Abstract

Purpose – In this article, 149 hospitality-related studies published in the past two decades pertaining to environmental management were reviewed and synthesised. The review was divided into three main stages, 1993-1999, 2000-2009 and 2010-2014, and provided future research directions.

Design/methodology/approach –The study sample consisted of articles published between 1993 and 2014 in four leading hospitality journals. The four journals chosen were the International Journal of Hospitality Management, Cornell Hospitality Quarterly, International Journal of Contemporary Hospitality Management and Journal of Hospitality and Tourism Research. The title, abstract and the content, as needed, of all environmental management-related full-length articles from these four journals were content analysed. Editors' notes, book reviews, industry news, conference papers and research notes were excluded from this study.

Findings – Environmental management research in the hospitality industry during the first two stages focused on the development of environmental policies and practices, green consumerism, managers' environmental attitudes, indoor air quality and smoke-free environments, sustainable development, environmental performance, environmental cost control, and environmental management systems (EMSs). During the third stage from 2010 to 2014, topics about environmental benchmarking and indicators have surfaced. Notwithstanding this, environmental management in the environmental reporting, and green marketing have been pursued less enthusiastically.

Research limitations/implications – Compared with the mainstream management literature and considering the future development of environmental management, hospitality scholars are encouraged to extend their research to include green marketing, environmental technologies, environmental reporting, carbon footprint, employees' green behaviour, the effects of environmental management on hospitality firms' stakeholders, and small- and medium-sized hospitality firms. In addition, more effort should be spent on developing hospitality-specific theories for environmental management.

Originality/value – Little has been done to determine the main research agendas in hospitality environmental management. A review of recent research on this topic provides an inventory of existing knowledge and points out areas requiring further knowledge exploration.

Keywords:

Environmental management; Environmental research; Review article; EMS, Agenda 21

1. Introduction

In addition to the increasingly serious environmental problems, the escalating number of environmental laws and increase in market pressure have raised corporate environmental awareness. Businesses, including hospitality firms, have become much more aware of the relationships among environmental performance, scarce resources, public legitimacy, burdensome litigation and profitability (Schot and Fischer, 1993). Environmental management (EM) in the hospitality industry is a particularly important issue and the industry has a vested interest in protecting the environment because attractive and safe surroundings are part of its core product. EM's increasing importance in the hospitality industry has drawn academic attention since the publication of Agenda 21 and the introduction of formal environmental management systems (EMSs) in the 1990s. For instance, in the hotel field, Chan and Wong (2006) found that 'corporate governance' and 'legislation' were the most salient factors in determining a hotel's intention to obtain certification for the ISO 14000 EMS standard. Kirk (1998) identified the attitudes of hotel managers towards EM. Enz and Siguaw (1999) examined the four operations that were named environmental best-practice champions in the Cornell University School of Hotel Administration's study of best practices in the US. Deng and Burnett (2002a, b) reported on energy and water use as well as management in Hong Kong hotels.

As with any emerging areas of research, EM has to strive for credibility and subsequent acceptance by established hospitality fields with a body of knowledge that is conceptually and methodologically sound. Despite the proliferation of research on EM in the hospitality industry, little has been done to determine the main research issues in this area. Lu and Nepal (2009) reviewed 341 studies published in Journal of Sustainable Tourism to provide an overview of the progress on EM tourism research. Several similar reviews (Chamorro *et al.,* 2009; Lockett *et al*., 2006; Srivastava, 2007) were also found in mainstream management journals. Baloglu and Assante (1999) emphasised that a review of a field's past research efforts can provide boundaries and an understanding of the research practices and techniques used in the field. Hence, it seems appropriate to review the current research efforts in the field of EM within the hospitality industry.

The overall aim of this review is to synthesise the most popular research topics and identify research trends in hospitality EM and then to identify research gaps by comparing with the main research themes identified from the review of the mainstream management literature, which could provide insights and possible research gap in the hospitality context. A content analysis was conducted on title, abstract and content of the articles (as needed) published in four hospitality journals, focusing on EM issues. The review begins in 1993 to follow the launch of Agenda 21 in 1992, which was an important action plan in relation to sustainable development. Agenda 21 comprised an extensive list of measures for the twenty-first century aimed at governments, local authorities and non-government organisations (NGOs), that was endorsed at the United Nations Conference on Environment and Development (UNCED) in 1992. The four leading hospitality

journals – *International Journal of Hospitality Management (IJHM)*, *Cornell Hospitality Quarterly (CHQ)*, *International Journal of Contemporary Hospitality Management (IJCHM)* and *Journal of Hospitality and Tourism Research (JHTR)*– were selected for this study, as these hospitality journals were rated 50% or higher in terms of aggregate importance (McKercher *et al*., 2006). The four journals were also selected on the basis of their influence, as measured by the impact factor - a ratio of the number of times that the published articles in a journal were cited to the total number of citable articles (DuBois and Reeb, 2000). We focused on the journals with high impact factors, because the importance of these journals within the disciplines has been previously demonstrated, and believed that the UK-based IJHM and IJCHM as well as the US-based CHQ and JHTR in terms of the location of the publishers' corporate office can draw their contributions globally. All articles from these four journals published over the period 1993-2014 were examined to identify EM-related papers. Articles' title, abstract, and keywords (e.g., environmental, energy and water saving, green practices, EMSs and green customers) were reviewed to identify EM research in these journals. All selected articles were further reviewed to ensure that they were about EM. As Baloglu and Assante (1999) recommended, only full-length articles were selected for the analysis. Editors' notes, book reviews, industry news, conference papers and research notes were excluded from this study.

A coding scheme based on a comprehensive literature review, including research in other disciplines, was developed before conducting the content analysis to ensure that a comprehensive list of environmental topics was included. A copy of the scheme was also sent to an expert in the field of hospitality EM for further review to ensure its validity. Based on the expert's feedback and the identification from the literature, some main categories such as functions of EM, applications of formal EMS, green technologies, customer behaviour, environmental attitude of managers, and green marketing were included in the scheme. The coding scheme allowed us to identify the topical focus of each article, we also employed an inductive approach that provided us with an open mind to identify any new research areas or elements that were not identified in the previous literature as the analysis progressed. During the analysis, the title, abstract and the content (as needed) of articles were reviewed and classified mainly based on their research topic, unit of analysis, and analytical technique. Both a trained research assistant and the chief investigator were involved in the process of determining themes pertaining to category modifications. Any disagreement was discussed and ultimately agreed upon by both. The articles were manually coded into the selected categories initially based on keywords, title and abstract content. In cases where the information was insufficient for the assignment of an article to any category, the content of the article was reviewed and discussed until mutual agreement was reached as to its appropriate classification. The context in which the research was applied was also identified after the topical review. Such an analysis is essential, as the applications of EM for different sectors of the hospitality industry are not homogenous.

2. Environmental management research in the mainstream management literature

To understand more about what the common research themes in mainstream management journals such as *Academy of Management Journal*, *Strategic Management Journal*, *Business Strategy and the Environment, Management Science*, and *Journal of Business Research*, a review of the articles listed in Google Scholar were conducted. Google Scholar was selected, as it is a component of Google, the world's leading search engine, which indexes scholarly articles, books, and dissertations from different databases (Law *et al.*, 2009). Google Scholar was also identified as an important new source for citation analysis (Harzing and van der Wal, 2008), thus gaining the attention of academic researchers. By using the commonly-indexed keywords in EM research such as EM, environmental responsibility, environmental performance, sustainability, green, conservation, pollution, nature/natural identified by Lockett *et al.* (2006) and some additional keywords identified by the authors such as energy and water saving, waste management, and carbon footprint, Google Scholar search results were reviewed. The title, abstract and content (as needed) of articles were further reviewed to ensure that they were about EM. The review process stopped when the identified themes/foci of study were found saturated after reviewing the articles listed on the first thirty pages of search results.

When reviewing the literature on EM in mainstream management journals, it is common to find studies that focused on sustainable development and its effect on companies (Table 1). Academics and practitioners in the management field also attempted to improve their understanding of EM by classifying companies' environmental behaviours and evaluating their performances. For instance, the meaning of EM was re-visited by Bryant and Wilson (1998). By drawing on the contingency theory, Christ and Burritt (2013) investigated the relationship between organisational context and EM accounting, while Kolk and Mauser (2002) further gave an overview of the development of different EM models, including stage and phase models, and a range of typologies. They then analysed their characteristics, strengths and weaknesses. Ervin *et al.* (2013) examined the motivations and barriers to EM. Researchers in management have also explored the relationships between EM/EMSs and companies' performance, such as market competitiveness, environmental performance, financial performance and perceived customer satisfaction (Ann *et al.*, 2006; Christmann, 2000; Claver *et al.*, 2007; Jabbour and de Sousa Jabbour, 2013; King and Lenox, 2001; Klassen and McLaughlin, 1996; Melnyk *et al.*, 2003; Yang *et al.*, 2011; Yang *et al.*, 2010); examined the effect of EM on operations (Mahesh, 1995); analysed the effect on human resource management (Wagner, 2013); investigated the impact on sustainable economic development (Mangra *et al.*, 2014); and proposed a framework to evaluate corporate environmental strategies (Vastag *et al.*, 1996). Additional important research areas have been the effect of environmental regulation on a firm's performance through the stimulation of domestic innovation (Jaffe and Palmer, 1997) and the effects of regulation, plant-level management policies and other factors on the environmental compliance of manufacturers (Dasgupta *et al.*, 2000).

Probably because of the introduction of 'sustainable development (SD)' in the Brundtland Report in 1987, different research topics related to SD have been very popular. For instance, Khan (1995) explained the key concepts, issues and implications of SD. Mebratu (1998) and Redclift (2005) further examined the conceptual history of SD since the Brundtland Commission's definition in 1987. By using the capital theory, a measurement of SD was developed to assess "weak" sustainability (Pearce and Atkinson, 1993; Victor, 1991). Devuyst (2000) further introduced the sustainability assessment systems by linking impact assessment and SD. Gladwin *et al*. (1995) examined the integration of SD to modern management theory. In addition, Giddings *et al*. (2002) investigated the relationships between SD and environment, economy, and society; and Hopwood *et al.* (2005) presented a classification and mapping of different trends of thought on SD. Campbell (1996), on the other hand, investigated the contradictions of SD to urban planning. Different approaches (Boele *et al*., 2001) and motivations and barriers (Moon, 2007) to SD through the medium of corporate social responsibility were examined, while the relationship with stakeholder relations management was investigated (Steurer *et al*., 2005). Welford *et al*. (1999) also suggested ways for tourism organisations to improve tourism services with the concept of SD.

The research of carbon footprint has been very popular in mainstream management journals. Topics ranged from the measurement of carbon footprint of different products (Hassard *et al*., 2014; Kim and Neff, 2009; Mogensen *et al.,* 2014; Pathak *et al*., 2010; Shirley *et al*., 2012), strategies to reduce carbon footprint (Bocken and Allwood, 2012) to the relationship between carbon footprint and supply chain management (Lee, 2011; Sundarakani *et al*., 2010) were frequently seen. It is noticed that this research topic has been attracting the eyeball of many management researchers, and this trend will likely continue.

Environmental policies and strategy planning (Garrod and Chadwick, 1996; Guo *et al.,* 2001) have also been the research foci of EM. Apart from planning, researchers have investigated implementation strategies for, barriers to, driving forces behind and opportunities for EM and EMSs (Cotoc *et al*., 2013; Fryxell and Szeto, 2002; Hui *et al*., 2001; Khanna and Anton, 2002; Morrow and Rondinelli, 2002; Zhang *et al*., 2008); obtaining environmental certification such as ISO 14001 (Nakamura *et al*., 2001); the value of ISO 14001 EMS (Rondinelli and Vastag, 2000); and the relationship between a company's EMS and its stock prices (Feldman *et al*., 1997). The integration of quality and EMSs was discussed by Karapetrovic and Willborn (1998). Delmas (2002) further analysed and compared the adoption rates of ISO 14001 in Europe and the US, while the cost of adopting an EMS was examined by Darnall and Edwards (2006). EM studies have also taken place in SMEs. For instance, Ammenberg and Hjelm (2003) and Hillary (2004) examined implementation strategies for and barriers to EMSs in SMEs.

As environmental reporting is advocated in a formal EMS, it has triggered a series of studies investigating corporate environmental reports in the context of large, public companies; specifically, what types of information are reported and how the information is presented (Cormier

and Magnan, 2003; Deegan and Gordon, 1996; Lober *et al.*, 1997). Although issuing an environmental report is generally a voluntary exercise in most countries, the reasons behind reporting a firm's environmental activities and performance are worthy of investigation, as the reporting exercise can contribute to green marketing.

Green marketing and advertising research are found within the management research. For instance, Roberts (1996), Tanner and Kast (2003) and Zinkhan and Carlson (1995) examined the relationship between green advertising and consumers' green purchases. Font and Carey (2005) examined the incorporation of green product opportunities into the management of the marketing mix. To create an analytic framework, Mathur and Mathur (2000) used four categories of green marketing – green products, recycling, green promotions and environmental policy manager appointment – to analyse the wealth effects of green marketing strategies. Ginsberg and Bloom (2004) used the primary marketing-mix tools of product, price, place and promotion (the 4Ps) to divide green marketing into four main strategies: lean, defensive, shaded and extreme green strategies. Wong *et al.* (1996) studied the marketing strategies and prospects for green consumer products. The evaluation of green marketing strategies (Polonsky, 1995; Polonsky and Rosenberger, 2001), re-evaluation from a stakeholder perspective (Rivera-Camino, 2007), the effect of eco-labels on the market (Teisl *et al.*, 2002) and green consumer products (Tang *et al.*, 2004) were also investigated.

In addition to green marketing and advertising, the relationship between EM and the supply chain was frequently investigated in management research. Studies have examined topics such as the role of EM or EMSs in the supply chain (Bloemhof-Ruwaard *et al.*, 1995; Carter and Dresner, 2001; Darnall *et al.*, 2008; Hajmohammad *et al.*, 2013; Vachon and Klassen, 2008); the barriers for green supply chain (Govindan *et al.*, 2014); the evaluation of green supply chain (Lin, 2013; Mirhedayatian *et al.*, 2014); the selection of green suppliers (Kannan and de Sousa Jabbour, 2014); and purchasing role in EM (Carter and Dresner, 2001). Burritt *et al.* (2002) further developed a comprehensive framework for EM accounting that linked business actors and EM accounting tools.

The soft side of EM – such as people's attitudes and behaviours – is also commonly investigated. For instance, Barr (2007) investigated factors influencing people's environmental attitudes and behaviours. More specifically, Daily and Huang (2001) researched employees' views on the roles of human resource factors, such as top management support, environmental training, employee empowerment, teamwork and rewards systems, in the success of EM programmes. The research on the involvement and support of employees is important, as employee involvement is a critical success factor of a company's EM initiatives.

Apart from employees, the influence of stakeholders on a company's EM plan and practices has also been studied (Delmas and Toffel, 2004; Ramanathan, 2001). There have been studies on the integration of suppliers into EM processes (Walton and Handfield, 1998) and the assessment of a supplier's environmental performance to suggest effective techniques for developing the

supplier selection procedure according to an environmental viewpoint (Handfield *et al*., 2002; Noci, 1997). In addition, the relationship between corporate environmental protection and shareholder value was examined (Schaltegger and Figge, 2000).

(pls. insert Table 1 here)

3. **Topical review of hospitality journals (1993-2014)**

To compare with the mainstream management literature, 149 EM articles from the abovementioned four top-tier hospitality journals were reviewed and then classified into topical areas. Of the reviewed articles, the most frequently used study design was field survey (over 40%), followed by the use of mixed methods consisting of experiments, surveys and/or interviews (over 20%). Other methods included the analysis of secondary data and case studies. Only a few of the articles reviewed reported experimental design (e.g. Adams and Bracey, 1994; Chan *et al*., 2009; Lo *et al*., 2011; Rahman *et al*., 2014). The primary research approach emerging from these articles was quantitative. Due to the complex and evolving nature of EM in its application to the hospitality industry, more qualitative techniques could be used in the future to reveal in-depth and detailed information.

Apart from the brief review of methodological issues, the following sections describe the topical review in three main stages separated by decades, 1993-1999, 2000-2009 and 2010-2014, to examine whether the research themes identified in these periods have changed over time.

(pls. insert Table 2 here)

3.1. Research themes from 1993 to 1999

This stage of EM research begins one year after the launch of Agenda 21 in 1992 and ends in 1999.

Development of environmental policies and practices. As shown in Table 2, the development of environmental policies and practices was the most examined topic in this stage. In 1993, Shanklin discussed the implications of ecological age for the hospitality and tourism industry by presenting four key environmental issues: solid waste, energy, water quality and availability, and

air pollution. Subsequently, a number of studies on why and how environmental policies and practices should be implemented in hotels were conducted (Brown, 1996; Kirk, 1995; Iwanowski and Rushmore, 1994). Stipanuk (1996) further identified examples from the past that illustrated how environmental issues had long been of concern to the US lodging industry. Enz and Siguaw (1999) shared four champions' recycling programmes and their other environment-focused activities. From 1995 to 1998, Ayala (1995, 1996a, b, 1997, 1998) published several papers introducing the concept of an eco-resort master plan (Ayala, 1995) and further indicated that the master plan integrates three core principles: the 'resort plus' scope of master-planning, an expanded capacity to assimilate and a layered approach to product development (Ayala, 1996a). Ayala (1996b) also analysed the prospects of international ecotourism from three perspectives: a boom in national and regional ecotourism strategies, the international hotel industry's various approaches to ecotourism product development and the apparent convergence between the evolving markets of international tourists and eco tourists. In 1997, Ayala further demonstrated how resort business interest could make conservation a viable facet of national and regional growth aspirations. In 1998, the scholar highlighted the Action Plan for the Development of the Tourism-Conservation-Research Strategic Alliance for the Republic of Panama as a way of getting the tourism and hotel industry actively and systematically involved in the development of the heritage-tourism platform (Ayala, 1998).

In the catering sector, foodservice waste and energy management seemed to be the main research topic, probably due to the nature of the business. Looking at food waste issues, Nicholls and Nystuen (1993) discussed foodservice waste management and proposed the need for a 'metabolic restaurant'. Ghiselli *et al*. (1995) further estimated the amount of solid waste generated in school foodservice operations. The status and prospects of food-donation programmes were also evaluated (Adams and Tabacchi, 1997). Adams and Bracey (1994) measured the production capacity and energy costs of three pieces of fast-food equipment: the single griddle, the double griddle and the jet impinger.

The growing research on the development of environmental policies and practices in this stage is understandable especially when hospitality-related companies wanted to know how a firm's environmental programme and management system should start and implement correctly after the launch of Agenda 21.

Indoor air quality and smoke-free environment. Apart from environmental measures to save energy and water, the indoor air quality (IAQ) and a smoke-free environment were common research topics during the stage. Several papers mainly published by *Cornell Hotel and Restaurant Administration Quarterly* (now known as *Cornell Hospitality Quarterly*) addressed these topics (Bojanic, 1996; Corsun *et al*., 1996; Cuthbert and Nickson, 1999; Field, 1999; Morrison, 1993; Teeters *et al*., 1995; Young, 1997). These studies were frequent probably due to the launch of the Smoke-Free-Air Act in the US. The main results of these studies revealed that smoke-free restaurants normally attracted rather than drove away business due to cleaner and healthier dining

environments. Sales and employment in the hospitality industry generally increased in counties that implemented smoke-free regulations, but only a slight decrease in sales was reported in some places where restaurants had units operating under a smoking ban. Ignoring airborne contaminants could place hotel operators in legal jeopardy, given the increasingly strict IAQ regulations, and a higher percentage of non-smoking travellers switching hotels when no non-smoking rooms are available. On a positive note, the examination of IAQ and smoke-free environment probably reflects the increasing demand of non-smoking facilities in hotels and full-service restaurants.

Green consumerism. Wiener and Doesher (1991) indicated that green consumerism is often viewed as a form of "pro-social" consumer behaviour, that can also be considered as a socially responsible consumer behaviour (Antil, 1984). Consumers' attitudes about 'green' topics began to catch researchers' attention. For instance, Gustin and Weaver (1996) evaluated a consumer's intention to stay at a hotel based on its environmental strategies, and concluded that hotels that implement such strategies can increase business. The research reflects the importance of adopting environmental programmes according to the perspectives of hotel consumers. This was echoed by Reynolds and Braithwaite (1997), who were the first to add 'environmental sustainability' and 'customer satisfaction' to a list of variables when investigating the best solution for maximising revenue in tourist operations. In order to better understand the needs and wants of green consumers, more and more hospitality researchers have turned their attention to this growing market segment.

Managers' environmental attitudes. In addition to the external stakeholders (consumers), the role of internal stakeholders (hotel managers) in EM has also been researched. Environmental attitude defined by Schultz *et al*. (2004: p.31) as "the collection of beliefs, affect, and behavioural intentions a person holds regarding environmentally related activities or issues" was a particular research interest of hospitality researchers. For instance, studies conducted by Kirk (1998) and Stipanuk and Ninemeier (1996) indicated the importance of managerial attitudes to the success of EM in hotels. These studies revealed that hotels' environmental actions depend on management's attitudes towards them, and the degree to which innovative steps are taken to address environmental issues. The studies reflect that a top-down approach appears to be an effective strategy in the planning of EM.

The remaining studies in this stage were related to the relationship between sustainable tourism and religious traditions (Gupta, 1999), the balancing of urban growth and landscape preservation using Flagstaff, Arizona as a case study (Casado, 1999) and planning in tourism and its effect on environmental conservation using the Banda Islands in Eastern Indonesia as a case study (Wrangham, 1999).

3.2. Research themes from 2000 to 2009

The decade starting from 2000 is considered as the second stage of hospitality EM research. During this stage, some new topics appeared, and the following reviews the topical trends that characterise this period.

Researchers continued to pay attention to issues identified in the first stage, including the development of environmental policies and practices (Mensah, 2006; Stipanuk, 2001; Wolfe and Shanklin, 2001), IAQ (Chan *et al*., 2009; Hyland *et al*., 2003; McNabb and Hearns, 2005; Pratten, 2003; Toh *et al.,* 2001), green consumerism (Han *et al*., 2009; Manaktola and Jauhari, 2007), and hotel managers' attitudes about EM (Bohdanowicz, 2005, 2006). Notwithstanding, new research topics were noted in this stage.

Sustainable tourism development. Sustainable tourism development is viewed as "all kinds of tourism developments that make a notable contribution to or, at least, do not contradict the maintenance of the principles of development in an indefinite time without compromising the ability of future generations to satisfy their own needs and desires" (Tosun, 1998, p.596). Although sustainable development was introduced in 1987 by the Brundtland Report and has been frequently discussed in mainstream management literature as well as appeared in other tourism research journals (e.g. Cater, 1993; Sharpley, 2000) since the 1990s, studies on sustainable tourism development have only appeared in these four hospitality journals from 2001 onwards. Even with a late start, the topic was the most popular during this stage. Various cases and destinations were selected to examine such development, including sustainable tourism in the Caribbean (Clayton, 2003; Harrison *et al*., 2003; Jackson, 2006), Canada (Jayawardena, 2003), Northern Cyprus (Altinay and Hussain, 2005), Phuket (Henderson, 2007), Niagara (Jayawardena *et al*., 2008) and the Blue Ridge National Heritage Area (Stoddard *et al*., 2008). These studies mainly focused on development issues, the role of educational institutions in sustainable tourism development, the environmental impact, the relationship between corporate social responsibility and sustainable tourism development, and the economic and promotional effects. Weaver (2001) and Gibson *et al*. (2003) also investigated the role of ecotourism in mass and urban tourism, respectively. Geographic location appears to be the main focus in most of the above-mentioned sustainable tourism development studies.

Environmental performance. Environmental performance, broadly defined as "measurable results of an organisation's management of its environmental aspects" (ISO, 2004), of companies began to attract the attention of hospitality researchers, For instance, Chan and Tse (2001) examined the energy use involved in roasting four Chinese BBQ items. Chan and Lam (2002) estimated the quantity of pollutants produced by the hotel industry, and Chan W. and Wong K. (2006) investigated the weight of solid waste – specifically newspapers – in hotels. Deng and Burnett (2002a, b) reported the energy and water use in Hong Kong hotels and recommended an energy management programme. In addition, Chan (2005a) predicted the consumption of electricity in sub-tropical hotels and recommended practical measures to conserve energy. In 2007, in what was described as the missing component in the 'greening' of tourism, the environmental performance of the self-catering accommodation sector was investigated by Leslie (2007), who found that the sector's awareness of green initiatives, practices, membership in green organisations and the reduction of energy consumption and waste management was all very low. Erdogan and Tosun (2009) also examined the environmental performance of tourist accommodation in

protected areas and found that the accommodation businesses performed poorly in matters such as energy efficiency, water conservation, responsible waste management, communication, environmental training and awareness, and necessary knowledge about interest in environmental protection and policies. Further, Rodríguez and Cruz (2007) examined the relationship between social environmental responsibility and performance in hotels and concluded that they were positively-related. These studies enrich our understanding of environmental performance of hospitality firms and would give managers new insights into what and how environmental performance of their firms can be improved.

Environmental cost control. Another important line of research in EM is environmental costs. According to Jasch (2003), environmental costs comprise internal costs and external costs, and the costs can be related to all costs incurred in relation to environmental damage and protection. Handling solid waste or investing in eco-facilities to achieve the desired environmental performance inevitably cost money. Therefore, Chan and Lam (2001a) explored the estimation and environmental accounting of municipal solid waste produced in hotels, and revealed that plastic toiletries incurred the highest costs followed by newspaper. Chan and Lam (2001b) further investigated the green cost attributable to water consumption in hotels; and Chan (2005b) analysed the environmental costs generated by hotels and found that those attributable to water protection and solid waste management were larger than the costs of air pollution. The environmental costs of hotel sewage and environmental saving techniques were also investigated (Chan *et al*., 2009). Butler (2008) examined the cost of a hotel building constructed according to the Leadership in Energy and Environmental Design (LEED) standards, as established in the US, and found that the cost was not greater than that generated by conventional building approaches. Chan and Ho (2006) further suggested some financing strategies for hotels to develop an international EMS. All these studies are important to the practitioners of the industry, since on-going environmental costs will likely determine a firm's decision to adopt an environmental programme.

Environmental management systems. As mentioned in Chan's (2008) study, EMS is defined as a management system that includes organisational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving and reviewing, and maintaining the environmental policy in accordance with the International Organisation for Standardisation (ISO)'s standards. As a result of the launch of ISO 14000 EMS standard in 1997, EMSs have surfaced as a topic of interest. In fact, hotel EMSs - formal systems that companies use to facilitate the implementation of environmental policies (Chan E.S.W. and Wong S.C.K., 2006) - have been another focus area of hospitality EM research in the 2000s. In addition to the abovementioned, studies on financing strategies for EMSs (Chan and Ho, 2006), the barriers to EMSs (Chan, 2008), analyses of firms' environmental statements (Priego and Palacios, 2008), and their environmental measures (Chan, 2009) were the common EMS-related research topics. The study of EMSs is important because an increasing number of hotels have achieved EMS accreditations such as ISO 14001 and Green Globe 21, and they are likely to result in various benefits, from monetary profits to marketing advantages.

3.3. Research themes from 2010 to 2014

Starting from 2010, this stage comprises obvious changes in EM research that could help identify future research efforts. No study on sustainable tourism development or environmental cost control, which attracted researcher attention in the previous decade, was published in this period.

Same as the first two stages, development of environmental policies and practices, green consumerism, and managers' environmental attitudes continued to draw research attention. Rahman *et al*. (2012) found that chain hotels are stronger adopters of green practices and hotel size had little effect on the extent of energy consumption management. Namkung and Jang (2013) examined the effects of restaurant green practices on customer-based brand equity formation. The impact of hotel sustainable development practices (Prud'homme, and Raymond, 2013) and green attributes (Slevitch *et al*., 2013) on customer satisfaction was also investigated.

For green consumerism, Han and Kim (2010) examined hotel customers' eco-friendly decision-making processes. Han *et al.* (2011) and Berezan *et al.* (2013) studied the relationships between hotel customers' attitudes, demographics, nationality and their intentions to visit/return a green hotel. Chen and Tung (2014), by using an extended theory of planned behaviour model, predicted consumers' intention to visit green hotels. Barber (2014) suggested that specific strategies should be developed for particular green hotel consumer segments to attract and retain more "green" hotel guests. Gao and Mattila (2014) found that customer satisfaction was higher for green hotels when service delivery is successful. Kang *et al*. (2012) took it one step further and investigated the consumers' willingness to pay for green initiatives taken by the hotel industry. They found that US hotel guests with higher degrees of environmental concern declared a higher willingness to pay for hotels' green initiatives. Susskind (2014) echoed that 45 percent of the respondents of his study agreed that they would pay a higher room rate to support hotel sustainability programmes. Miao and Wei (2013) made a comparison of consumers' pro-environmental behaviour and the underlying motivations between household and hotel settings and found that the respondents' pro-environmental behaviour in a household setting was significantly higher. Huang *et al*. (2014) also examined whether the motivation crowding effect occurs when hotel consumers try to be environmentally friendly, and showed a positive relationship.

In the catering industry, the relationship between consumer knowledge of green restaurants (Hu *et al.,* 2010), emotion (Kim *et al*., 2013) and their intentions to patronise were investigated, and DiPietro *et al*. (2013) concluded that customers expressed their preferences to patronage environmentally-friendly restaurants and use environmentally safe products. Jeong *et al*. (2014) further examined the impact of a café's green practices on customer attitudes and green image, while Jang *et al.* (2011) looked at the Generation Y consumers' selection attributes and behavioural intentions toward green restaurants.

Another common research topic since the first stage of analysis is managerial attitudes toward EM (Chou *et al.*, 2012; El Dief and Font, 2012; López-Gamero *et al.*, 2011; Park and Kim, 2014; Park *et al.*, 2014). Continued from the second stage of the analysis, the studying of environmental practices and EMSs as well as environmental performance also appeared in the third stage. For instance, Singh *et al.* (2014) suggested that hotels should practise recycling programmes, and involve guests in the process whenever possible in order to realise the potential monetary benefits. Chan and Hawkins looked at hotel employees' attitudes towards EMS (2010), and the application of EMSs in a hotel context (2012). Segarra-Oña *et al.* (2012) investigated the relationship between ISO 14001 EMS standard and economic performance. Hsiao *et al.* (2014) developed a preliminary EMS evaluation framework for hotels while Zhang *et al.* (2014) indicated that eco-certified hotels maintain higher operational efficiency and greater customer-driven resources efficiency.

Development of environmental benchmarking and indicators. Environmental benchmarking and indicators are measures of company proficiency in protecting the environment comprising different types of environmental performance indicator (Young and Welford, 1999). This is a newly emerged topic during this stage of hospitality EM research. For instance, Chan (2012) examined energy benchmarking in support of low carbon hotels and proposed that hotel energy benchmarking based on floor area is useful from the top-down management perspective. Teng *et al.* (2012) developed energy conservation and carbon reduction indicators for the hotel industry. Bastič and Gojčič (2012) examined a measurement scale for eco-components of hotel service quality and identified four eco-component dimensions: hotel staff's eco-behaviour, environmentally friendly and healthy equipment, efficient use of energy and water, and bio-food. Zhang *et al.* (2012) proposed a cost-based resource efficiency measure of environmental sustainability in hotels. Wang *et al.* (2013) also developed green management indicators for restaurants by applying supply chain management concept. The contributions of these studies are significant due to the importance of choosing indicators that are relevant and measurable, which is also an important part of environmental benchmarking process.

In addition to the above-mentioned main themes, Cornell Hospitality Quarterly published a special issue on *Sustainable and Eco-innovative Practices in Hospitality and Tourism* in 2014 due to the increasing importance of EM in the hospitality and tourism industry. The eleven articles in this special issue include conceptual papers and empirical studies covering different topics such as customer involvement in sustainable supply chain management (Sigala, 2014); the impact of ISO 14001 on hotels from customers' perspective (Peiró-Signes *et al.*, 2014); the barriers to customers' acceptances of hotel green practices (Baker *et al.*, 2014); the hotel employee awareness of Corporate Social Responsibility (CSR) activities (Raub and Blunschi, 2014); the link between sustainability and economic performance of hospitality firms (Singal, 2014); the impact of hotels implementing environmental sustainability measures on room pricing (Sánchez-Ollero *et al.*, 2014); the effective in-room green communication strategies (Lee and Oh, 2014); the influence of message framing and source credibility on hotel customers' attitudes and behavioural intentions (Kim and Kim, 2014); the relationship between hotel guests' mindfulness and their sustainable

behaviour (Barber and Deale, 2014); the efficacy of the sustainability value in predicting travellers' hotel choices (Sirakaya-Turk, 2014); and the influence of purchaser attitudes and product attributes on organic wine preferences (Rahman *et al*., 2014). These papers attest to the diversity and direction of current research on EM in the hospitality industry. The special issue also provides hotel managers with guidance to improve their company's environmental practices.

4. Implications for future hospitality environmental management research

A review of 149 hospitality journal articles indicated that over 20% of these studies dealt with green practices and EM system, such as applications of EMSs, IAQ, water and energy conservation and waste management. In fact, studies in these categories were the most frequently published in the four journals, compared to other EM issues. Green consumerism is another topic area that has had sustained research attention in the past decades.

Despite the variety of issues addressed from 1993 to 2014, compared with the management literature, several important issues not been examined thoroughly in recent hospitality research warrant future attention. These areas include:

1) Green marketing
2) Environmental technology
3) Environmental reporting
4) Carbon footprint
5) Employees' green behaviour
6) EM's effect on stakeholders
7) EM in SMEs

4.1. Green marketing

Green advertising in the hotel industry has emerged as a research topic from 2010 onwards. Hu (2012) examined the effectiveness of environmental advertising in the hotel industry. Hsieh (2012) also analysed the environmental policies and practices of hotel companies as disclosed on their corporate websites to identify the hotels' major environmental focus areas because of the popularity of social media and the rapid growth of the Internet as a communication strategy. Chan (2013a) and Geerts (2014) further investigated hotel managers' perceptions of the relative importance of different green marketing strategies and their views on environmental certification schemes, respectively. The gap between hotel managers' and customers' perceptions of green marketing-related activities was also examined by Chan (2013b). The growing research interest in green advertising and promotional channels used is understandable given today's ethical/green consumerism. Moreover, the study of green advertising reflects the increasing importance of green marketing, defined as the management process responsible for identifying, anticipating, and satisfying the requirements of customers and society in a profitable and sustainable way (Welford,

2000). Notwithstanding, unlike mainstream management environmental research, the review indicated that very few studies in these four journals have investigated the possibility of applying green premiums and examined the effectiveness of green marketing/advertising in the hospitality industry. Green marketing is increasingly important, as many organisations, including hotels, are trying to attract green customers/travellers (Chamorro *et al.*, 2009). However, due to the potential 'green washing' effect, the reported effectiveness of these strategies is questionable. Hence, research looking at various issues related to green products, green distribution, green pricing and green promotion is essential. Future studies could be conducted from different stakeholders' perspectives, including those of hotel guests and business partners, especially when Vargo and Lusch (2004) advocated that the new logic of marketing should provide both social and economic processes, consisting of a network of relationships to provide skills and knowledge to all stakeholder groups that hold a firm accountable for its actions.

4.2. Environmental technology

Environmental technologies can be broadly defined to include design, equipment, and operating procedures that limit or reduce negative impacts of products or services on the natural environment (Klassen and Whybark, 1999; Shrivastava, 1995). Although there have been numerous studies on environmental practices in hotel companies and some of the EM programmes are implemented via technologies, only a few studies on solar energy for hot water provision (Chan *et al*., 2013a), the heat pump hot water systems (Chan *et al*., 2013b), and water saving technology (Barberán *et al*., 2013) have explicitly examined environmental technology use. Technological advances are commonly used to better manage and deploy environmental programmes in hotel companies; and technologies can help hotel companies conserve energy and water, reduce waste and achieve higher customer satisfaction. Therefore, hotel managers' attitudes towards, perceived barriers of and actual usage of environmental technologies in deploying environmental programmes are important to understand. Given that hotels normally lagged behind in terms of technological applications when compared to other industries (Law and Jogaratnam, 2005) and very few research has been undertaken on the usage level of environmental technologies in hotels, further research on the application of these technologies in the hospitality field is likely to enrich the literature.

4.3. Environmental reporting

In accordance with chapter 30 of Agenda 21, business and industry are encouraged to annually release their environmental records and report on their use of energy and natural resources (United Nations Environmental Program Industry and Environment Office, 1994). Environmental reports can range from a simple public relations statement to a detailed examination of a company's environmental performance, policies, practices and future direction (Azzone *et al.,* 1997). By using different formats including their webpages, companies may publish their environmental reports to satisfy the requirements of banks and financial institutions and facilitate dialogue with the public to inform their stakeholders of their environmental policies and activities. However, the real motivation behind such practices is still unclear, and many companies remain at a crossroads.

Although more and more tourism companies such as some airlines in Asian Pacific region (Mak and Chan, 2006) and hotels (Holcomb *et al*., 2007) have already participated in corporate social responsibility or environmental reporting, only a few studies have focused on environmental reporting in the hospitality industry. For instance, Pérez and del Bosque (2014), by using sustainable development-stakeholder relations management approach, explored the sustainability reporting of hospitality companies, while Jones *et al*. (2014) provided an exploratory review of how the world's leading hotel chains publicly communicate their sustainability commitments and achievements. Investigating the driving forces behind such publications and the barriers preventing hotel companies from compiling these reports will contribute to the EM literature and provide hotel practitioners with more valuable insights.

4.4. Carbon footprint

The term 'Carbon Footprint' was declared a word of the year in 2007, according to Britain's Oxford University Press. The Oxford Dictionary defines the term as the amount of carbon dioxide released into the atmosphere as a result of the activities of a particular individual, organisation or community. In the hospitality industry, hotel managers have begun to discuss ways to reduce their carbon footprints, but few of them know how to optimise the reduction. Notwithstanding, a few studies about carbon footprint were seen in these four hospitality journals though this research topic has been very popular in other management journals. Despite Dhanda (2014)'s conceptual paper exploring the area of carbon offsets and carbon neutrality in the hotel context, McKercher *et al*. (2010)'s study examining people's willingness to modify their travel behaviours to reduce carbon footprint, and Teng *et al*. (2012)'s study to develop carbon reduction indicators for the industry, hospitality researchers should investigate more on the methods to calculate carbon footprint in a hotel, the strategies to reduce carbon footprints, and provide an implementation framework for hoteliers to follow.

4.5. Employees' green behaviour

Without staff involvement, a company's environmental programme will very likely fail, as many environmental measures are executed by front-line employees. But, personnel problems can arise, as some employees may feel threatened when their existing responsibilities are changed (Gurtoo and Tripathy, 2001) especially when their responsibilities and authority are redefined to ensure the success of some environmental programmes. Of the papers reviewed from 1993 to 2014, only two articles investigated hotel employees' perceptions of EMSs and the environmental triggers, which drive hotel employees' intentions to implement green practices (Chan and Hawkins, 2010; Chan *et al.,* 2014) whereas the views of customers and managers have received relatively more attention. Therefore, the authors suggest more studies to be conducted on hotel employees' motivation for eco-friendly behaviours, and barriers hindering hotel employees from engaging in green behaviours or creative green thinking. This research is essential and important, "as hospitality employees may experience additional difficulties in balancing good-quality service to

hotel guests and the required environmental performance" stated in Chan and Hawkins' (2010, p.643) study.

4.6. Environmental management's effect on stakeholders

Implementing a successful environmental programme depends on the full co-operation and involvement of a hospitality firm's stakeholders, including employees, customers, suppliers, business partners, and governments. The introduction of a firm's environmental programmes may result in resistance from some stakeholders due to changes in routine operations. Therefore, the stakeholders' importance cannot be underestimated. However, the relationship between EM and a hospitality firm's stakeholders has received less interest from hospitality researchers. Starkey and Madan (2001) recommended that management researchers should align stakeholders in the future of management research to reduce the relevance gap between business and academia, while Franche *et al*. (2005) advocated that the role of stakeholders in research should be optimised. Therefore, hospitality scholars are encouraged to explore this issue in future EM research.

4.7. Environmental management in SMEs

As in the general management literature, small- and medium-sized enterprises (SMEs) are of great interest to hospitality EM researchers. For instance, the study about the role of small businesses in sustainable tourism development by Horobin and Long (1996) concluded that many small tourism business owners recognised the importance of sustainable tourism development, but do not necessarily see a central role for themselves in its implementation. Tzschentke *et al*. (2004, 2008) investigated the reasons for implementing EM in small hospitality businesses and found that the owners' personal values and beliefs played a critical role, such that a greater understanding is needed of the complexity of motives that drive small hospitality business owners. They further found that the development of environmental consciousness and personal, socio-cultural and situational factors were all significant influences in convincing small hospitality operators to go green. Chan (2011) investigated the barriers hindering small- and medium-sized hotels from implementing EMSs, and encouraged researchers to conduct more studies on SMEs in the future. As Hillary (2004) stated, SMEs are a vital part of the enterprise society that collectively contributes to sustainable development, and these types of hospitality firms may experience more challenges of EM and its implementation together with different green practices. Therefore, researchers should continue to investigate issues related to SMEs' EM efforts.

5. Conclusion

EM is an important issue, given the various environmental problems facing the planet. EM topics have captured the attention of hospitality researchers, as many hospitality firms have taken different environmental measures for various reasons. The main aim of this paper is to review and synthesise previous studies published over the period of 1993-2014, which were categorised as

environmental policies and practices, IAQ, green consumerism, managers' environmental attitudes, sustainable tourism development, environmental performance, environmental cost control, EMS, and environmental benchmarking. The study, as one of the very few studies to review hospitality EM articles in top-tier hospitality journals over the past decade, should give hospitality academics and practitioners an overview of the updated body of knowledge in the field of EM and stimulate more in-depth research that will further extend the EM literature.

It is clear that EM is an important topic and managing environmental performances features high on the agenda of the many academics and hospitality practitioners. Still, the research area is relatively new compared with other hospitality fields, with only 149 EM-related papers published in the reviewed journals over the study period. This does not seem to match the information needs for the wide variety of environmental issues faced by the hospitality industry. Therefore, hospitality researchers should consider pursuing more studies in this area. A number of key issues would benefit from further attention, including green marketing's role in the industry, environmental reporting in the industry, the application of environmental technologies in the hospitality industry, carbon footprint management, strategies for involving hospitality employees in EM and its effect on hospitality firms' stakeholders, as not many studies examined the above-mentioned issues in the hospitality industry. Building green reputation due to the overall business climate towards more sustainability through green marketing and environmental reporting has become popular, and it is therefore expected that the full implementation of green marketing and reporting and the examination of their effectiveness will be of value to the industry. Furthermore, multidisciplinary research involving engineering, such as energy and environmental engineering, should be encouraged as research on the application of environmental technologies and carbon footprint management would involve technical knowledge and varied research methods. In terms of the involvement of employees, EM researchers need to take a closer look at hotel employee characteristics and investigate which human resources policies, practices and systems may have the most impact in order to gain their support to achieve better environmental performance.

More than twenty articles in the four journals have studied customer-related topics such as the relationship between green practices/room facilities and the intention to buy; the guest satisfaction level and hotel green policies; and demographic of hotel guests and their return to a green hotel. However, due to the constantly evolving nature of consumer needs, customer behaviour will likely receive continued attention from environmental researchers. Hospitality researchers may consider studying the suggested research issues from the customer perspective, such as hotel guests' perceptions on hotel green technologies and their views on hotel green marketing. Apart from employees and customers, the roles and views of other stakeholders such as suppliers and travel agents should be considered because of their potential influence on the success of a hospitality firm's environmental programmes. The investigation of the above-mentioned issues related to SMEs' EM efforts should also be expanded, as little is known about the way hospitality SMEs perceive the environmental agenda or their role in responding to it (Carlsen *et al.,* 2001).

Nearly 60% of the studies occurred in the context of hotels. Thus, this sector was the dominant source of data and information. Other data sources included restaurants and schools. A few articles also touched on ecotourism. Surprisingly, only about one-tenth of the articles reviewed were related to foodservice outlets. It seems the sector did not receive equivalent research attention, compared with the hotel sector, despite the former's important role in the hospitality industry. Perhaps the nature of the reviewed journals accounted for the disproportionate industry applications. Still, researchers are encouraged to conduct more studies in the foodservice sector, as the effect of its operations on environmental protection is significant. For instance, study of employee perceptions on food and beverage outlets' environmental initiatives and practices could be one of the research foci in the sector, as understanding employee behaviour is a contributing factor to the success of a company environmental programme.

In addition, only a few articles (e.g., El Dief and Font, 2012) have proposed and/or tested EM theories in a hospitality-specific context. More research on theoretical development is necessary to advance hospitality management as a discipline, beyond replicating studies from and adopting theories/models used in other fields. The hospitality industry has its own unique attributes and characteristics, hospitality EM researchers may therefore be able to uncover and develop unique theoretical frameworks for the field. With the emerging of industry-specific models or theories, specific practical implications for the industry could be derived in the future. Besides, due to the extensive reach and importance of the hospitality industry to the global economy and the multi-disciplinary nature of the field, theoretical advancement in hospitality could push the research frontier for other industries and disciplines as well. Authors of future hospitality EM research are encouraged to publish in top-tier high impact journals, both in hospitality and general management fields, to increase the influence of hospitality EM research in the broader academic community. Research findings with practical implications should also be distributed via trade/practitioner publications so as to narrow the gap between theory and industry practices, thus increasing the real impact of research.

The most often used research approach among the studies reviewed was quantitative in nature using questionnaire survey as the data collection method. To move beyond descriptive studies and replicating research from other fields, hospitality scholars are encouraged to use more qualitative research approach to lay the theoretical foundation and identify fine-grain information unique to the hospitality industry. As part of the theory building process, the development of measurement for constructs also requires the insights provided by qualitative research. Qualitative research can also unearth reasons behind surface phenomena identified by quantitative studies. Thus, a combination of qualitative and quantitative approaches should be used in future studies to enrich the breadth and depth of current knowledge on EM. We hope that this review of articles published in the four top-tier hospitality journals can provide hospitality researchers with some reasonable insight on the most popular EM research topics in the past twenty years, and on the potential areas for further inquiry.

This review is not without limitations. First, the review is delimited to papers published in the four top-tier hospitality journals. Although such delimitation sets the necessary boundary of any investigation, results of the review would not be generalizable to the EM research published in other academic journals. Future research may also consider selecting papers based on their individual impact (e.g., citation record) in addition to including all papers published in high impact journals. Second, all research papers reviewed are written in English. Therefore, future research could expand the number and field of journals to include publications in other languages to present a more comprehensive picture of the hospitality and tourism EM research landscape and achieve a greater global coverage. More in-depth meta analyses could also be undertaken to identify patterns among study results, sources of disagreement among those results, and other interesting relationships among the issues and stakeholders of interest.

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Table 1 Literature on Environmental Management in Mainstream Management Field

Researcher	Focus of Study	Sub Focus
Bryant and Wilson (1998)	Environmental management	Meaning
Kolk and Mauser (2002)		Different models
Ervin *et al*. (2013)		Motivations and barriers
Christ and Burritt (2013)		Accounting
Ann *et al*. (2006); Christmann, (2000); Claver *et al*. (2007); Jabbour and de Sousa Jabbour (2013); King and Lenox (2001); Klassen and McLaughlin (1996); Mahesh (1995); Melnyk *et al*. (2003); Yan *et al*. (2011); Yang *et al*. (2010);	The impact on business performance and operation function	
Dasgupta *et al*. (2000); Jaffe and Palmer (1997)	The effect of environmental regulation on a firm's performance	
Hopwood *et al*. (2005)	Sustainable development	Different approaches
Khan, M.A. (1995); Mebratu (1998); Redclift (2005)		Concepts, conceptual history
Giddings *et al*. (2002)		Relationships with environment, economy and society
Steurer *et al*., (2005)		Stakeholders relations
Boele *et al*. (2001); Moon (2007)		Relationship with corporate social responsibility
Devuyst (2000); Pearce and Atkinson (1993); Rennings and Wiggering (1997); Victor (1991)		Measurement/indicators
Welford *et al*. (1999)		Tourism services
Gladwin *et al*. (1995)		Implications for management theory
Campbell (1996)		Urban planning
Garrod and Chadwick (1996); Guo *et al*. (2001); Vastag *et al*. (1996)	Evaluation of environmental policies and strategies	
Cotoc *et al.*, (2013); Fryxell and Szeto (2002); Hui *et al*. (2001); Khanna and Anton (2002); Morrow and Rondinelli (2002); Zhang *et al*. (2008)	EMSs	Driving forces and barriers
Wagner (2013)		Benefits for human resource management
Mangra *et al*. (2014)		The impact on sustainable economic development
Khalili and Duecker (2013)		Design of EMS
Nakamura *et al*. (2001); Rondinelli and Vastag (2000)		EMS certification and value

Feldman *et al.* (1997)		The impact on stock prices
Delmas (2002); Darnall and Edwards (2006)		Adoption rate of ISO 14001 and cost of the adoption
Karapetrovic and Willborn (1998)		Integration with quality system
Ammenberg and Hjelm (2003); Hillary (2004)		EMSs in SMEs
Cormier and Magnan (2003); Deegan and Gordon (1996); Lober *et al.* (1997)	Environmental reporting	
Roberts (1996); Tanner and Kast (2003); Zinkhan and Carlson (1995)	Green marketing and advertising	The impact on green purchases
Font and Carey (2005); Tang *et al.* (2004)		The role of green product in marketing mix
Mathur and Mathur (2000)		Wealth effects of green marketing
Ginsberg and Bloom (2004); Polonsky (1995); Polonsky and Rosenberger (2001)		Green marketing strategies
Rivera-Camino (2007)		Stakeholders' views
Teisl *et al.* (2002)		Eco-labels
Bloemhof-Ruwaard *et al.* (1995); Carter and Dresner (2001); Darnall *et al.* (2008); Hajmohammad et al. (2013); Vachon and Klassen (2008)	Role of environmental management in supply chain	
Carter and Dresner (2001)		Purchasing role
Burritt *et al.* (2002)		Accounting role
Kannan and de Sousa Jabbour (2014)		Selection of green suppliers
Govindan *et al.* (2014)		Barriers for green supply chain
Lin (2013); Mirhedayatian *et al.* (2014)		Evaluation of green supply chain
Barr (2007)	Peoples' attitude and behaviour relating to environmental management	Contributing factors
Daily and Huang (2001)		Employees' views
Jabbour *et al.* (2013)		Role of green teams
Delmas and Toffel (2004); Ramanathan (2001)	Influence of stakeholders	
Noci (1997); Handfield *et al.* (2002); Walton and Handfield (1998)		Role of suppliers
Schaltegger and Figge (2000)		Effect on shareholder
Dong *et al.* (2013); Salmi and Wierink (2011); Sovacool and Brown (2010)	Carbon footprint	Evaluation of carbon footprint
El Hanandeh (2013); Weber and Matthews (2008)		Quantifying the carbon footprint
Lee (2011); Sundarakani et al., (2010)		Integrating carbon footprint into supply chain management

Bocken and Allwood (2012)		Strategies to reduce consumer goods' carbon footprint
Hassard *et al.* (2014); Kim and Neff (2009); Mogensen *et al.* (2014); Pathak *et al.* (2010); Shirley *et al.* (2012)		Calculating carbon footprint

Table 2 Main Themes Identified in the Four Hospitality Journals

Hospitality Journal	1993 - 1999	2000 - 2009	2010 -2014	Total	Main Theme
CQ	8	1	1	10	Development of environmental policies and practices (24/149)
IJHM	1	2	4	7	
IJCHM	3	0	1	4	
JHTR	2	1	0	3	
				(24)	
CQ	5	2	0	7	Indoor air quality and smoke-free environment (12/149)
IJHM	0	1	0	1	
IJCHM	1	2	0	3	
JHTR	1	0	0	1	
				(12)	
CQ	0	0	5	5	Green consumerism (25/149)
IJHM	0	1	13	14	
IJCHM	1	1	2	4	
JHTR	1	0	1	2	
				(25)	
CQ	1	1	1	3	Managers' environmental attitudes (9/149)
IJHM	1	1	2	4	
IJCHM	0	0	0	0	
JHTR	0	0	2	2	
				(9)	
CQ	0	2	0	2	Sustainable tourism development (10/149)
IJHM	0	1	0	1	

IJCHM	0	7	0	7	
JHTR	0	0	0	0	
				(10)	
CQ	0	0	1	1	Environmental performance (11/149)
IJHM	0	6	2	8	
IJCHM	0	1	1	2	
JHTR	0	0	0	0	
				(11)	
CQ	0	1	0	1	Environmental cost control (6/149)
IJHM	0	1	0	1	
IJCHM	0	2	0	2	
JHTR	0	2	0	2	
				(6)	
CQ	0	1	1	2	Environmental management systems (8/149)
IJHM	0	1	3	4	
IJCHM	0	1	0	1	
JHTR	0	0	1	1	
				(8)	
CQ	0	0	1	1	Environmental benchmarking and indicators (5/149)
IJHM	0	0	4	4	
IJCHM	0	0	0	0	
JHTR	0	0	0	0	
				(5)	
Total:	25	39	46	**110**	
Remarks:					
CQ – Cornell Hospitality Quarterly (formerly known as The Cornell Hotel and Restaurant Administration Quarterly)					

IJHM – International Journal of Hospitality Management

IJCHM – International Journal of Contemporary Hospitality Management

JHTR – Journal of Hospitality and Tourism Research