

Green Supply Chain Management for Thai Hotel Restaurants

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Green supply chain management (GSCM) has emerged as a critical theory for the hospitality industry to achieve corporate profit by reducing environmental risks and improving ecological efficiency. This paper interrogated Thai hotel restaurants concerning their green supply chain management. The standards of green restaurant management in relation to GSCM were integrated and presented utilising several attributes. By means of an importance-performance analysis (IPA), the results of the study were mapped onto a two-dimensional grid detailing the perception of importance and the performance of the hotel restaurant's GSCM. The further implications for management strategies were highlighted accordingly using the IPA results, creating a comprehensive guide for Thai hotel restaurants to assimilate greener sustainability measures into their management.

Keywords: *Green supply chain management, Hotel restaurant, Thai hotel industry, Sustainability, Importance-performance analysis (IPA).*

Introduction

For businesses to achieve sustainability, it is crucial to integrate environmental thinking into supply chain management (Srivastara, 2007). This strategic approach addresses the environmental impact of the whole supply chain, known as green supply chain management (GSCM) (Albino et al., 2009; Somjai & Jermisittiparsert, 2019; Mee-ngoen, Nualkaw, Sirariyakul, Tomcharoen, & Jermisittiparsert, 2020). Green, in this context, is expressed as an action that reduces negative impacts on the environment, such as eco-purchasing or recycling (Wolfe, Shanklin, 2001). Businesses should strive to improve and implement GSCM practices at every level, to achieve the full realisation of the benefits, which may include an improved environmental image and any economic benefits that come with this (Zhu et al., 2008). Hotels have taken great efforts to make their environmental impact as small as possible, reducing waste and being eco-friendlier. The contribution from this sector has led to

increased sustainable development with extrapolated benefits for society, as a whole (Gossling et al., 2009). With this green concept in mind, hotels cannot avoid maintaining the environmental standards of all operating units, especially their restaurants. Also, by focussing on being environmentally friendly, the restaurant industry has had to adjust their services to meet the changing expectations of their customers (Wang, 2012). Businesses have always attempted to shape their green strategies in consonance with the preferences and interests of their consumers and stockholders (Pańkowska, Sołtysik-Piorunkiewicz, 2013). Thailand has been acknowledged for its engagement of environmentally friendly policies, and the support for the operation of green hotels around the country. However, this is based on the divisions of their business, and not yet their restaurants. To explore this, an appropriate survey of hotels from the two aspects of perception, and the importance and performance, will be conducted and analysed to formulate a meaningful strategic framework of GSCM for the hotel industry. This will become a guideline for their green operation practice, in line with a national government gearing towards Thailand 4.0, and sustainable development.

Literature Review

The topic of sustainability in the context of SCM has been discussed using several terms in the literature surrounding the subject. Sustainability and SCM concepts are tightly linked using the idea of green supply chain management (GSCM) (Ashby et al., 2012). Green supply chain management is a vital organisational philosophy, stating that corporate profits and market share objectives can be increased by reducing a company's environmental footprint (Rao & Holt, 2005). Green supply chain management is defined as the assimilation of environmental awareness right across the supply chain, including areas of design, procurement, manufacturing and assembly, packaging, logistics, and distribution, to improve the environmental performance of suppliers and customers, and conserve energy and natural resources (Klassen & Whybark, 1999; Srivastara, 2007). Some definitions of GSCM describe it in terms of green concepts, such as green manufacturing and packaging, green marketing, green suppliers, green stock, and green eco-design (Shang et al., 2010). Other definitions explain it in terms of environmental approach and supplier commitment, green information systems, environmental cooperation with suppliers, and environmental cooperation with customers (Handfield, 2002; Albino et al., 2009). All these GSCM activities, including eco-design, sustainable sourcing, recycling, remanufacturing, and reducing energy consumption, are implemented by many companies across the board (Diabat & Govindan, 2011; Al-Sheyadia et al., 2019). Several studies show that many advanced management practices were positively impacted by GSCM, and it was a major contributor to improving environmental performance (Li, 2011). Green manufacturing and green logistics have significant effects on firm performance, and on a firm's competitive advantage (Goodman, 2000; Sen, 2009), as well as its customer satisfaction and loyalty (Kassinis & Soteriou, 2003). Accordingly, GSCM serves as a way for firms to sustainably and responsibly manage themselves and the

impact they have on the environment, meanwhile still turning over a profit (Rao, Holt, 2005; Tseng, Chiu, 2010). Conclusively, it is the belief that GSCM practices (e.g. internal and external environmental orientation, green purchase, customer cooperation, investment recovery) considerably and encouragingly boost the organisational performance of a company (Zhu et al., 2008). Hotels in Thailand have been promoting the implementation of green practices in restaurants to comply with the rest of the country's environmentally friendly policies. Besides, Thai hotel managers also have a significant positive relationship with GSCM implementation (Kerdpitak, 2019). However, previous documentary studies neglect the application of GSCM when constructing green management indicators for restaurants (Wang, 2013). Contributing to theoretical restaurant management concerns, a research framework has been constructed based largely on the standards of green restaurant management relating to wider concepts of GSCM processes, as identified by Wang (2013). The process includes concepts such as green marketing, green purchasing, green design, and green production. These conceptual frameworks could be appropriately applied to a restaurant's green management and even include details of a corporation's social responsibility (e.g. green customer education, green training, and social care).

Research Methodology

Drawing on the existing standards of green restaurants and their approach to supply chain management, a list detailing the different ways that the supply chain management could become green was developed (Szegeedi et al., 2017). Subsequently, an unstructured personal interview with ten Thai hotel chefs was carried out by using a modification to a previous study by Wang et al. (2013) to determine the 46 attributes of GSCM that have been adopted in Thai hotels. These attributes are divided into the following categories: green food procurement, green menu planning and cooking, green takeaway packaging, a green kitchen environment, green dining environment, green cleaning and post-treatment, a green management policy, green customer education, and green corporate social responsibility. A self-administered questionnaire based on these attributes was formulated to use as a tool for this research. The questionnaire consisted of three sections. The first section was comprised of the demographic data of the respondents. The second section examined the opinion of the hotel chefs towards the level of importance of the different categories by using a Likert scale ranking of '1' or 'least important' to '5' or 'most important'. The third section recorded the opinions towards their performance level concerning the same determined GSCM criteria, again using a Likert scale which this time ranged from '1' or 'rarely performed' to '5' or 'extensively performed'. A pre-test was employed to validate each measurement (Alaimo, Olson, Frongillo, 1999). As sample sizes of 30 or more are required for pre-tests to achieve a reliable result and avoid any corrupted information (Perneger et al., 2015), 30 hotel chefs were approached, and it was verified that they understood the questions and their response choices. A questionnaire was sent to 278 chefs of Thai hotels in Bangkok, and specifically

hotels which are members of the Thai Hotels Association (2019). Two hundred and fifty-four questionnaires were returned, representing a response rate of 91.37 per cent. According to prominent journals that routinely publish survey research, this response rate is quite high and acceptable. This provided an adequate proportion of more than five samples for each of the attributes in the questionnaire (Tabachnick & Fidell, 2013). Subsequently, the data collected was tested through an exploratory factor analysis (EFA), using principal component extraction and varimax rotation. An EFA is designed to exhibit patterns of correlation in new domains of measured variables (Haig, 2010). Afterwards, the data was again analysed through an importance-performance analysis (IPA), which is used as a common pattern evaluating the operating performance in hospitality (Martilla & James, 1977). The analysis concentrated on two dimensions of predetermined GSCM — the importance, and performance — and the finding was displayed using a two-dimensional grid. Therefore, adopting an IPA in the final stage was vital for evaluating the factors derived from the questionnaires. This duplicates a model of reasoned action, as it uses the relationship between importance and performance to evaluate managerial actions accordingly (Sheppard et al., 1988).

Research Results and Conclusion

Firstly, viewing the demographics of the respondents, out of a total of 254 respondents, 155 or 61 per cent were male; 107 or 42.1 per cent were aged between 40–49 years; and 154 or 60.6 per cent held a bachelor's degree.

Secondly, through an EFA, 46 predetermined GSCM attributes were analysed and broken down into a smaller set of factors that explained most of the variation among the attributes. The justification showed that these data sets were appropriate for factor analysis with the following remarks. The correlation matrix showed that more than 60 per cent of correlation coefficients were greater than 0.3, which pinpointed a strong inter-correlation of the data (Noursis, 1994). The Kaiser-Meyer-Olkin (KMO) measure of a sampling adequacy test was 0.91, which was above the required 0.6, indicating creditable and interrelated data (Kaiser, 1974). The Bartlett's Test of Sphericity value was 7928.587, with the significance value of 0.000. The significance value, which was equal to or less than 0.05, implied a significant with an adequate correlation to factor analysis (Pallant, 2016). Finally, the communalities ranged from 0.526–0.812 with an average value of 0.64, complying with Kaiser Criterion's reliability, which states the value should be equal or above 0.60 (Field, 2009). This concludes that the variance of the data is moderately accounted for by the common factors (Child, 2006). The steps of factor extraction are shown in Table 1. The principal components provided seven factors with reasonable loadings of over 0.4, which is a different significant loading cut-off based on pragmatic reasoning (Yong & Pearce, 2013). These factors have an eigenvalue greater than one, explained by 60.96 per cent of the variance of GSCM attributes.

Five attributes with factor loading less than 0.4 were removed from the scale, leaving only 41 attributes for a simpler subsequent IPA procedure. The seven factors are listed in the following Table.

Table 1: Results of Factor Analysis for GSCM attributes of Thai hotel restaurants

GSCM factors	Factor loading	EV ^b	Pct of variance ^c	Commu. ^d
<i>Factor 1: Green consumer education and social responsibility (n=9, $\alpha^a = 0.89$)</i>		18.2	39.50%	
1. Set reward policy to encourage customers' green behaviour.	0.687			0.738
2. Encourage customers to take away uneaten dishes.	0.618			0.618
3. Create a slogan to urge customers to adopt a greener attitude.	0.584			0.706
4. Promote green food concepts on take-away packaging.	0.490			0.659

GSCM factors	Factor loading	EV ^b	Pct of variance ^c	Commu. ^d
5. Posters at restaurants to encourage energy-saving or green dining behaviours.	0.489			0.583
6. Manage customer relationship using electronic systems or the Internet.	0.488			0.529
7. Inform customers about the hotel's energy efficiency efforts.	0.483			0.655
8. Hold activities to promote consumer green education.	0.478			0.644
9. Participate in activities concerning health, the environment, and community.	0.464			0.526
<i>Factor 2: Green kitchen environment (n=9, $\alpha = 0.90$)</i>		2.4	5.14%	
1. Produce food in compliance with safety and sanitation regulations.	0.699			0.705
2. Replace old electric equipment with those which have a Green Mark or Thailand Energy label.	0.666			0.652
3. Clean and maintain the kitchen equipment and	0.594			0.647

appliances regularly.				
4. Follow the Environmental Agents Control Act about the use of detergents or chemical products.	0.582			0.639
5. Install oil-water processing ventilators or activated carbon treatment equipment.	0.568			0.704
6. Use 100% eco-friendly of detergents with a Green Mark.	0.496			0.644
7. Ensure proper use of ventilations; clean aggregates, grids and condensers.	0.448			0.703
8. Recycle kitchen waste and compost.	0.426			0.559
9. Set up a recycle spot to appropriately classify waste and garbage.	0.415			0.606
Factor 3: Green menu planning and cooking ($n=6, \alpha = 0.84$)		1.9	4.01%	
1. Cook healthy food with proper cooking methods, frying less than 20% of dishes.	0.742			0.618
2. Follow the food safety and sanitation regulations for employees in the food industry.	0.614			0.668
3. Adopt less energy-consumptive cooking methods, like blanching, steaming, boiling or cold salads.	0.587			0.601
4. Choose appliances that do not leach chemicals or toxic metal particles when cooking.	0.574			0.632
5. Conserve energy and food materials when cooking.	0.443			0.600
6. Use more vegetables, fruits, and less meat.	0.440			0.603
Factor 4: Green food procurement ($n=6, \alpha = 0.83$)		1.7	3.69%	
1. Inspect purchased food in the inventory every month.	0.741			0.705
2. Seasonal food makes up more than 50% of food purchased.	0.527			0.664
3. Avoid using protected wildlife when cooking.	0.496			0.604
4. Purchase organic certified food more than 20% of the time.	0.477			0.674
5. Monitor food expiration dates to avoid serving expired produce.	0.474			0.527
6. Purchase food and seasoning in appropriate	0.430			0.717

quantities.				
Factor 5: Green management policy ($n=4, \alpha = 0.72$)		1.5	3.21%	
1. Announce green management policies to the employees.	0.768			0.670
2. Integrate green concepts into marketing programs.	0.630			0.607
3. Implement an annual training program to improve employees' green awareness.	0.574			0.609
4. Adopt e-marketing for promotions or advertising.	0.413			0.591
Factor 6: Green dining environment ($n=5, \alpha = 0.83$)		1.3	2.74%	
1. Control air quality, prohibit smoking and uncomfortable odours in restaurants.	0.645			0.722
2. Ensure all restrooms (100%) are equipped with dual flush toilets.	0.628			0.648
3. Ensure at least 50% of lighting bulbs have energy-saving labels.	0.538			0.567
4. Ensure at least 50% of faucets have a Green Mark or are water-saving in the dining space and restrooms.	0.474			0.731
5. Use sunlight as natural lighting.	0.453			0.642
Factor 7: Green package for taking out ($n=2, \alpha = 0.71$)		1.2	2.67%	
1. Adopt packages or containers made of biodegradable and compostable materials.	0.809			0.812
2. Adopt safe packaging materials which do not leach chemicals when containing hot foods or reheated.	0.416			0.636

^a α = Cronbach's Alpha.

^bEV: Eigenvalue.

^c 60.96% of the cumulative variance explained.

^dCommu.= Communalities.

To test the scale reliability and internal consistency of the attributes in each factor, a reliability analysis of Cronbach's Alpha was employed (Cronbach, 1951). The Alpha coefficient of the seven factors ranged from 0.71 to 0.90. These values were higher than 0.70, meaning that the scale measurements have an acceptable level of reliability (Peterson, 1994).

Thirdly, an importance and performance analysis was performed. The mean importance and performance ratings for the seven factors of the 41 attributes are presented in Table 2.

Table 2: Mean ratings of Importance and Performance of Thai hotel restaurants

GSCM factors	Importance		Performance	
	Mean ^a	SD ^c	Mean ^b	SD ^c
Factor 1: Green consumer education and social responsibility	4.25	0.57	3.97	0.63
Factor 2: Green kitchen environment	4.19	0.61	3.92	0.61
Factor 3: Green menu planning and cooking	4.22	0.58	3.96	0.62
Factor 4: Green food procurement	4.30	0.56	3.95	0.56
Factor 5: Green management policy	4.35	0.52	4.17	0.51
Factor 6: Green dining environment	4.23	0.61	3.98	0.60
Factor 7: Green takeaway packaging	4.29	0.65	4.06	0.63
Mean Average	4.26	0.49	4.00	0.50

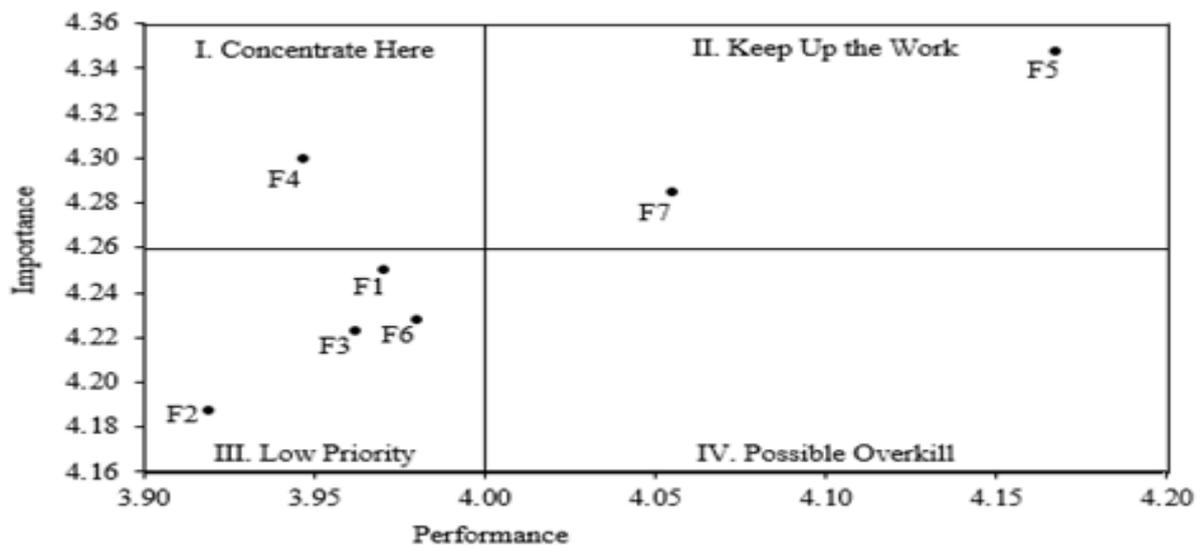
^a Mean scale: '1' or 'least important' to '5' or 'most important'.

^b Mean scale: '1' or 'rarely performed' to '5' or 'extensively performed'.

^c Standard Deviation

The data was then transferred onto an IPA grid presentation. The X-axis represents the performance scores given by chefs regarding GSCM, and the Y-axis represents the importance scores that they gave. The four quadrants are constructed based on the mean scores of the importance and performance factor ratings (4.26, and 4.00 respectively) (Hemmasi et al., 1994). These mean factor ratings formed the grid crosshairs, which distinguished the four quadrants (see Figure 1).

Figure 1. Importance-Performance Grid with Factor Rating



Source: own work based on Hemmasi et al. (1994)

The quadrant one (I), ‘concentrate here’, only included one factor: green food procurement. This rated a high importance but low performance, indicating critical performance shortfalls, where importance fails to fulfil the chefs’ expectations. The quadrant two (II), ‘keep up the good work’, contained two factors: green management policy, and green takeaway packaging. This indicates that the chefs of the hotel restaurants valued these categories as being relevant to their performance. The quadrant three (III), ‘low priority’, is comprised of four factors: green consumer education and social responsibility, green kitchen environment, green menu planning and cooking, and green dining environment. These factors underperformed but they require no further action, as they do nothing for the betterment of management in the chefs’ views. Lastly, quadrant four (IV), ‘possible overkill’, had none of the factors placed in it, meaning that no GSCM attributes were thought to have too much performance requirement for not enough importance. Using this data, we can develop useful strategies for Thai hotel restaurants. A green management policy should be kept up to date with consistent annual training programs to boost employees’ green awareness. Green concepts should be integrated within marketing programs by adopting online promoting and advertising to meet the target customers. Green packaging should be implemented by utilising packages or containers that are free of polystyrene, which do not leach chemicals, and are made of recyclable, biodegradable, and composted materials. Thai hotel restaurants should concentrate on green food procurement, as it aligns their buying strategy with their long-term goals. This may include purchasing eco-sourced food and managing quantity, inspecting purchased inventory, and having a first-in-first-out policy for stock. Finally, Thai hotel restaurants should continue to participate in green consumer education and social responsibility, as it creates a positive image as a modern green service. Endeavours to promote these green attitudes to customers are essential for building a strong relationship



with the customers. Community-based green activities are also important to develop business growth sustainably. A green kitchen environment should be maintained by observing green safety and sanitation regulations, installing the necessary equipment to control pollution, using products accredited with green marks or organisations, and managing effective and efficient recycling systems. They should persist in implementing green menu planning and cooking by following food safety and sanitation regulations, offering food prepared with proper cooking methods and green ingredients, and conserving energy. Lastly, a green dining environment should be created using green electric appliances and utilities with energy-saving labels and controlling pollution and unpleasant odours. These aforementioned strategies are the guidelines for Thai hotel restaurants to advance greener practices and reduce their environmental impact, while subsequently improving the sustainability of their business.

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