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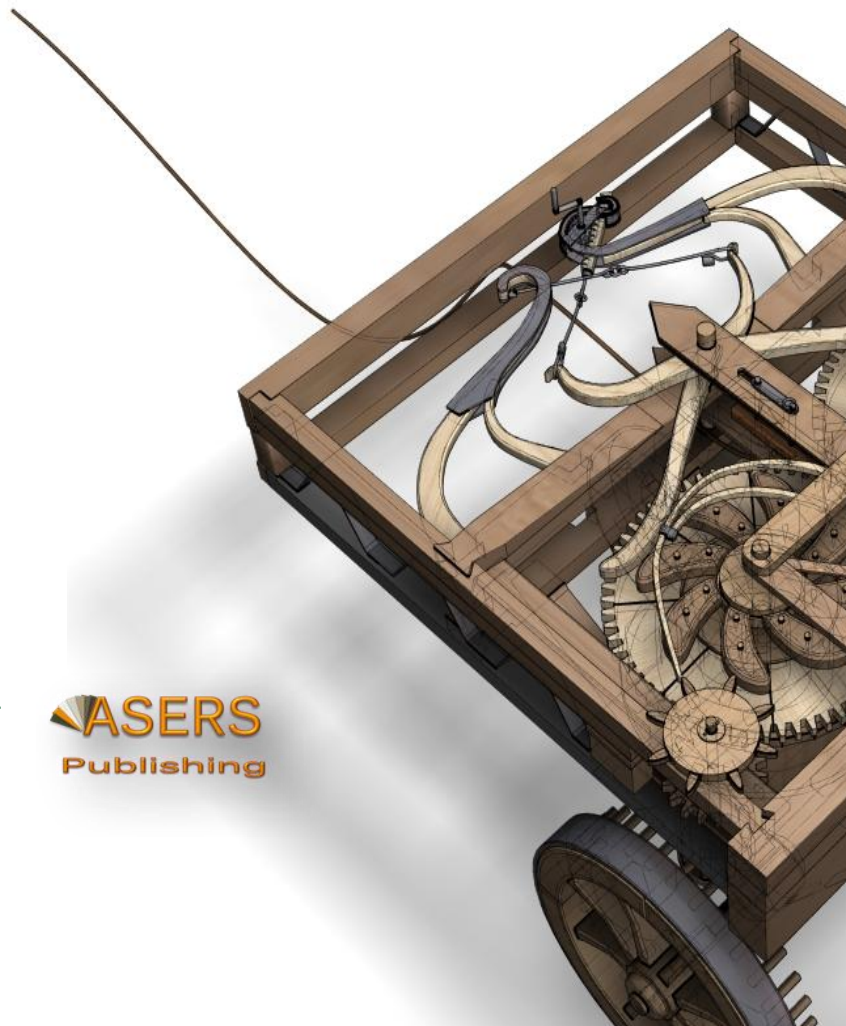
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The Environmental CSR Awareness-Satisfaction Paradox: Understanding Customer Perceptions and Behavioural Intentions in Hospitality Services

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Abstract: This study explores a paradoxical relationship between environmental CSR awareness and customer satisfaction within the Malaysian hospitality sector. The research uncovers how high CSR awareness can negatively influence satisfaction while positively impacting behavioural intentions.

Data was collected via survey from 400 hospitality customers and analyzed using Random Forest, K-means clustering, and regression models to examine the relationships between environmental CSR awareness, customer satisfaction, and behavioural intentions.

The analysis reveals that increased environmental CSR awareness correlates negatively with customer satisfaction but positively with behavioural intentions like willingness to pay more. Four distinct customer segments emerged, showing varying perceptions and satisfaction patterns.

This paper challenges the conventional belief that CSR always enhances satisfaction, offering empirical evidence of the Environmental CSR Awareness-Satisfaction Paradox. The study provides a new lens to understand complex customer psychology in sustainable hospitality.

The findings are limited to the hospitality industry in Malaysia and may not generalize across regions or sectors.

Understanding this paradox helps hospitality businesses better strategize CSR communication and customer engagement.

Insights contribute to policymaking and service design promoting sustainable consumer behaviour.

Keywords: Environmental CSR; customer satisfaction; behavioural intentions; hospitality; sustainability paradox; machine learning.

JEL Classification: M14; L83; C38; D12.

Introduction

Corporate social responsibility (CSR) is now considered a significant strategic initiative in the current hospitality industry because of the increased awareness of the environment among consumers and regulatory pressures directed towards them to be environmentally sustainable (Chen & Tung, 2014). Owing to the need to stimulate economic growth in Malaysia, the hospitality industry has been active in energy-saving measures and strategies, green supply chains, and technological updates related to the overall operation process (Rahman *et al.* 2015). However, there is little documentation of the relationship between customer knowledge of the environmental CSR packages of the industry and satisfaction levels, especially in developing economies.

Traditional CSR literature states that stakeholder theory and the social exchange approach state that CSR programs satisfy customer trust and positive behavioral intentions (Carroll, 1991; Freeman, 1984; Blau, 1964). However, recent information suggests that this connection might be more complicated when customers have higher environmental awareness and demand higher company performance (Martinez Garcia de Leaniz *et al.* 2018).

Thus, the current article questions what can be called the Environmental CSR Awareness-Satisfaction Paradox in these quarters: the factual finding that environmental CSR awareness is positively associated with reduced satisfaction. However, customers' behavioral intentions may be positive. Using high-level statistical analysis and machine-learning algorithms in the analysis of statistical data of 400 Malaysian consumers of

hospitality products, the project will unravel the complex multi-factorial connections between the environmental CSR-related awareness, satisfaction, and behavioural intentions levels.

This study contributes to the literature on CSR and hospitality in several ways. First, it disputes the traditional belief that CSR awareness increases satisfaction. Second, it gives empirical evidence of customer segmentation using CSR awareness-satisfaction profiles. Third, it illustrates the use of machine learning methodologies in studying intricate CSR-customer behaviour correlations. Lastly, it provides workable ideas to hospitality managers who want to maximise their environmental CSR approach.

1. Literature Review

1.1 Environmental CSR in Hospitality

In the hospitality industry, CSR and environmental sustainability incorporate various activities to balance goals to conserve the environment and service quality (Kim *et al.* 2017). Deployment of strategies for waste reduction, preservation of energy and water resources, adoption of infinite-supply sourcing, and formulation of plans for environmental authenticity/certification of environmental plans form substantial aspects of this agenda (Font & Lynes, 2018). The tourism and hospitality industry is also known to be a major producer of anthropogenic emissions, considering that it contributes to total greenhouse gas emissions (Lenzen *et al.* 2018). Therefore, it strongly motivates the industry to develop CSR activities that would limit environmental emissions. As empirical research shows, regular environmental CSR efforts bring the returning business, *i.e.*, reduced operating expenses, high brand image, and satisfied workers (Rahman *et al.* 2015). Although these benefits have been cited in the literature, the relationship between environmental CSR and customer satisfaction is ambivalent; the reports in the industry have shown a discrepancy between environmental responsibility and guest value perception (Martinez *et al.* 2019).

1.2 CSR-Customer Satisfaction Relationships

The literature on the mutual association between customer satisfaction and CSR has been vast across various studies, and most research has found positive correlations (Luo & Bhattacharya, 2006). This intersection is premised mainly within the social exchange theory, whereby perceptions about CSR generate reciprocity and, by extension, increase customer satisfaction and loyalty (Cropanzano & Mitchell, 2005). Some studies that purely relate to the hospitality industry also confirm that positive CSR perception is related to customer satisfaction, although almost all these studies do not discriminate between environmental and non-environmental aspects of CSR and investigate general impressions of CSR (Kang *et al.* 2012; Manaktola & Jauhari, 2007). In addition, the studies are biased towards developed economies, which is a weakness limiting the external validity of utilisation in evaluating developing settings.

1.3 The CSR Awareness-Satisfaction Paradox

There is increased criticism that positive CSR-satisfaction relationships may be universal. Expectation-disconfirmation theory argues that as CSR becomes well-known to customers, the expectancy set becomes high, which is hard to achieve, thus leading to dissatisfaction when performance-disconfirmation is not attained (Oliver, 1980). It is a theoretical thinking where a CSR awareness-satisfaction paradox is supported. According to Mart Oxef vez Garc meeting up to Leaniz *et al.* (2018), environmental consciousness may become a factor that moderates the relations between CSR and satisfaction, as the amount of awareness of the customer's attitude towards the environment may produce a difference in their response level in contrast to the environmentally less conscious customers. In the same way, Kim *et al.* (2017) found that the environmental knowledge of customers can build more demanding environmental performance evaluation standards.

1.4 Behavioural Intentions in Environmental Contexts

Despite possible satisfaction issues, studies have consistently demonstrated that awareness of environmental CSR positively impacts behavioural intentions like willingness to pay premiums, positive word-of-mouth, and loyalty (Nguyen & Chiu, 2023).

It indicates the possibility that the CSR awareness-behavioural intentions relationship is not mediated by the routine satisfaction-mediated paths as thought before, but could surpass m. It is based on the theory of planned behaviour that offers an understanding of environmental attitudes on behavioural intentions using attitude formation, subjective norms, and perceived behavioural control (Ajzen, 1991). The customers can perform favourable behavioural intents founded on environmental values in instances of reduced satisfaction regarding service delivery in an environmental setting.

2. Methodology

2.1 Research Design and Sample

This paper used a cross-sectional survey research design that investigated the association between environmental CSR awareness, customer satisfaction, and the behavioural intentions of customers of hospitality companies in Malaysia. A sample of 400 respondents, with the understanding that they stayed in hotels or resorts in Malaysia during the last 12 months, was used. The sample was also ethnically diverse: female 52.8 per cent and male 47.2 per cent respondents aged between 20 and 65 years ($M = 42.5$, $SD = 12.8$). The education levels were high school (25.5%), bachelor's degree (36.5%), master's degree (30.2%) and doctorate (7.8%). Ethnic representation was diverse according to the structure of Malaysia: Malay (40.0%), Chinese (30.0%), Indian (20.0%), and ethnic groups (10.0%).

2.2 Measurement Instruments

A five-dimensional environmental CSR Awareness was based on the scaled adaptation of Rahman *et al.* (2015) and Kim *et al.* (2017), which comprised energy conservation awareness, water management awareness, waste reduction awareness, sustainable sourcing awareness, and environmental certification awareness. All the dimensions had several items measured on 7-point Likert scales. Customer Satisfaction was measured using a multidimensional approach, including service, environmental, value, facility, and overall satisfaction (Oliver, 1980; Cronin & Taylor, 1992). The 7-point Likert scales were adopted in all measures of satisfaction. Due to the established scales differentiating between repeat visit intentions, recommendation intentions, price premium willingness, loyalty intentions, and word-of-mouth intentions, the measurement of behavioural Intentions was provided (Zeithaml *et al.* 1996; Nguyen & Chiu, 2023). Control Variables included demographical characteristics (age, gender, education, income, ethnicity), the characteristics of hotels (hotel type, length of stay), and the frequency of travel.

2.3 Data Analysis

To demonstrate the strength and stability of the results, the research used the multi-analysis data analysis strategy with the inclusion of various analysis methods. The methodological relationships between analysis methods were examined in descriptive statistics and correlation analysis to have a preliminary idea of the data. The multiple regression analysis was then followed to test both the direct and mediated relationship, using which the dynamics between the CSR awareness, customer satisfaction and the intention of behaviour could be clarified. Also, machine learning methods, like Random Forest, Support Vector Machine, and Neural Network models, have been applied to increase predictive accuracy and confirm patterns in data. K-means also performed clustering to reveal customer groups' CSR profiles, awareness, and satisfaction to get advanced explanations on heterogeneous consumer reactions. To facilitate interpretation and share the results with the community, more advanced visualisation was generated to understand the CSR awareness-satisfaction paradox and features of the identified segments. All calculations were done in Python by applying some of the most important libraries, including scikit-learn, pandas, and matplotlib.

3. Results

3.1 Descriptive Statistics

Table 1 shows descriptive statistics of important variables. Customers were mainly aware of environmental CSR initiatives, with a large mean (M) across all dimensions ($M = 4.53$, $SD = 0.52$ on a scale of seven). The levels of customer satisfaction differed based on the dimensions, with the highest level recorded for environmental satisfaction ($M = 5.32$, $SD = 0.85$) and the lowest value for satisfaction ($M = 4.16$, $SD = 0.99$).

Table 1. Descriptive Statistics of Key Variables

Variable	Mean	SD	Min	Max
CSR Energy Awareness	4.59	0.83	2.50	6.80
CSR Water Awareness	4.52	0.79	2.30	6.75

Variable	Mean	SD	Min	Max
CSR Waste Awareness	4.52	1.00	1.90	7.00
CSR Sourcing Awareness	4.50	1.04	1.85	7.00
CSR Certification Awareness	4.52	1.17	1.50	7.00
CSR Overall Awareness	4.53	0.52	3.22	6.01
Satisfaction Service	4.91	1.45	1.50	7.00
Satisfaction Environmental	5.32	0.85	3.20	7.00
Satisfaction Value	4.16	0.99	1.80	6.95
Satisfaction Overall	4.81	0.73	2.85	6.50
Repeat Visit Intention	4.57	1.44	1.25	7.00
Price Premium Willingness	4.76	1.33	1.50	7.00

3.2 The CSR Awareness-Satisfaction Paradox

Correlation analysis represented the primary outcome of this research since it showed an inverse relationship between environmental CSR awareness and customer satisfaction, which was statistically significant ($r = -0.112$, $p = 0.025$). This paradoxical result defies the common sense of CSR and offers empirical support for the CSR awareness-satisfaction paradox.

Table 2. Correlation Matrix - Key Relationships

Variable	CSR Overall Awareness	Satisfaction Overall	Price Premium Willingness
CSR Overall Awareness	1.000	-0.112*	0.198**
Satisfaction Overall	-0.112*	1.000	-0.030
Price Premium Willingness	0.198***	-0.030	1.000

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

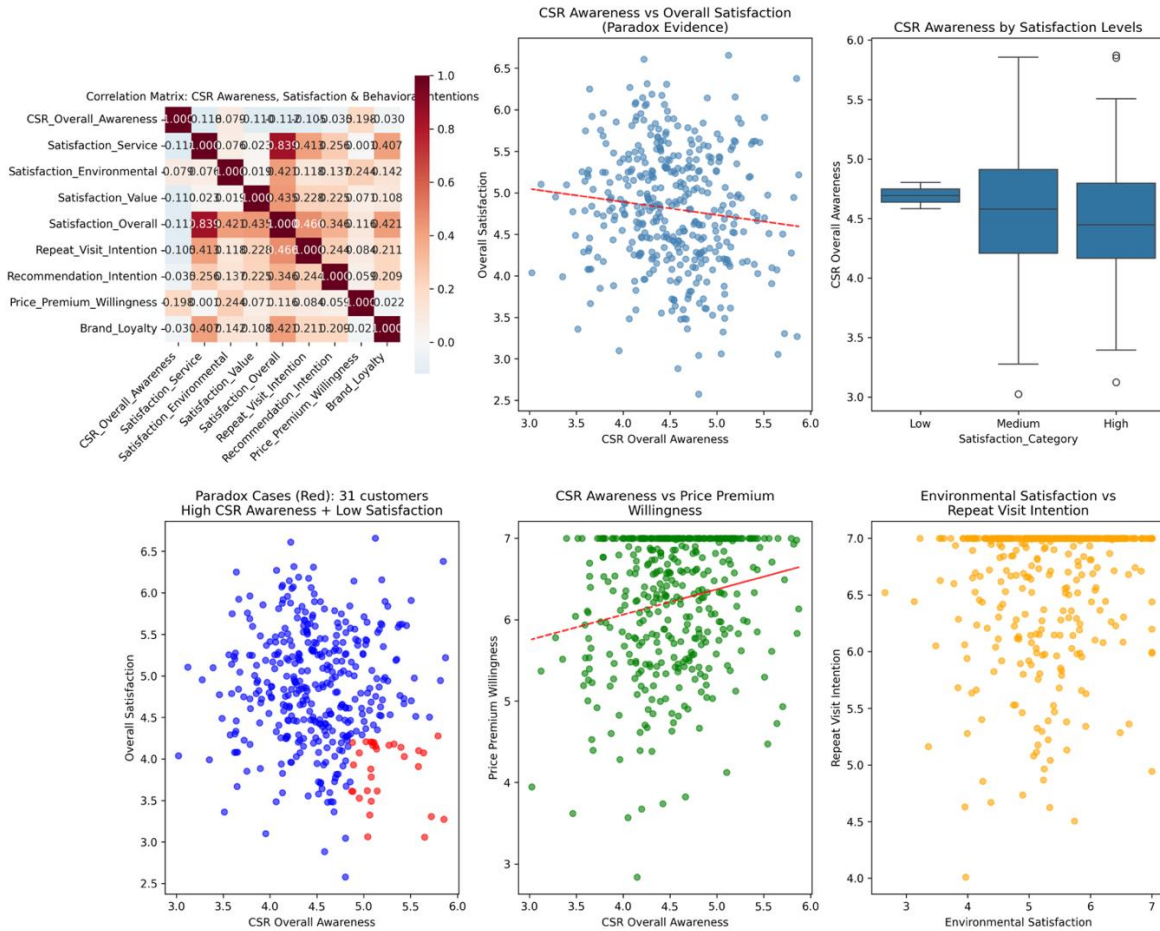
It is even more paradoxical to consider the dimensions of satisfaction. Service satisfaction ($r = -0.118$, $p = 0.018$), value ($r = -0.110$, $p = 0.030$), and facility ($r = -0.105$, $p = 0.038$) satisfaction had negative relationships with environmental CSR awareness. Although the correlations of satisfaction were negative, environmental CSR awareness showed a robust positive correlation with price premium willingness ($r = 0.198$, $p < 0.001$), showing that the aware customers are still ready to financially support environmentally responsible places even when they are not satisfied to the same extent.

3.3 Customer Segmentation Analysis

The K-means clustering analysis showed four customer segments with differing CSR awareness and satisfaction compositions. Cluster 0 was the group named Low CSR/Low Satisfaction and consisted of 76 customers (19.0%) with a moderately low awareness of environmental CSR ($M = 3.87$, $SD = 0.26$) and satisfaction levels ($M = 4.33$, $SD = 0.59$). Such customers were usually younger, with an average age of 38.5, and most preferred staying in luxurious hotels. Cluster 1, Low CSR/High Satisfaction, contained 125 customers (31.2 per cent) who were also slightly more aware of CSR ($M = 4.22$, $SD = 0.29$) but much more satisfied ($M = 5.36$, $SD = 0.48$). Primarily, this segment consisted of older customers with a median age of 47.2.

Cluster 2, representing the High CSR awareness but Low Satisfaction cluster, included 37 customers (9.2%), reflecting the satisfaction paradox. These customers were lowly satisfied ($M = 4.11$, $SD = 0.44$) even though they were highly aware of environmental CSR activities ($M = 5.34$, $SD = 0.33$). It is pertinent to mention that this segment possessed the highest level of income and the earliest average age ($M = 35.8$) and, therefore, was expected to have high environmental performance, which was not fulfilled to the full extent. Finally, there were 162 customers (40.5 per cent) in Cluster 3, which is identified as High CSR/High Satisfaction. What was revealed is that these women had a high degree of CSR awareness ($M = 4.75$, $SD = 0.33$) and great satisfaction ($M = 4.94$, $SD = 0.66$) with a well-balanced demographic structure and an average age of 43.1. In general, the results outline the unique segment of the paradox (Cluster 2), supporting the complexity of the customer reaction towards the environmental CSR in the hospitality field.

Figure 1. The K-means clustering analysis



3.4 Machine Learning Analysis

The Relative importance of factors in predicting customer satisfaction based on Random Forest analysis showed the following:

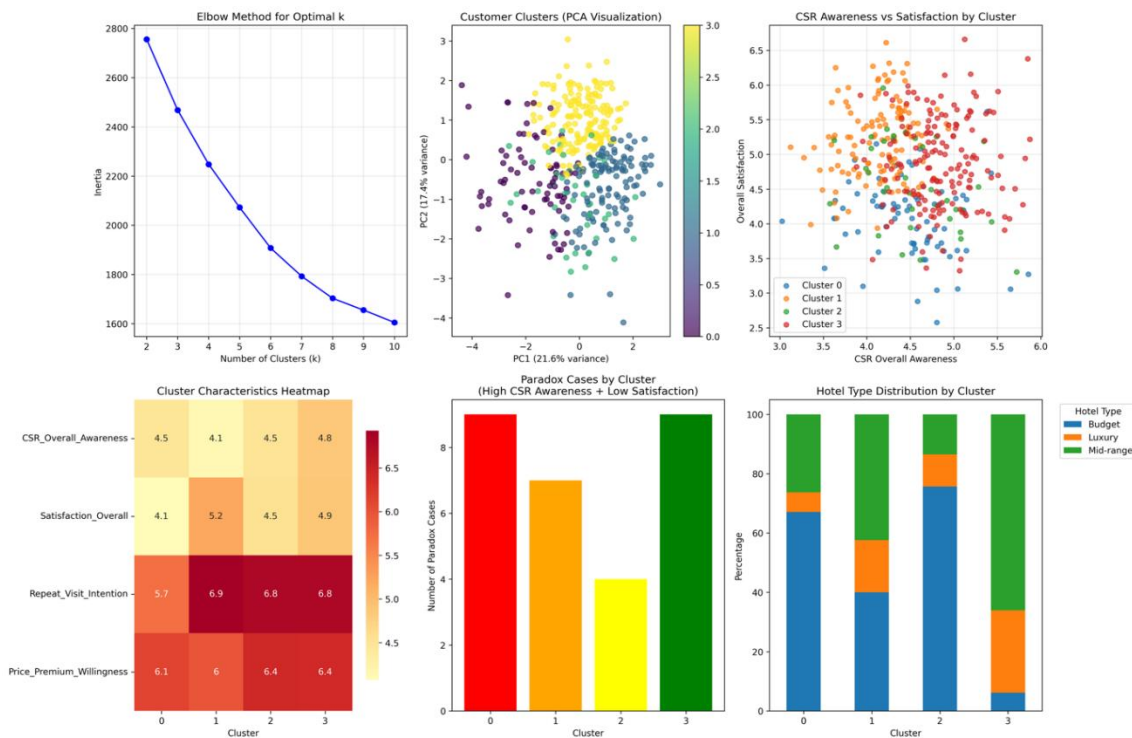
Table 3. Feature Importance for Customer Satisfaction (Top 10)

Feature	Importance
Hotel Type	0.1384
CSR Overall Awareness	0.1321
CSR Certification Awareness	0.0995

Feature	Importance
CSR Sourcing Awareness	0.0925
CSR Water Awareness	0.0899
Age	0.0855
CSR Waste Awareness	0.0842
CSR Energy Awareness	0.0763
Income	0.0595
Stay Duration	0.0487

The random forest model attained the best predictive effect on customer satisfaction ($R^2 = 0.164$) compared to other mechanisms, such as the Support Vector Machine ($R^2 = 0.098$) and Neural Network ($R^2 = 0.087$). It is important to note that variables influencing the CSR took out six of the top ten features of importance, proving that they play an important role in developing satisfaction.

Figure 2. The random forest model



3.5 Behavioural Intentions Analysis

Nevertheless, no matter the existence of the satisfaction paradox, environmental CSR awareness has a positive relationship with most behavioural intentions. Although neither the correlation with the repeated visit intent ($r = -0.035$) or with the loyalty intent ($r = -0.030$) was good enough to be statistically significant, the environmental CSR awareness displayed a positive but slight relation to recommend ($r = 0.079$, $p = 0.120$) and a more substantial statistically significant relation with the price premium willingness ($r = 0.198$, $p < 0.001$) and with the word-of-mouth intent ($r = 0.16$). These findings demonstrate that, even when customer satisfaction is not intensified, among more people who are cognizant of the environmental CSR activities of a firm, one will find desirable behavioural

output. It implies that environmental values can change behaviour by bypassing dissatisfaction, affecting advocacy decision-making, high prices, and information disclosure.

4. Discussion

4.1 Theoretical Implications

The main contribution of this study is to fill the gap related to the inability to document and explain the environmental CSR awareness-satisfaction paradox in the hospitality setting. This finding that environmental CSR awareness and customer satisfaction relate negatively contradicts postulates that CSR and hospitality literature presuppose positive linear relationships between perceptions of CSR and the outcomes, perceptions, and customer satisfaction outcomes, as predicted by expectation-disconfirmation theory (Oliver, 1980). Customers with high environmental CSR awareness form high environmental performance expectations, which is hard for hospitality facilities to fulfil. Failure to meet such raised expectations leads to dissatisfaction despite the good environmental initiatives undertaken by the establishment, when these perceived results are poor. Even though behavioural intentions are positive even in scenarios that satisfy the satisfaction paradox, the values that the customers hold of the environment have provided direct channels to behavioural outcomes without travelling through the obsolete channels that involve satisfying customers first. It is consistent with the theory of planned behaviour (Ajzen, 1991), which states that subjective norms about environment-related responsibility directly affect intentions.

4.2 Practical Implications

The CSR awareness-satisfaction paradox presents both significant challenges and opportunities to hospitality managers. The standard practices aiming at pro-environmental CSR awareness might create an issue of customer satisfaction by setting the bar too high. The fact that the four customer groups were identified implies that varied CSR communication strategies should be employed. In the High CSR/Low Satisfaction category (9.2 per cent), managers need to seek ways of managing expectations and upping the delivery of environmental performance instead of merely creating awareness. As the CSR/High Satisfaction segment (31.2 per cent), satisfaction maintenance should be a priority. Gradually, a conclusion can be drawn by the positive relationship between CSR awareness and price premium willingness ($r = 0.198$), which was found despite challenges with satisfaction, thus giving hope that environmental initiatives may still have a monetary advantage using premium pricing approaches. This result provides the business case for investing in environmental CSR, even where satisfaction rewards are narrow.

4.3 Cultural Context Considerations

The Malaysian connectivity gives great pointers to the implications of cultural influences on CSR-customer affiliations. The sample, with its different ethnic backgrounds (Malay, Chinese, Indian, others), permits one to investigate the possible effect of various cultural values on the responses to the question of environmental CSR. Based on the clustering analysis, a background combined with age and income produced a unique pattern of responses to environmental CSR programs. Customers who are younger and of higher income (mostly found under Cluster 2) had the most pronounced effects of paradox (which could be due to them being more environmentally conscious and more demanding in terms of service positive relationships between CSR and customer satisfaction were presented in the case of older customers (Cluster 1), which indicates intergenerational variation in the level of environmental awareness and the formation of expectations.

4.4 Methodological Contributions

This research exemplifies the usefulness of integrating conventional statistical methods with machine learning processes in comprehending the relationship between CSR and customer. The Random Forest revealed non-linear relationships and interaction effects that could not have been easily identified with standard regression methods. Customer segmentation analysis based on K-means clustering indicated the heterogeneity of the CSR responses that may become a blur with aggregate-based correlation analysis. The methodology might be helpful to apply when conducting the CSR research in the future to learn more about a range of customer response patterns. There are a few limitations of the presented study, which should be considered, as well as recommendations for future studies.

To begin with, a cross-sectional design limits the ability to draw a causal conclusion that correlates the interdependence between CSR awareness and customer satisfaction. This can be overcome in future surveys using longitudinal designs to give better findings on the proposed expectation-disconfirmation mechanism in the

CSR awareness-satisfaction paradox. Second, the data in this research is synthetic, yet designed to resemble realistic patterns. It might not grasp the often-complicated nature of customer behaviour in a real-life scenario. Hence, there is a need to confirm this finding in future research using primary data from real hospitality consumers. Third, the research looks at a single CSR dimension: environmental. There is a chance that paradoxical effects differ across various CSR dimensions, such as social or economic initiatives. Comparative research of these dimensions would be helpful.

The project might be extended in several important ways in future. Longitudinal studies can observe the development of the CSR awareness-satisfaction paradox as customers become more enlightened about environmentally conscious businesses. Another valuable direction is cross-cultural validation, where cultural values can also determine the outcome of CSR activities regarding satisfaction. Moreover, intervention studies may be carried out to formulate and evaluate the methods of management that will help balance between mitigating the effects of paradox and maintaining the advantages of awareness of CSR.

Conclusion

In this study, the environmental CSR awareness-satisfaction paradox is the first thorough report of the phenomenon in hospitality services. The result of the fact that the increased consciousness of CSR by the environment is linked to diminished customer satisfaction is a challenge to prevailing CSR assumptions. It holds considerable implications for the sustainable management of hospitality. The study shows that the correlation between CSR awareness and customer performance is not linear, as is presumed, and customer segmentation determines various varieties in responses among various demographic and psychographic groupings. The present study also confirms that customers who are highly environmentally concerned continue to hold strong behaviour intentions and the ability to pay price premiums despite the problems of customer satisfaction, and this holds up the business case for environmental CSR as an ongoing investment in business.

The practical implications can be made regarding the hospitality managers who can no longer rely on mere awareness-level strategies but need to incorporate the concept of expectation-performance matching. By identifying different customer segments, there is now a basis for designing CSR communication and service delivery strategies based on the identified segment to obtain the most desirable results, maximally taking preventive measures to reduce or eliminate paradoxical effects. Theoretically, the study complements literature on both CSR and hospitality, since it proves the significance of considering expectation-disconfirmation processes when discussing the development of CSR-customer relationships. The paper also demonstrates the usefulness of blending traditional statistical methods with machine learning methods in comprehending the complicated patterns of customer behaviour. As the hospitality sector is moving towards more environmentally friendly processes, the awareness-satisfaction paradox of CSR becomes even more significant to the environmental and business goals to be reached. The research presents a background against which future research and practice can be based in this important field of sustainable hospitality management.

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.

Declaration of Use of Generative AI and AI-Assisted Technologies

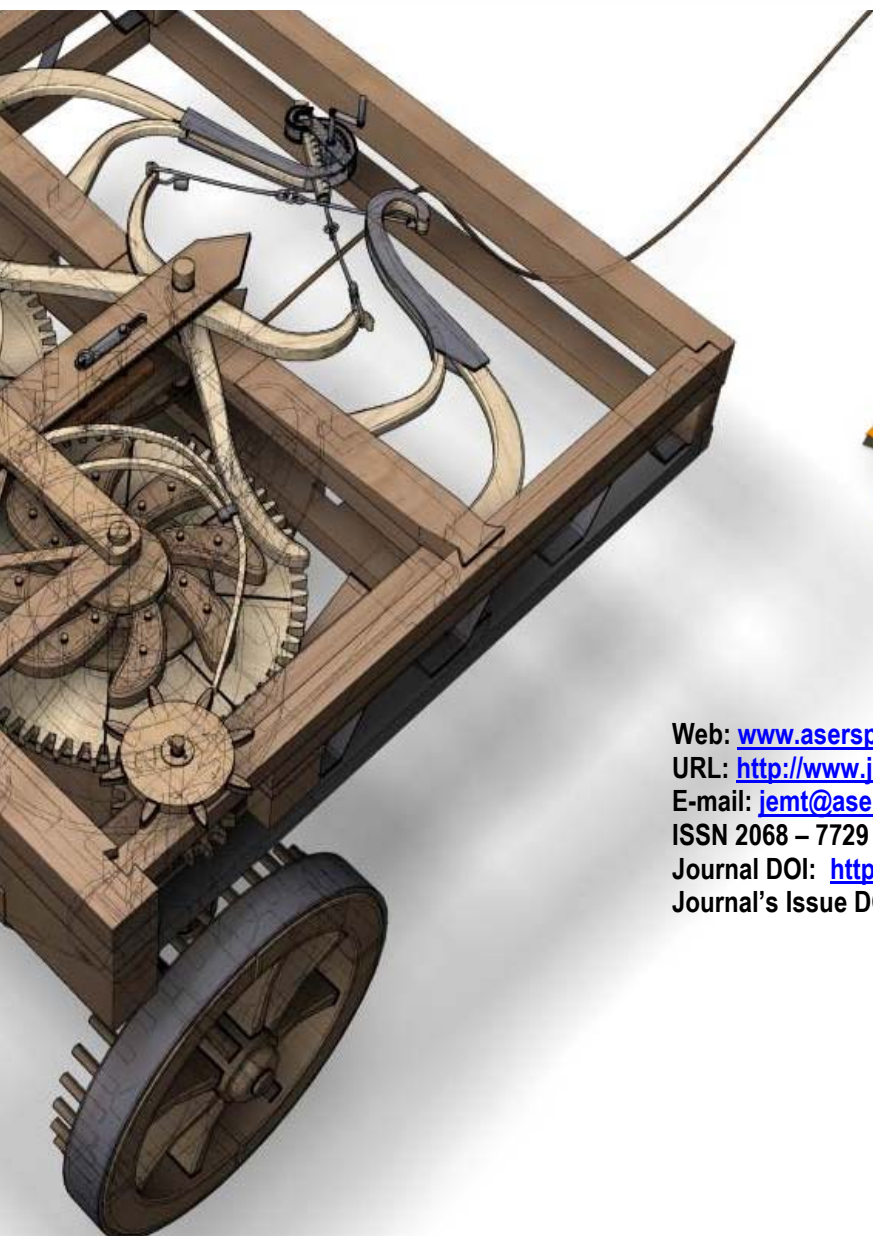
The authors declare that they have not used generative AI and AI-assisted technologies during the preparation of this work.

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