade, 2020). Fig. 1 shows the allocation of industrial sectors examined within the concept of GSCM. This chart shows production as the leading target (42.5%), then followed by food and beverages, healthcare, clothing, tourism, automotive, electronics. The extreme focus of research in the manufacturing domain reveals a gap of vital importance and an opportunity to build up GSCM knowledge in neglected areas such as tourism and hospitality. Furthermore, the commonly addressed themes identified in the literature are illustrated in the word cloud presented in Fig. 2.

This study supports SDG 11, SDG 12 and SDG 13 by demonstrating the preference for GSCM in Sri Lanka's hotel industry. It promotes efficient use of resources, waste reduction, and minimal carbon footprint. GSCM plays a complementary role that is direct in enhancing the management of waste in hotel operations. The internal environmental strategies including resource efficiency programmes, eco-designed processes, and organised waste-segregation plans can assist the hotels in decreasing food waste, minimizing the development of solid waste, and enhancing the recycling performance. In the meantime, other external GSCM methods such as green procurement and increased involvement of environmentally renewable suppliers can reduce the amount of upstream packaging waste, lower non-recyclable inputs, and encourage closed-loop material flow. The interrelated features provide a comprehensive framework through which hotels can systematically reduce waste at its source, improve recovery procedures, and enhance the overall environmental performance (Phu et al., 2018). Italian manufacturing companies have shown that total performance measurement systems, such as the balanced scorecard, can highly contribute to strategic alignment and organisational performance when complemented with GSCM practices (Lucianetti et al., 2019). US internal management commitment is crucial in facilitating supplier and market pressure and fostering GSCM adoption by manufacturing organisations (Agarwal et al., 2018). Moreover, food industry is deeply committed to GSCM, with efforts like minimising packaging waste and green transport increasing green capability and company performance indirectly (Chiu & Hsieh, 2016). Lebanese food companies have further demonstrated that green buying, environmental collaboration, and green design

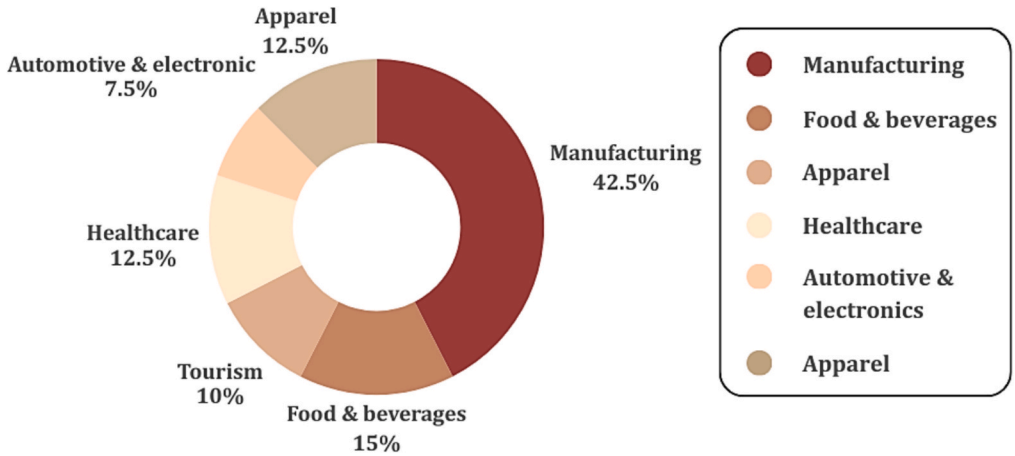

Fig. 1. Sectorial distribution of organisations implementing GSCM practices.
Source: Developed by authors- based on literature review

Fig. 2. Keyword cloud analysis-GSCM research theme.
Source: Developed by authors- based on literature review

translate to contributing to environmental health and lowering risks (El Ayoubi & Radmehr, 2023).

Green logistics and RL operations in the healthcare sector lead to enhanced operating and environmental performance, with private hospitals outperforming public and university hospitals (Sari & Yanginlar, 2015). Pharmaceutical companies in Saudi Arabia are highly mature in their GSCM by integrating green activities with national sustainability agendas and internal systems of quality management (Laghouag, 2023). In Pakistani textile SMEs, GSCM practices fundamentally harvest business process performance and allow businesses to prosper (Ali, 2023; Susitha & Nanayakkara, 2023). These cross-industry findings substantiate the truth that, while GSCM adoption is inconsistent in scope and objective, its contribution to building sustainable performance is salient across industries. Despite the hotel industry being a key contributor to the national economic development in Sri Lanka, it is also known to be a major contributor of waste disposal and environmental pollution. As the government has been increasingly focusing its efforts on changes in the sustainable waste-management, as well as encouraging the adoption of eco-friendly operational patterns in the hotel, restaurant, and catering sections, the necessity of environmentally friendly supply chain practice has gained a new urgency. In that regard, it is timely and critical to investigate the implementation of GSCM in hotels. Although the sector has been outstanding for its environment footprint and its strategic value to the national economy, an empirical gap in GSCM implementation on hotels in Sri Lanka is very significant. Thus, it judges the need to explore the gap in greater depth of scholarly research (Abeydeera & Karunasena, 2019). In this setting, this study explores the influence of GSCM practices on OP in the Sri Lankan hotel industry, utilising hotel star rating as the moderating variable. The study emphasises that sustainable practices can organizational outcomes, but its effect varies according to hotel classification. The findings provide actionable recommendations for hotel management and contribute to sustainable hospitality literature.

To reach this, the study aims:

- To analyse the impact of GSCM practices on OP in the hotel industry in Sri Lanka.
- To examine the moderating role of hotel star rating on the relationship between GSCM practice and OP in the hotel industry in Sri Lanka.

Literature review

GSCM practices on organisational outcomes

In an era where sustainability forms the foundation of competitive advantage, GSCM practices are integral to the way in which organisations can balance environmental responsibility with operational capability. GSCM emerged into a significant research domain with its conceptual origins extending back to the early 1990 s. However, the subject matter has experienced considerable growth in scholarly interest as evidenced by increasing scholarship publications and meta data studies (Tseng et al., 2019). This growth attests to global interest in sustainability and the strategic significance of supply chains in protecting the environment, resulting in heightened study by scholars and practitioners into GSCM as a potent tool for improving environmental performance (Alkaraan et al., 2025). Furthermore, GSCM implementation is much related to the Natural Resource-Based View (NRBV), which describes how businesses can achieve competitive advantage in terms of environmental capabilities. The term has been implemented in previous studies (Al-Shammari & Al-Maathidi, 2024; Fernando et al., 2022; Zhang et al., 2019) and in this research as well, as an attempt to explain the relationship between green practices and OP.

Shifting focus to the role of multi sector strategies, required initiating sustainability transitions. Mahoney et al. (2022) proved that confluent objectives of energy and equity resolve through innovation, while financing gaps hindered the growth of renewables, requiring institutions of support (Sunio et al., 2021). Rojas Ospina and Zúñiga Collazos (2025) confirmed, through SEM-PLS, that associativity, management, ICTs, and civic involvement increase sustainability performance with implications for the service industry. Khorram-Manesh (2023) highlighted that effective institutions and partnerships (SDGs 16–17) are required in all transitions. These findings are mirrored in the hospitality industry, where GSCM practices, sustainable sourcing and ED demand financial innovation, computer assistance, stakeholder involvement, and institutional assistance to provide environmental performance and guest satisfaction.

Eco Design (ED)

ED is a new GSCM practice that brings environmental considerations into product and packaging design to minimise total lifecycle impacts. Geng et al. (2017) emphasise that ED harmonises environment more with business performance in emerging Asian economies through, specifically, the use of product disassembly, recycling, and reuse and the use of recyclable material. Mustafi et al. (2024) show how green ED facilitates OP of Bangladeshi firms, particularly coupled with internal green orientation and supply chain collaboration. Vijayvargy et al. (2017) establish that Indian producers use ED to enhance material and energy efficiency much adoption in large firms due to regulatory pull and availability of resources. In Thailand, Laosirihongthong et al. (2013) distinguish between product and packaging focused ED and discover that packaging action, such as reducing hazardous content and making recycling easier, are more common and have a positive relationship with economic and intangible performance. Overall, these studies are supportive of ED as an innovation strategy for sustainability and competitiveness in developing economies.

Investment Recovery (IR)

IR is a strategic GSCM approach that focuses on retrieving value from surplus, outdated, or scrap materials through reselling, reusing, or recycling them. Vijayvargy et al. (2017) determined that IR improves financial and operational performance in Indian manufacturing firms mainly through the disposal of excess inventory and scrap. Further, a research demonstrates about the small economic performance impact of IR practices for Bahrain's food and beverage sector, with statistically significant but small effect sizes (Al-Shammari & Al-Maathidi, 2024). Moreover, IR's strong link with India's environmental performance while its economic impact is indirect (Sahoo & Vijayvargy, 2021). Even though IR improves Turkish industry's environmental and social performance, it cannot contribute to the economy due to lack of proper recycling infrastructure.

Reverse Logistics (RL)

RL is a strategic level GSCM operation of gathering, reusing, recycling, and remanufacturing products and packaging to lower environmental footprints and extract value. Geng et al. (2017) found RL to have a moderate yet significant effect on economic, environmental, and performance functionality in Asian emerging economies despite being the least practiced GSCM activity because of infrastructural and monetary limitations. Laosirihongthong et al. (2013) additionally found fairly low levels of adoption in Thailand, where RL did not bring any performance improvement, but stresses of a reactive, rather than a strategic, focus. Remanufacturing and packaging recovery RL practices boosted environmental, but not economic and operational, performance in Bahrain's food sector (Al-Shammari & Al-Maathidi, 2024). Along these lines, another study, concluded that RL enhanced overall performance in Turkish healthcare, i.e., in private hospitals (Sari & Yanginlar, 2015).

Internal Environmental Management (IEM)

IEM comprises the integration of sustainability into organisational systems by way of leadership commitment, ISO 14001 certification, and environmental auditing. Previous studies discovered IEM to increase economic performance in Indian and South Korean manufacturing firms, studies in Bahrain and India (Vijayvargy et al., 2017; Park et al., 2022). Further, a study showed no such profound effect, implying that IEM success is contingent upon institutional maturity and the level of managerial involvement. Where IEM is well-funded and strategically focused, it acts as a lever for cost reduction and a platform for overall GSCM performance (Al-Shammari & Al-Maathidi, 2024; Sahoo & Vijayvargy, 2021). Further, IEM in the hotel industry functions under well-laid internal mechanisms which entrench sustainability in everyday running. Hotels have formal environmental policies, green management teams, staff training and monitoring tools to assess energy and water consumption. The adoption of eco-efficient housekeeping practices, optimisation of kitchen processes, and the smart use of technologies to reduce resource consumption are also considered among IEM practices. To further contribute to waste-reduction, hotels also include food-waste tracking systems, recycling systems and in-house waste-segregation systems to minimise environmental impacts on a case-by-case basis. All these internal processes help reinforce environmental performance and contribute to the systematic introduction of sustainable operations (Bhaskara et al., 2025). See Table 1.

Moderating factors on the impact of GSCM on organisational outcomes

Several moderating factors influence the relationship between GSCM practices and business and logistics performance. Business size, business type, and export status are all important factors influencing the effectiveness of GSCM, with larger firms and export firms performing better (Geng et al., 2017). Organisational support additionally has a part to play in that it has a reinforcement effect on the effect of transactional and relational governance systems on long-term financial performance. Star grading in hospitality is a moderator of service quality and satisfaction in such a manner that low grade hotels concentrate on infrastructure and knowledge of staff and luxury hotels concentrate on

Table 1
Definitions of constructs.

Constructs	Definitions
Eco Design (ED)	Manufacturers must design goods that decrease materials and energy consumption; promote the recycling, reuse, and recovery of significant parts and materials; and reduce or prevent the use of Poisonous and dangerous elements in manufacturing processes (Khan et al., 2024).
Investment Recovery (IR)	IR requires the sale of excess inventories, scrap and used materials, and excess capital equipment (Sahoo & Vijayvargy, 2021).
Green purchasing (GP)	GP is concerned with the production and processing of ecologically friendly items and does not damage the environment and collaboration with suppliers(Khan et al., 2024).
Reverse Logistics (RL)	RL applied by customers returning unused or no-longer useful products and materials to reincorporate them into the supply chain through reusing, recycling, repairing remanufacturing, and disposing of the products and materials (El Ayoubi & Radmehr, 2023).
Internal Environment Management (IEM)	IEM is the practice of incorporating GSCM into an organization's strategy and showing their commitment through top management vision, middle management involvement, and spreading across all organizational members through the establishment of cross-functional teams. Proactive companies focus on the IEM as a foundation for the whole GSCM change process (Saeed et al., 2018).
Organizational performance (OP)	OP is essential for researchers and managers to evaluate firms and compare them to their competitors. (Yaghoobi & Haddadi, 2016).

Source. Developed by authors – based on literature review.

interaction and efficiency (Nunkoo et al., 2020). Hospital type is a significant moderator in health care logistics where private hospitals perform better than public and university hospitals in operational, economic, and environmental dimensions (Sari & Yanginlar, 2015). This shows that institutional form influences how greener practices relate to performance improvement. Table 2 provides a summary of published studies on GSCM.

Research framework & hypothesis development

Green Supply Chain Management Practices → Organisational Performance

Although more attention has been given to sustainability, not all GSCM initiatives are alike in bringing about performance improvement. A study in Bharain found that five GSCM practices like GP, cooperation with customers, IR, green packaging, and RL were associated with better environmental, economic, and operational performance. Within the hospitality industry, vocational training shows GSCM practices to improve visitor satisfaction and regulatory compliance but supplier non-cooperation and employees' lack of training reduce overall performance improvements (Al-Shammari & Al-Maathidi, 2024; Marwad & Zagade, 2020). Green production and RL were seen, to have increased operational, economic, and environmental performance (Sari & Yanginlar, 2015). It is indicated from this study that organisational entities that embrace GSCM practices are capable of delivering improved results, especially where these processes are implemented in a strategic manner.

Hypothesis 1 (H1): GSCM practices have a positive impact on organisational performance in the hotel industry in Sri Lanka.

Table 2
Summary of published studies on GSCM.

Focus on the Study	Method	Findings of the Study	Year & Reference
To examine the impact of GSCM methods on operational performance (OP) with the mediation of technological innovation, in the context of Pakistani manufacturing firms.	Structural Equation Modelling	GSCM practices have a statistically significant effect on both technological innovation (TI) and operational performance. TI directly influences OP and partially mediates the relationship between GSCM practice and OP.	2022 (Khan et al., 2024)
To examine the deployment of proactive and reactive practices in the implementation of GSCM and analyze their impact on environmental, economic, and intangible performance by considering business strategy as the organizational focus.	Factor analysis	Thai companies adopt GSCM mainly due to legal pressure, with low impact from proactive practices, and quality-focused strategies improve performance, whereas cost-cutting strategies reduce it. A mix of proactive & reactive practices is essential.	2013 (Laosirihongthong et al., 2013)
To examine the relationship between seven GSCM practices and their impact on three types of OP in Bahrain's food and beverage (F&B) producers.	Structural Equation Modelling	The study identified positive links between several GSCM practices and OP. These results suggest that Bahraini enterprises are only beginning to apply GSCM at this level. Consequently, managers must work harder to implement GSCM concepts effectively.	2024 (Al-Shammari & Al-Maathidi, 2024)
To examine whether internal and external green supply chain management (GSCM) practices have the same or different kinds of regulatory, market, or competitive pressures.	Structural Equation Modelling	Normative pressures strongly influence both internal & external GSCM. Coercive and mimetic pressures affect internal and external practices. Internal GSCM improves environmental performance and supports external GSCM	2018 (Saeed et al., 2018).
To examine the impact of green supply chain management (GSCM) practices on the sustainability performance of firms in Pakistan.	Regression Analysis and Factor Analysis	The study's findings indicate that GSCM practices have a positive impact on environmental, economic, and social performance.	2021 (Sarwar et al., 2021)

Source. Developed by authors- based on literature review.

The Moderating Role of Star Rating

Empirical evidence prove that a comprehensive *meta*-analysis of 50 articles covering 11,127 Asian emerging economy manufacturing firms and concluded that use of GSCM practices positively impacted economic, environmental, operational, and less robustly social performance (Geng et al., 2017). The moderator analysis identified firm size, industry category, ISO certification, and export orientation as affecting the strength of these correlations. But none of the research in the summary had made use of external quality measures like star ratings, which are especially appropriate where hospitality type service industries are involved. A similar study noted that hotel star rating is a moderator of the relationship between service quality dimensions and customer satisfaction in South African hotels (Nunkoo et al., 2020). By using Multi-Group Analysis (MGA) and Importance Performance Map Analysis (IPMA), these scholars demonstrated that the impact of service quality determinants like infrastructure and competence of staff differ significantly among low, mid, and high star hotels. While it is useful in hospitality service studies, star rating has scarcely ever been employed as a moderating variable when investigating the relationship between GSCM practices and OP. This gap is addressed by the current study by stating that the star rating will moderate the effectiveness of GSCM procedures in the hotel industry.

Hypothesis 2 (H2): Star rating has a positive moderating impact on the relationship between GSCM practices on organisational performance in the hotel industry.

Research framework

Fig. 3

Methodology

This section describes the approach used in the study and provides a step-by-step summary of the following steps taken. Notably the steps are linked as to retain the logical order of this study's process. Fig. 4 illustrates the time order of the research process applied in this study. As previously mentioned, the steps are consecutive and linked. In addition, the method was well-designed to make the results valid and reliable. Each phase was aligned with the research goals, enabling a smooth transition between data collection and analysis. Such well-structured approach not only enhances the credibility of the study but also makes it replicable for future studies.

Data collection and sampling technique

This paper examines the impact of GSCM practices on OP in Sri Lanka with special reference to the star rated hotels. Because of the country's pollution and climate change, GSCM have turned into a crucial component of the hospitality industry in Sri Lanka. The sampling frame comprised registered 1-to-5-star hotels according to the Sri Lanka Tourism Development Authority (SLTDA) Annual Statistical Report 2024. The complete population were used, ensuring that equal selection probability for all units. This process yielded 130 valid responses, corresponding to a response rate of 78%, which is considered adequate for the statistical reliability. With the total population taken into account, all the 167 hotels were included in the consideration. Simple random sampling was used to make sure that no bias was put in terms of selection to be analysed, as each hotel was assigned a unique identification number and random numbers were generated by using the Excel RAND () function. The final sample comprised of hotels based on the random numbers that selected (Noor et al., 2022). It is asserted that simple random sampling is favourable in homogeneous and uniformly selected populations (Noor et al., 2022). This method is especially advantageous because it allows generalisation of results to the wider population with greater accuracy. Therefore, this study demonstrates simple random sampling to provide every potential respondent an equal opportunity of selection, ensuring fairness and reliability in collecting data on ED, RL, IR, IEM, GP and OP.

Fig. 5 illustrates the distribution of the participants based on star rating, experience, and designation. The violin plot indicates that managers, the most numerous group (50%), were mostly concentrated in higher experience groups (4–6 years and above 6 years). Engineers and procurement officers were distributed uniformly over 1–6 years of experience, while participants in other groups showed greater variability, including some with less than one year. This shows that more senior positions are associated with greater work experience. The polar bar graph displays that 4-star ratings were most common (24.62%), followed by 1-star (21.54%) and 3-star (19.23%), with less feedback given in the form of 2-star (17.69%) and 5-star (16.92%) ratings. This shows that while most respondents leaned towards moderately positive feedback, a considerable amount of low and high ratings were further present, reflecting mixed levels of satisfaction.

The following Fig. 6 heatmap demonstrates the correlation patterns among survey questions related to various GSCM practices, measured on

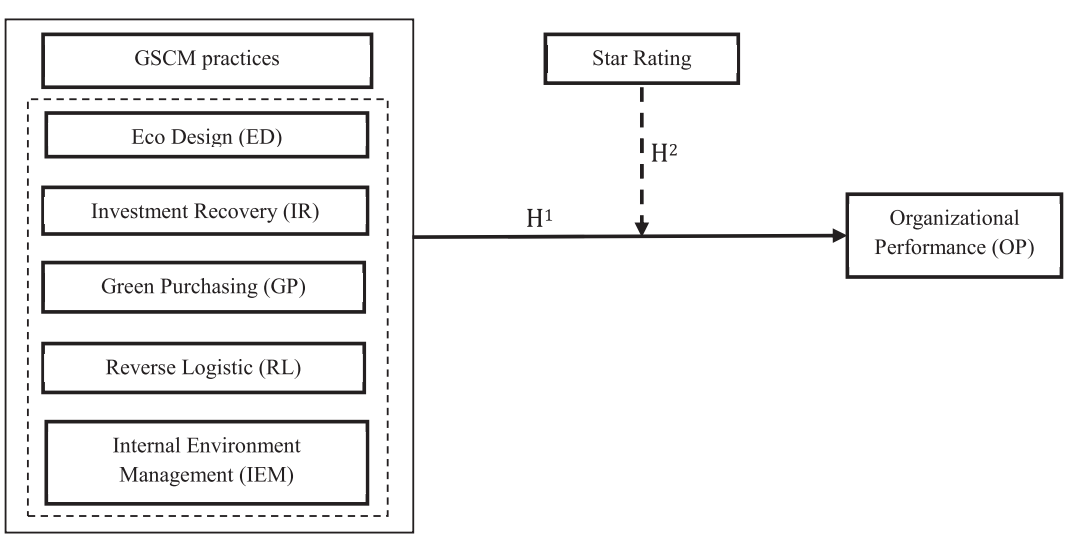

Fig. 3. Conceptual Framework.
Source: Developed by authors

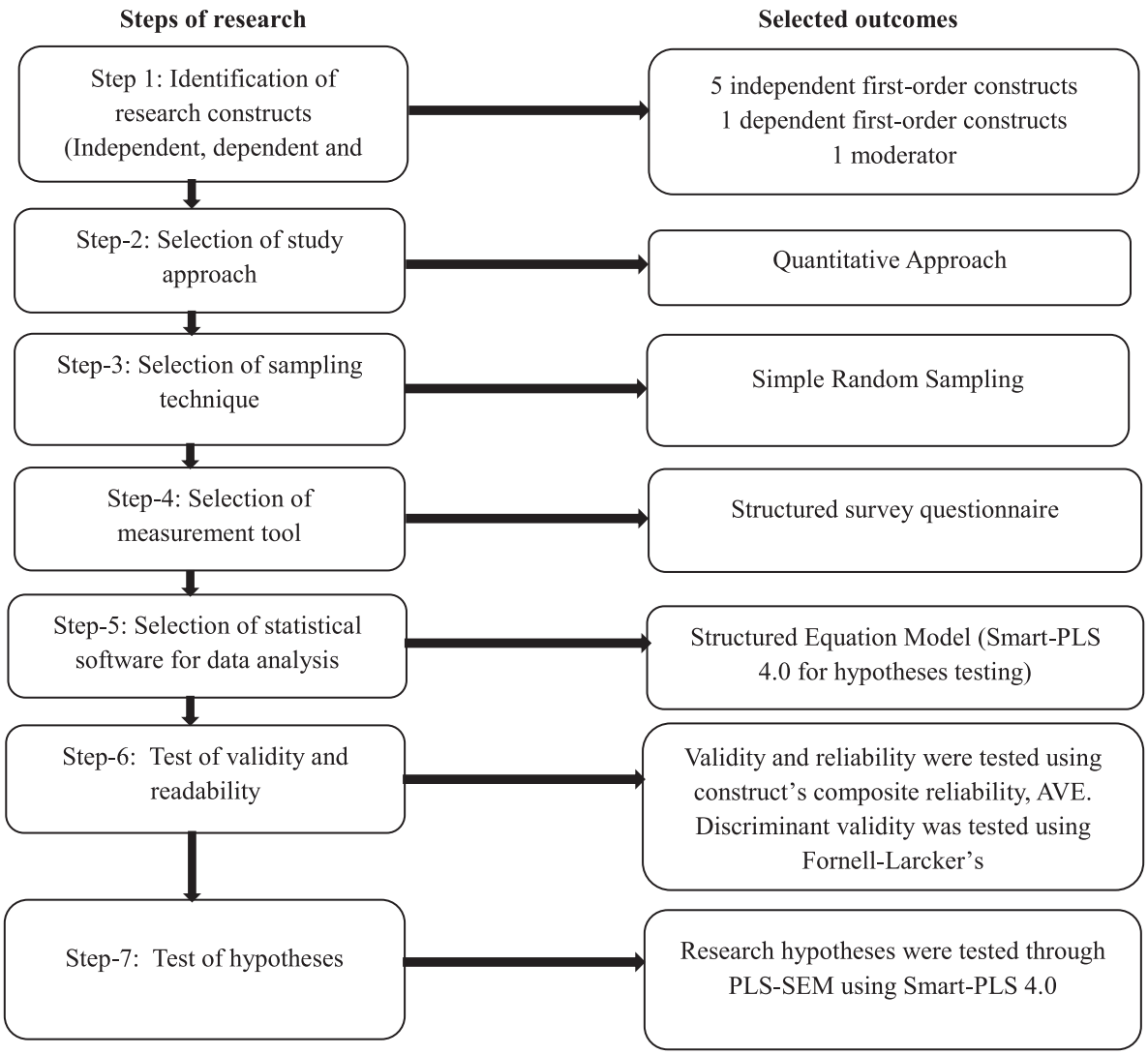

Fig. 4. Research Method.
Source: Developed by authors- based on synthesis of relevant methodological literature

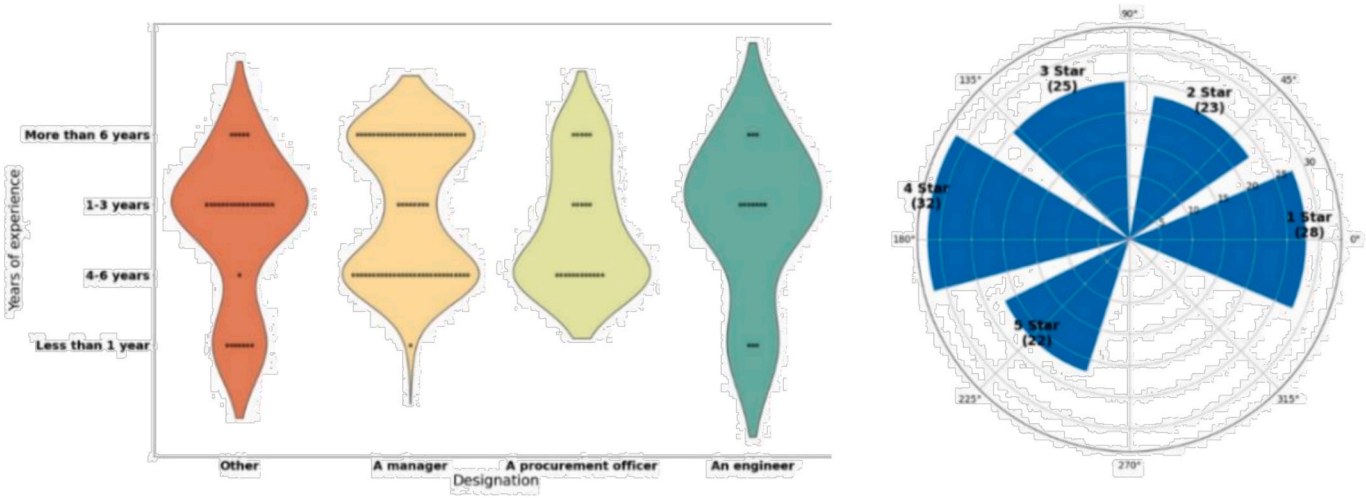

Fig. 5. Designation vs Years of Experience (Violin plot) and Star Rating Distribution (Polar Chart).
Source: Based on the survey responses- visualised using python (Jupyter notebook)

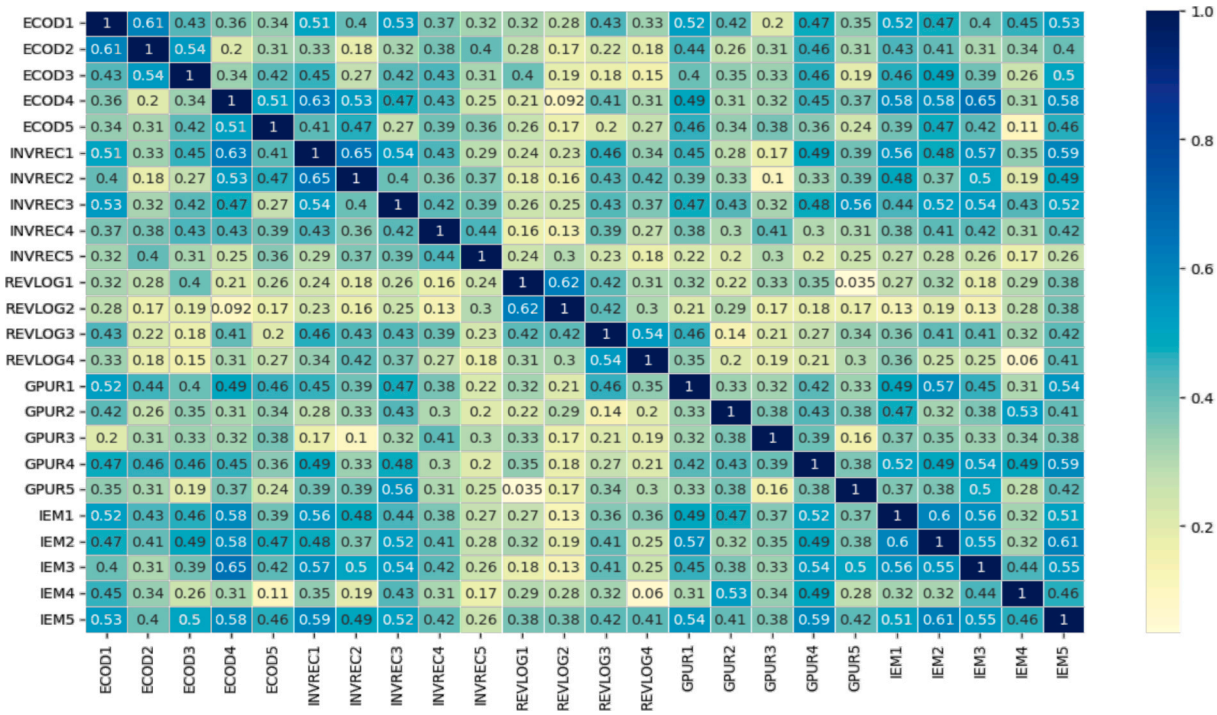

Fig. 6. Heatmap of GSCM Likert-Scale Practices.
Source: Based on the survey responses- visualized using python (Jupyter notebook)

a Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Each cell shows the correlation coefficient between two items, with values ranging from −1 (perfect negative correlation) to 1 (perfect positive correlation). Darker blue shades indicate stronger positive correlations, suggesting that respondents' perceptions of one practice tend to align with another, while lighter yellow shades indicate weaker or negative correlations. Overall, this heatmap provides a comprehensive visual summary of the relationships among GSCM practices, enabling researchers and practitioners to detect patterns, assess consistency, and explore how various sustainability initiatives interact within an organisational context.

Measurement tool

A survey questionnaire developed based on the comprehensive literature review and past studies. The questionnaire was sub-divided into seven parts. The initial part included the demographics, which included qualifications of the respondents, years of experience in the industry, designation, and the official star rating of each hotel. Hence, 30 questions concerned with GSCM practice and OP were included in the remaining 6 sections. The respondents were to answer the given statements by agreeing or disagreeing with them using a five-point Likert scale 1 to 5, 1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly agree and the survey measurement items are shown in Table 3.

Participant selection process and questionnaire validity

The questionnaire was sent to randomly selected hotels through their official email addresses obtained through the list of hotels registered with the SLTDA. The survey link was shared among the 167 members of the population. Even though the online method of delivery was used, only authorised employees of these hotels could access the questionnaire, which implied that only responsible employees who were directly engaged in the work of these hotels could fill out the survey. This controlled distribution strategy meant that only the relevant organisational representatives were used to get the responses. Including various reviews conducted by experts and pilot test enhanced the face and content validity of the questionnaire. All questionnaire items were assessed by academic experts in the field of sustainability and professionals in the field of research methodology to ensure clarity, relevancy, and correspondence to constructs of the study. Moreover, a pilot run done with 40 hotels and their response was used to refine and finalise the instrument further and then embark on the actual data collection. Their recommendations were included in order to enhance the accuracy and completeness of the instrument (Lam et al., 2018; Marqvorsen et al., 2024).

The identity of respondents was confirmed by comparing the names of hotels, the star rating, and the position held with the SLTDA hotel list. Any answers that included fewer than complete information or a wrong classification were considered invalid. In such instances, the corresponding hotel was approached once again through respondents (his/her) official email, to receive a revised submission since the population was confined to 167 hotels. The questionnaire was distributed to the randomly selected hotels, and 147 responses were received. During data screening, 5 responses were eliminated because of missing data, 4 were removed due to inconsistent responses and 8 responses eliminated due to unverified hotel identity. Following this screening, 130 responses were valid to further an analysis. Response rate was determined by dividing the valid responses (130) with the total number of responses collected (147) and multiply them by 100. Therefore, the response rate shows that 88.44% of the collected responses were valid and suitable for further analysis and a sample size of 100 samples and preferably 200 samples is adequate for SEM (Cheah et al., 2020).

Analysis and Interpretations

Table 4 presents the demographic profile of the participants. Following this, the assessment of the measurement and structural model of PLS-SEM model involves reliability, validity and this method was used to test the hypotheses for a particular study (Geng et al., 2017). The main objective of PLS-SEM is to maximise the amount of variance

Table 3
Survey measurement items.

Variable	Measures	Source
GSCM Practices	**Eco Design**	
ED1	We design our products to avoid or reduce the use of hazardous products. (Hazardous Products- substances that could harm human health or the environment)	(Choi & Hwang, 2015) (Sahoo & Vijayvargy, 2021)
ED2	We design our products for reuse, recycle, and recovery of material and component parts.	
ED3	We provide design specifications to our suppliers to ensure environmental protection.	(Vijayvargy et al., 2017)
ED4	We create items that consume less material and energy.	(Mustafi et al., 2024)
ED5	We specialize in product design focused on waste reduction.	
	Investment Recovery	
IR1	We adopt sale of excess inventories/ materials to reduce environmental impact. (Ex. Hotels sells surplus linens and furniture to guesthouses, reducing waste)	(Choi & Hwang, 2015)
IR2	We actively engage in the sale of scrap and used materials.	
IR3	We implement the Sale of excess capital equipment no longer in use, as a practice to promote asset reuse and minimize unnecessary waste.	(Vijayvargy et al., 2017)
IR4	We implement recycle policies across different hotel operations. (Ex: separating and recycling paper, plastic, glass, kitchen waste, linen, and packaging materials)	(Al-Shammari & Al-Maathidi, 2024)
IR5	We implement remanufacturing policies. (Ex: repairing or reusing furniture, fixtures, or equipment rather than disposing and buying new ones)	
	Reverse Logistic	
RL1	Our hotel collects unwanted or used products from customers for reclamation, recycling of materials, or reuse.	(Al-Shammari & Al-Maathidi, 2024)
RL2	Our hotel collects used packaging from customers for reuse or recycling.	
RL3	Our hotel returns its products to suppliers for retaining of materials, or remanufacturing. (A hotel returns old mattresses for refurbishing or recycling.)	(El Ayoubi & Radmehr, 2023)
RL4	Our hotel returns its packaging to suppliers for reuse and recycling.	
	Green Purchasing	
GP1	Our hotel uses eco-labelling of products.	(Al-Shammari & Al-Maathidi, 2024)
GP2	Our hotel suppliers are ISO 14000 certificated.	
GP3	Our hotel cooperates with suppliers to achieve environmental objectives.	
GP4	Providing design specification to suppliers that include environmental requirements for purchased item. (Hotel asks suppliers for Eco-friendly toiletry packaging.)	(Vijayvargy et al., 2017)
GP5	Environmental audit for suppliers' internal management.	
	Internal Environmental Management	
IEM1	Senior managers in our hotel are committed to green supply chain management.	(Al-Shammari & Al-Maathidi, 2024)
IEM2	Mid-level managers in our hotel support green supply chain management.	
IEM3	Our hotel emphasizes cross-functional cooperation for environmental improvements. (collaboration between different departments or teams)	(Sahoo & Vijayvargy, 2021)
IEM4	Our hotel obtained an ISO 14001 certification to produce environmentally friendly goods.	(Vijayvargy et al., 2017)
IEM5	Our hotel integrates total quality environmental management practices. (improving the quality of products, services, and processes)	
Dependent Variable	**Organizational Performance**	
OP1	Our hotel has reduced material purchasing costs through the adoption of green supply chain practices.	(Sahoo & Vijayvargy, 2021)
OP2	Our hotel has decreased energy consumption costs as a result of implementing green initiatives. (Energy consumption costs are the expenses for using electricity, gas, or other energy sources)	(Chasapi et al., 2024) (Namagembe et al., 2019)
OP3	Our hotel has achieved a reduction in waste treatment and disposal costs through sustainable practices. (Lower costs for waste treatment and disposal)	(Sahoo & Vijayvargy, 2021)
OP4	Our hotel has improved the effectiveness of delivering reliable and eco-friendly products to customers. (Ex: offers guests eco-friendly amenities such as bamboo toothbrushes, reusable water bottles, and organic linens)	(Chasapi et al., 2024)
OP5	Our hotel has enhanced supply chain coordination by aligning operational processes with green business procedures. (Ex: Using eco-friendly cleaners and fewer deliveries saves money, reduces labor, and helps the environment.)	(Namagembe et al., 2019)
OP6	Our hotel has increased its competitive advantage through green supply chain management.	

Source: Developed based on literature review.

explained in the endogenous constructs of the structural model (often viewed as prediction) to facilitate the explanation of the model's relationships (Cheah et al., 2020). In recent years, the usage of PLS-SEM has become more widespread in various domains, with non-normal data, small sample sizes, and the use of formative constructs being the most common reasons for its employment. The toolkit for PLS-analytical SEM has been expanded to address more complex model building and resolve data issues like heterogeneity (Khan et al., 2024). PLS-SEM was deemed appropriate for this study to test the hypotheses. As explained above, it has many benefits for subordinate construct analysis. The "Two-stage Technique" was employed to test the relationship between the constructs (Chiu & Hsieh, 2016). In the first stage the lower-order measurement model was developed, and all the measures of reliability and validity were computed. The indicators identified for the higher-order construct in the first stage were subsequently tested in a structural equation model for hypothesis testing in the second stage (Choi & Hwang, 2015).

Measurement model

Table 5 indicates the outcomes of Average Variance Extracted (AVE), Composite Reliability (CR), and Cronbach's Alpha (CA) measurements considering the validity and reliability of the research model. There are no latent variables or model constructs with AVE values below 0.50, hence constructs of this model acceptable (Mustafi et al., 2024). Each construct in the model has a CR value greater than or equal to 0.80. Models that have a CR value of 0.70 or greater are acceptable (Junaid et al., 2022).

Table 4
Demographics of participants.

Designation	n	(%)	Experience	n	(%)	Star Rating	n	(%)
Manager	65	50.00	Less than 1 year	11	8.46	1	28	21.54
Engineer	13	10.00	1–3 years	37	28.46	2	23	17.69
Procurement Officer	22	16.92	4–6 years	42	32.31	3	25	19.23
Other	30	23.08	More than 6 years	40	30.77	4	32	24.62
Total Participants	130	100	Total Participants	130	100	5	22	16.92

Source: Smart-PLS4.0, developed based on the survey responses.

Table 5
Factor analysis with indicator reliability and model fitting information.

Factor	Association	Factor Loading	SD	IR	T-Statistics	CA	CR	AVE
Eco Design (ED)	ED1 → ED	0.840	0.00	0.71	11.84	0.76	0.77	0.68
	ED2 → ED	0.853	0.00	0.73				
	ED3 → ED	0.784	0.00	0.61				
Green Purchasing (GP)	GP1 → GP	0.747	0.00	0.56	11.88	0.71	0.72	0.53
	GP2 → GP	0.706	0.00	0.50				
	GP3 → GP	0.671	0.00	0.45				
	GP4 → GP	0.791	0.00	0.63				
Internal Environment Management (IEM)	IEM1 → IEM	0.857	0.00	0.73	14.04	0.79	0.79	0.71
	IEM2 → IEM	0.848	0.00	0.72				
	IEM3 → IEM	0.827	0.00	0.68				
Investment Recovery (IR)	IR1 → IR	0.826	0.00	0.68	17.54	0.78	0.80	0.54
	IR2 → IR	0.748	0.00	0.56				
	IR3 → IR	0.774	0.00	0.60				
	IR4 → IR	0.701	0.00	0.49				
	IR5 → IR	0.604	0.00	0.36				
Reverse Logistics (RL)	RL1 → RL	0.753	0.00	0.57	8.84	0.75	0.77	
	RL2 → RL	0.726	0.00	0.53				0.57
	RL3 → RL	0.823	0.00	0.68				
	RL4 → RL	0.725	0.00	0.53				
Organizational Performance (OP)	OP1 → OP	0.730	0.00	0.53	17.08	0.79	0.80	0.55
	OP2 → OP	0.701	0.00	0.49				
	OP3 → OP	0.761	0.00	0.58				
	OP4 → OP	0.816	0.00	0.67				
	OP5 → OP	0.697	0.00	0.49				

Note: IR = indicator reliability. Source: Smart-PLS 4.0. ***Source:*** *Smart-PLS4.0.*

Internal consistency was first assessed using Cronbach's Alpha (CA). As shown in Table 6, all CA scores passed the suggested cut-off point of 0.70, hence demonstrating an acceptable level of internal consistency (Park et al., 2022). Reliability and validity were further evaluated using established measurement criteria. Convergent validity was more evaluated using established measurement criteria. Convergent validity is confirmed by AVE values being greater than 0.50, indicating that each construct accounts for more than half the variance of its indicators (Wong, 2016). The values for Composite Reliability (CR) have shown to be more than 0.80, an additional indication of good construct reliability (Hair et al., 2017). The values for Indicator Loading Validity (ILV) were between 0.60 and 0.70, indicating of good item reliability (Al-Shammari & Al-Maathidi, 2024; Laosirihongthong et al., 2013). Overall, these figures verify that the measurement model has reliability and convergent validity metrics that met the standards set forth in Table 6.

Table 6
Reliability indices and criteria.

Reliability Index	Criteria	Reference
AVE	>0.50	(Wong, 2016)
CR	>0.80	(Hair et al., 2017)
CA	>0.70	(Ringle et al., 2015)
ILV	0.60 to 0.70	(Al-Shammari & Al-Maathidi, 2024; Laosirihongthong et al., 2013)

Source: Smart-PLS4.0.

Discriminant validity

Discriminant validity of the measurement model was verified using Fornell-Larcker criterion (Fornell & Larcker, 1981). This test looks at the correlations of each of the latent variables with other variables and compare these with the square root of the Average Variance Extracted (AVE). Where the highest correlation of a variable with any other latent variable in the model is less than the square root of its AVE, discriminant validity is confirmed. As shown in Table 7, all the constructs met this criterion. Each construct shares more variance with its own indicators than with other constructs' indicators, hence showing appropriate discriminant validity. Discriminant validity was moreover verified by using the Fornell-Larcker criterion, which states that a square root of AVE of every construct should be greater than its highest correlation with any other construct in the model (Hair et al., 2011). Discriminant validity is confirmed through Table 7, where the square roots of the

Table 7
Discriminant Validity.

	ED	GP	IEM	IR	OP	RL	SR
ED	0.826						
GP	0.656	0.730					
IEM	0.622	0.726	0.844				
IR	0.633	0.623	0.704	0.735			
OP	0.52	0.681	0.723	0.677	0.742		
RL	0.426	0.473	0.445	0.536	0.514	0.758	
SR	0.208	0.232	0.255	0.328	0.261	0.177	1

Source: Smart-PLS4.0.

values for the AVE for all the constructs are greater than their corresponding correlations with other latent variables.

The evaluation was conducted at the first-order construct level, while acknowledging the existence and potential relevance of second-order structures. The analysis utilised the latent variable score (LVS) method, where the first-order dimensions were reflective indicators of their respective second-order constructs (Wetzels & Odekerken, 2009). All LVS loadings were above the threshold value of recommended 0.70, while the square root of AVE for all second-order constructs was greater than their correlations with other constructs, thereby ascertaining discriminant validity at higher order. The adopted methodology aligns with contemporary empirical applications in supply chain research, wherein LVS-based discriminant analysis was employed within a PLS-SEM framework to validate higher-order constructs (Jahed et al., 2022). This approach ensures that the constructs are theoretically coherent and empirically well-differentiated across all layers of the measurement framework.

In contrast, discriminant validity testing is a critical element in establishing the conceptual uniqueness of the conceptions in question. Attaining such validity reduces problems of possible multicollinearity as well as the validity of the measurement model. By defining each of the constructs as distinct elements of the underlying theory, this test ensures empirical results are both interpretable and reliable and thus improves the methodological rigour and robustness of the study overall. Fig. 7 presents the measurement model of the LOC measurement model. The model illustrates the relationships between the latent construct and its observed indicators, along with their respective factor loadings.

To ascertain the robustness, predictive ability, and explanatory fit, the structural model was tested using several criteria. Hair et al. (2011) show that, path coefficients, R2, and Stone–Geisser's Q2 are important predictors. The research field dictates that 0.75, 0.50, and 0.25 as values for R2 represent substantial, moderate, and weak strengths, respectively. According to Table 8, the relationship between GSCM and OP was highly and positively significant ($\beta = 0.749$, $t = 17.349$, $p < 0.001$) with a 95% bias-corrected CI of 0.665 to 0.883, respectively, supporting the hypothesised relationship. Star Rating x GSCM had no significant moderating influence on OP (β = -0.064, t = 0.961, p = 0.337). The confidence interval (−0.194, 0.066) included zero, which meant rejection of hypothesised moderation.

These results concur with predictive-oriented paradigm, which puts high importance on the significance of out-of-sample prediction and model building. Overall, results indicate explanatory capability of basic structural routes but highlight the necessity for continued examination of contextual moderators. Ringle et al. (2015) identify the need to include effect size (f^2) and model fit indices such as the Goodness-of-Fit (GoF) index, especially for reflective items. Furthermore, (Hair & Alamer, 2022) advocate the predictive paradigm for PLS-SEM, emphasising the use of out-of-sample prediction measures such as PLS predict, and the inclusion of higher-order constructs where theoretically justified. Taken together, these methods validate the structural coherence and predictive potential of the model, confirming its applicability in theory generation and empirical analysis.

Assessment of model quality – Coefficient of determination (R^2) and Adjusted R^2

The structural model's explanatory power was evaluated using the coefficient of determination (R^2). This indicates the amount of variance in the endogenous construct (OP) explained by its benchmarks for marketing and social science research. R^2 values between 0.02 and 0.12 are weak, 0.13 and 0.25 are moderate, and 0.26 and higher are substantial (Cohen, 2013).

Table 9 shows the R-square and adjusted R-square values for examined constructs, each of which evaluates the explanatory power of a certain variable. The findings show that IR ($R^2 = 0.768$; Adj. $R^2 = 0.767$) and IEM ($R^2 = 0.745$; Adj. $R^2 = 0.743$), with the highest model fit levels,

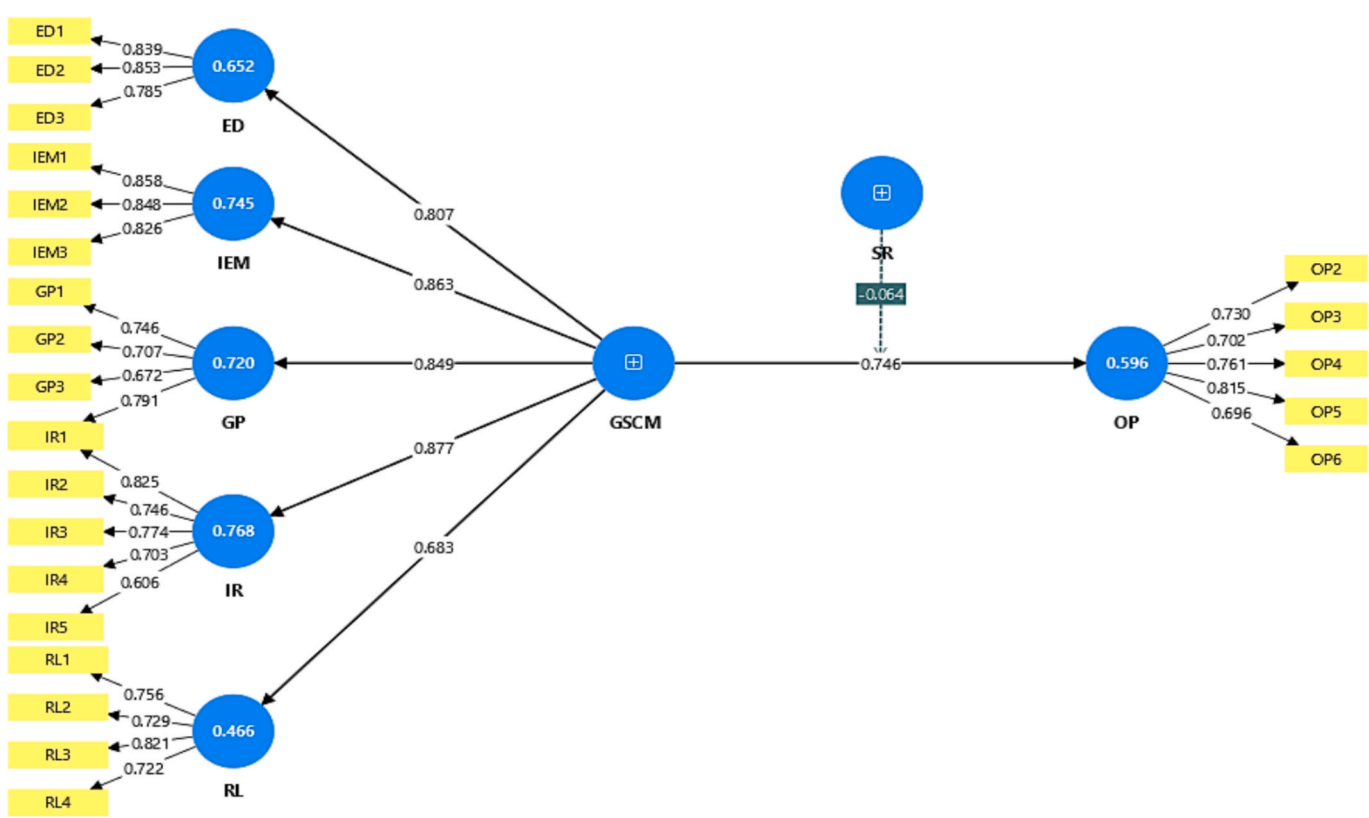

Fig. 7. LOC measurement model.
Source: Smart-PLS4.0

Table 8
Path Model.

Path	Beta	SD	LL	UL	T-statistics	P value	Comment
GSCM –> OP	0.749	0.043	0.665	0.883	17.349	0.000	Supportive
SR x GSCM –> OP	−0.064	0.067	−0.194	0.066	0.961	0.337	Rejected

SD- Standard Deviation, LL- Lower Limit, UL- Upper Limit.
Source: Smart-PLS4.0.

Table 9
Assessment of model quality.

	R-square	R-square adjusted
ED	0.652	0.649
GP	0.72	0.718
IEM	0.745	0.743
IR	0.768	0.767
OP	0.596	0.586
RL	0.466	0.462

Source: Smart-PLS4.0.

explain a significant amount of the dependent construct's variance. Adj. $R^2 = 0.718$ indicates that GP is further highly predictive, though ED and OP have low explanatory power. The findings help prioritise constructs for subsequent analytical stages and provide an accurate understanding of variable performance.

Second-Order construct assessment

The PLS-SEM method was used to test the hypotheses of the study while analysing the reliability and validity of the variables, as this method was used for evaluating the complex statistical models. On the other hand Mustafi et al. (2024) have shown that PLS-SEM is non-parametric and works well with non-normal distributions, having a minimal limit on the usage of ordinal and binary scales when appropriately coded. However, empirical evidence proved that the PLS-SEM method can be used for handling complex models while providing an overall better outcome (Hair & Alamer, 2022; Chin et al., 2008; Wong, 2013). Formative indicators within a measurement scale can reflect a negative, a positive or no correlation among themselves. Thus, reliability indicators like internal consistency and discriminant validity are usually not reported in the context of a formative measurement scale. According to evidence from a previous study by Wong (2013), this is due to Average Variance Extracted (AVE), Composite Reliability (CR), and outer loadings are meaningless for any constructs that constitute uncorrelated measures. Researchers have predominantly used two criteria to assess the measurement model for formative measurement i.e. for the significance and relevance of indicator weights and evaluation of indicator collinearity (Hair et al., 2011). Building on this Hair et al. (2017) described three fundamental tasks:

1. Checking convergent validity
2. Solving potential collinearity issues
3. Finally testing for significance and significance of formative indicators.

Following the recommendation of Hair et al. (2017) in the case of cultural orientation, reflect is formed as follows.

Assessment of convergent validity

There are two procedures for evaluating the convergent validity of formative latent constructs (Hair et al., 2017). The first method involves analysing the correlation between the formative latent variable and its reflective measures, requiring a path coefficient of at least 0.70 between constructs and an R-Squar value of at least 0.50 for the endogenous construct. However due to the minimum sample size and maintain the responses rates in our study on the impact of GSCM practices on OP, the study adopted the second method proposed by (Hair et al., 2017).

The first method involves analysing the correlation between the formative latent variable and its reflective measures, requiring a path coefficient of at least 0.70 between constructs and an R^2 value of at least 0.50 for the endogenous construct. To mitigate respondent fatigue and maintain response rates in our study on the impact of GSCM practices on OP, this research adopted the second method proposed by (Hair et al., 2017). This approach uses a global item to capture the essence of the reflective-formative construct. We developed a global item specifically for GSCM practices, which was pretested with experts before inclusion in the survey instrument to ensure its validity. The analysis revealed a path coefficient of 0.751 between the constructs and an R^2 value of 0.602 for the endogenous construct, indicating acceptable convergent validity for the GSCM practices construct. See Fig. 8.

Evaluation of indicators collinearity

In formative measurement models, high correlations between indicators are generally unexpected. Hair et al. (2022) have strongly reflect that the correlations among formative indicators indicate collinearity, which is considered undesirable. To assess this, the study analysed Variance Inflation Factors (VIFs) to check for collinearity among the constructs' formative components. Inner VIF values were used for this evaluation, as the model involves a reflective–formative second-order construct. Accordingly, collinearity was examined for ED, IEM, RL, GP, IR, GSCM practices and OP as predictors of hotel success. Hair et al. (2017) VIF values should not exceed 5 to be deemed acceptable. Table 10 presents the results, showing that all VIF values were well below 5, indicating no significant collinearity issues among the formative indicators (Hair et al., 2022; Wong, 2013).

Evaluation of the significance and relevance of indicator weights

The weight of an indicator reflects its relative importance, while the loading indicates absolute importance. Both can be tested using bootstrapping, with resamples equal to or greater than the original sample size (Wong, 2013). In this study, Smart-PLS and a bootstrapping procedure with 5000 resamples were applied to assess indicator relevance (Ringle et al., 2015; Streukens & Leroi-Werelds, 2016).

Results show that formative indicator which OP exceeded this threshold and had significant t-values, confirming its retention. Confidence intervals did not include zero, and the H1 in the study was tested by ensuring there is a relationship between the GSCM practices and OP reflect the *p*-value as below 0.10, indicating strong significance. However, the H2 was insignificant due to the higher *p* value.

Discussion

This study focuses on GSCM practices including the impact of ED, IEM, RL, GP and IR on OP in the hotel industry in Sri Lanka. This was accomplished by developing SEM model based on the data collected from the respondents. Accordingly, hypotheses based on the valid responses from 130 star rated hotels in Sri Lanka. The results shown in Table 10 of structural equation modeling represent that GSCM practices have a significant positive impact on OP. This result has been supported

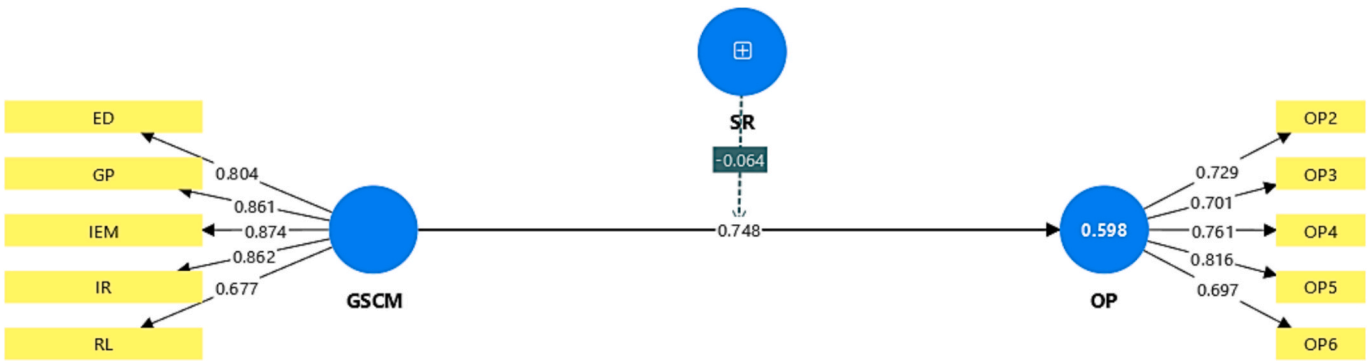

Fig. 8. Assessment of convergent validity of second-order constructs.
Source. Based on smart pls

Table 10
Hypotheses testing.

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	VIF
ED –> GSCM	0.198	0.196	0.017	11.84	0.000	2.089
GP –> GSCM	0.237	0.237	0.02	11.887	0.000	2.563
GSCM –> OP	**0.751**	**0.76**	**0.044**	**17.086**	**0.000**	**1.142**
IEM –> GSCM	0.259	0.257	0.018	14.049	0.000	2.749
IR –> GSCM	0.317	0.314	0.018	17.54	0.000	2.493
RL –> GSCM	0.202	0.201	0.023	8.847	0.000	1.471
SR x GSCM –> OP	**−0.064**	**−0.062**	**0.065**	**0.972**	**0.331**	**1.045**

by many researchers in various countries (Chiu & Hsieh, 2016; Choi & Hwang, 2015; Geng et al., 2017; Laosirihongthong et al., 2013; Mustafi et al., 2024). Through this study, it was found that ED, IEM, IR significantly correlate with OP. Further a previous study providing, solid evidence that hotel star rating is a moderator of the relationship between service quality dimensions and customer satisfaction in South African hotels (Nunkoo et al., 2020).

A first-order reflection SEM was built to ascertain the validity of unique contributions of each GSCMP dimension. GP, IEM, IR, ED and RL were modelled separately with strong loadings of indicators with convergent validity. In addition to the first order reflecting model, the structural model further includes a second-order formative GSCM construct that includes five dimensions, ED, GP, IEM, RL and IR. The relationship between GSCM and OP was statistically significant and direct, and it verifies that hotel performance is strengthened by sustainability activities. Although the moderating effect of star rating was not significant, having it helps put this in context by examining if the classification of a hotel has any effect on the GSCM-OP relationship strength.

Empirical evidence from emerging economies provides support to determine the non-significance of hotel star rating on the adoption of GSCM practices and its impact on OP. Rassiah et al. (2024) discovered that Malaysian hotels, regardless of star level classification, were keen about cost saving and short-term profits than long-term environmental gains without any discernible trend towards sophisticated sustainability policies by star levels. This implies that star ratings are not necessarily indicative of environment commitment or performance results. Similarly, studies found that although waste management practices were generally favoured more in highly rated hotels within Pakistan's hospitality sector, it did not have any impact on the business performance, dispelling the notion that star categorisation equates with efficiency in sustainability (Muhammad & Leo, 2022). This is additionally a broader regional trend where management intention, stakeholder pressure, and operational integration count higher than hierarchical grading systems for forging sustainable outcomes.

In the current analysis, star rating did not significantly influence the adoption of GSCM practices among Sri Lankan hotels. This result can be attributed to several contextual reasons. First, even lower-rated hotels may be motivated to implement environmental practices for operational cost savings, such as reduced energy, water, and waste-management costs, in line with studies in the hotel industry, indicating that cost reduction remains one of the significant drivers for green management adoption (Kannangara et al., 2024). Second, higher-rated hotels may be less visible or more frequently outsource environmental initiatives, such as waste management or energy-saving systems being dealt with by external service providers, thus weakening the observable relationship between star rating and internally managed GSCM practices. On the same note, there was no significant relationship indicating that OP was influenced by GSCM practices. This can be explained by the fact that green practices have been adopted partially or not uniformly at all, and are usually geared towards compliance, and cost reduction as opposed to strategic integration. Variations in management commitment, resources and operation maturity among hotels can also dilute quantifiable influences. These findings indicate that environmental activities in Sri Lanka are viable operational choices and not prestige choices, and that the adoption of GSCM practices does not necessarily lead to instant OP changes without complete strategic implementation.

Further, the findings justify GSCM practices as a system driver towards sustainability, where carbon action at the city level is echoed through greening of the supply chain, renewable integration, and ED in hospitality that promotes innovation (Ahmed et al., 2025). Enduring tensions regarding equity and the allocation of resources mirror transformation trade-offs on a large scale and institutional vulnerability puts gains at risk (Khorram-Manesh, 2023; Mahoney et al., 2022). Embedding GSCM practices into SDG aligned governance elevates it from just being a tool to societal well-being, justice, and resilience to an industry best practice. By building on these developments, growing initiatives by international businesses to reduce environmental impacts, GSCM practices have emerged as a strategic imperative in various industries. Even though theoretical links between GSCM and improved OP have received extensive scholarly interest, results are varied as far as real practices are concerned, particularly in service-dominant settings. The current research as well as prior research evidence confirms that GSCM practices have a positive impact on OP, highlighting their significance in

strategies of sustainability.

Implications and future research

Academic implications

This study adds to the body of GSCM and sustainability literature by operationalising GSCM practices as a multi-dimensional construct that encompasses distinct practices such as ED, GP and IEM in Sri Lanka's hotel industry. While OP was measured in an integrated manner, the broken-down analysis of GSCM practices better elucidates how various environmental approaches affect aggregate performance. This work fills a lacuna in service-sector research, wherein GSCM has been far too frequently regarded as a homogeneous construct when it possesses operational heterogeneity (Mustafi et al., 2024; Al-Shammari & Al-Maathidi, 2024). By using this paradigm in an emerging economy, the present study adds environmental context applicability value to GSCM theory and provides empirical evidence from a still under-represented region in sustainability discourse. The findings invite further research to explore the differential impact of diverse GSCM practices dimensions and its integration in service-based supply chains, particularly in a resource-scarce setting.

Managerial implications

The findings of this study offer a valuable insight for the hotel industry of Sri Lanka, as the environmental pressure and stakeholder expectations are increasing, integrating GSCM practices can be a form of competition. The conclusions of this research are of great value to hospitality managers and sustainability planners looking to improve OP through certain GSCM practices. Through empirical verification of the positive impacts of multidimensional GSCM practices like ED, GP and IEM, this research serves as a practical guide for incorporating sustainability into day-to-day hotel operations. General managers to supply chain coordinators can all utilise these practices to increase the efficiency of resource usage, lower operational costs, and improve brand standing. The adoption of GSCM practices is a competitive edge for the hotel industry in Sri Lanka since stakeholder demands and environmental concerns are escalating. The results of the study deliver useful information for hotel operators and sustainability planners who seek to enhance OP through targeted GSCM practices. Through empirical validation of the beneficial effects of holistic GSCM practices, such as IEM, ED and GP, the study provides a handy roadmap for instituting sustainability in fundamental hotel operations. Such practices can be utilised by managers at all levels, ranging from supply chain coordinators to general managers, to strengthen brand reputation, reduce operating costs, and promote resource efficiency.

Although interviews were not conducted in this study due to time constraints, the practical suggestions provided are endorsed by the empirical data of the study and information on sustainability practices in Sri Lankan hotels that can be accessed publicly. An overview of the content of website, CSR reports, and social media pages of a number of lower- and mid-tier hotels reveals that there are typical operational areas of operational gaps. These include insufficient environmental compliance at the suppliers levels, irregular waste generation activities, limited employee training on sustainability, and low disclosure of resources efficiency activities. These are publicly visible gaps, that correlate with those mentioned in our implications section and indicate that the recommendations are not based on a fantasy but perhaps are tangible problems that afflict most hotels in Sri Lanka.

Future research directions

This study offers a variety of directions for future research while affirming the positive effect of multidimensional GSCM practices on OP for hotels. Due to the statistically insignificant moderating influence of hotel star rating, future studies must investigate other contextual variables that can potentially condition the GSCMP–OP relationship more effectively, such as ownership structure, stakeholder pressure, or environmental certification status. Further, future studies can extend this research to other Asian nations, whose cultural, legislative, and market characteristics could influence the application and effectiveness of GSCM practices differently. A comparison study of this nature would assist in exploring the external validity of findings outside the Sri Lankan scenario. Moreover, using customer satisfaction as a mediator could provide a better explanation of how GSCM operations lead to customer loyalty and customer base. To evaluate the temporal sustainability of sustainability-driven performance improvements, longitudinal research is needed, particularly for service supply chains whose dynamics change very rapidly. Furthermore, OP decomposition into financial, marketing, and environmental dimensions would enable future research to more deeply explore complex performance consequences and match complex inputs for multidimensional GSCM. Inter-regional, inter-sectoral comparative analyses, like manufacturing versus hospitality industries, could yield insights into how industry nature affects green initiative performance. Finally, application integration of qualitative methods such as case studies or interviews could promote deeper knowledge of managerial incentives and impediments to GSCM implementation in low-resourced environments. The current study can be enhanced in future research by interviews or case studies of various types of hotels, yet considering the limitations of the present investigation document-based evidence will provide a sufficient and resonant justification of the practical recommendations.

Conclusion

The supply chain plays an important role in the global economy and environment. Therefore, it is essential to apply GSCM practices in different business industries to assess and show to mitigate the negative environmental impact among the environments. This study has delved into the critical interrelationship between the GSCM practices on OP by using the hotel industry in Sri Lanka. In this research, this study aimed to examine the impact of five GSCM practices on OP. The practices selected for the study are ED, IR, RL, GP and IEM. For data collection, the research focused on the hotel sector in Sri Lanka known for adoption of these practices. The study used a moderating variable as star rating among the hotel sectors. The data has been gathered through a survey distributed among 167 hotels by covering the entire SR hotels in Sri Lanka and the result based on the 130 responses has shown a 78% response rate. To analyse the data, study utilised multiple statistical tools available in SMART PLS, ensuring a comprehensive and accurate assessment of data. Based on the overall study, it was observed that the direct hypothesis was statistically significant. The lack of a significant moderating effect by the hotel star rating is surprising since it indicates that the advantages of GSCM are not limited to luxury companies but applicable throughout the hospitality industry. This puts GSCM as a performance lever that can be applied everywhere and eliminates the view that sustainability is strategy for companies that are luxury focused. The study provides a sound basis for future hospitality business research and policy development in sustainable contexts by integrating theoretical concepts with industry realities. This benefits business practice and academic research.

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CRediT authorship contribution statement

R.M.H.N. Bandara: . **R.A.D.T. Ranathunga Arachchi:** Writing – review & editing, Writing – original draft. **L.D.C. Gunasekara:** Writing

– review & editing, Writing – original draft. **N.A.T. De Zoysa:** . **Anuja A. Lokeshwara:** Writing – review & editing, Writing – original draft, Supervision. **Chapa S.R.B. Refaie:** Supervision.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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