



## Towards Understanding Sustainable Technology Implementation: The Barriers Faced by IT Professionals when Implementing Technologies as Part of an EMS Program

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### Abstract

A dominant trend in the hospitality industry is a focus on sustainability and “greening”. Much of sustainability-focus exists due to new technologies in accordance with and mandated by certification programs such as EMS (Environmental Management Systems). The implementation of new sustainable technologies is necessary to continue bettering the sustainability of hospitality organizations and their properties. Yet, there are numerous barriers to the implementation of sustainable technologies. These barriers and shortcomings are well-documented. The most knowledgeable individuals in an organization in regards to technology and the implementation of such technologies are the I.T. personnel. A study documenting the perceived barriers to the implementation of new sustainable technologies in the hospitality industry by I.T. managers has not been conducted. The following qualitative inquiry documents the perceptions of I.T. managers in the hospitality industry and their perception of the barriers to the implementation of sustainable technologies in the hospitality industry.

**Keywords:** Sustainability; Technology; Hospitality (industry); Barriers; Implementation; Perceptions

### Introduction

A trend towards minimizing negative impacts on the environment has been made in hospitality research [1-4]. This trend has been coined under the umbrella term of “sustainability”. Sustainability has been defined by the World Tourism Organization as meeting “the needs of present tourists and host regions while protecting and enhancing opportunities for the future”.

Hospitality research has focused on the building of sustainability programs. Zhao, Day, and Cai write, “Sustainable programs refer to all the environmentally friendly practices implemented, such as reuse of water and linen, recycling of water, reduction of waste water and solid waste” [5]. Rheem offered a more generalized set of categories in regards to sustainability programs, citing such attributes as product procurement, emissions offset, and recycling [6].

Sustainability programs are in their infancy. Sustainability is a postmodern approach to consumer-based business development. The inclusion of sustainability programs in a business plan as an SOP (Standard Operating Procedure) is a recent development. The development of sustainability programs has occurred in correlation with consumer demands and environmental concerns [5]. Yet, there remain difficulties to the creation of sustainability programs.

Chan and Wong found that the industry is confused by the current certifications and standards for sustainability in the hospitality industry [7]. This is creating an industry-wide response-lag, meaning that the industry is failing to adhere to best practices that lead to the creation of a sustainable competitive advantage [8]. Furthermore, Propson found that consumers are confused by the certifications and standards being touted in the hospitality industry [3]. A primary approach to reducing response-lag is to implement new technologies. Furthermore, the implementations of environmentally sustainable technologies are a potential sustainable competitive advantage.

IT (Information Technology) is a sustainable competitive advantage in the hospitality industry and an important component of

environmental sustainability programs. Yet, there are numerous barriers to the implementation of environmentally sensitive technologies as part of EMS (Environmental Management Systems) programs. IT professionals, those responsible for understanding the capabilities of new technologies and implementing the technologies at the property level are not succeeding in implementing new technologies [1]. There are multiple implementational difficulties including finances, customer service, unrealistic expectations, front-line employee and executive motivation, a lack of certifiable indicators to gauge successes, and more.

The following literature review attempts to gauge the progress the industry has made in moving towards sustainability. The literature review shows that primary problematic qualities towards the creation of sustainable SOPs include: understanding available technology and utilizing instruments for measuring sustainability [4].

IT professionals in the hospitality industry may have a distinct capability when overcoming some or all of these identified obstacles. Therefore, a study seeking to identify the perception of IT professionals in regards to barriers to sustainable technology implementation in the hospitality industry is necessary.

### Consumers are driving sustainability in the hospitality industry

In the hospitality industry consumers are willing to pay a premium for environmentally sound practices. This is evidenced by Saunders, who compiled data from multiple sources in the hospitality industry

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Received April 24, 2015; Accepted May 29, 2015; Published June 04, 2015

**Citation:** Taillon J, Nguyen T, Lee SE (2015) Towards Understanding Sustainable Technology Implementation: The Barriers Faced by IT Professionals when Implementing Technologies as Part of an EMS Program. J Tourism Hospit 4: 152. doi:[10.4172/21670269.1000152](https://doi.org/10.4172/21670269.1000152)

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and found that there is support by consumers for environmentally sensitive practices [9]. Saunders found that the Travel Industry Association of America (TIA) pronounces in published literature that 54% of Americans are more likely to patronize hotels that practice environmental responsibility than those that do not, Orbitz figures that 67% of Americans place importance on the eco-friendliness of a destination, and Travelocity found that 80% of Americans are willing to spend more on an eco-friendly destination [9]. Finally, a Cone Roper Study found that 95% of consumers have a more positive image of a company that supports causes they care about.

Consumers are concerned with environmental practices. Yet, EMS are not well-evolved. Sustainability factors within EMS are under-developed according to Toth [10]. Within sustainability, environmental factors are particularly under-developed outside of Europe [11]. Although there are case studies depicting companies that are deemed sustainably sound [12,13], these case studies have not led to widespread adoption of sustainability practices [12].

Hotels have realized consumer demands and are making headway in regards to environmentally sustainable practices. For example, Marriott has stated a desire for all new properties to be LEED certified [14], Starwood has introduced a “Green” branded hotel chain (Element) [15], and Hilton has set goals for all of their properties to enhance “greening” attributes by 2014 [16]. Yet, there are hurdles to continuing the trend towards environmental sustainability in the hospitality industry.

What constitutes a “Green Hotel” remains ambiguous. There are currently more than 100 certification programs certifying environmental friendliness of some kind in hotels in the United States [3]. These programs follow different regulations, some of which actually contradict each other [3]. Furthermore, the information sharing amongst practitioners in regards to practices, vendors, and contractors is poor [17]. Green-washing techniques in the hospitality industry are no longer self-serving financially although they dominate the industry [17,18].

“The current proliferation of awards, labels, and endorsements has confused consumers to the extent of preferring to ignore these green messages” [19]. This is problematic for the hotel industry because a potential sustainable competitive advantage is being foregone. Furthermore, the industry has been found to be confused by the abundance of sustainability programs [7].

There are issues within the sustainable and greening literature that can be gauged for successes, shortcomings, pitfalls, and areas of further research.

### **EMS programs and the ISO 14001 series**

EMS is the term that has been coined by the EPA (Environmental Protection Agency) for the management of hospitality industry properties. The inception of modern EMS programs can be traced to the Rio Summit. Garnering an understanding of the current status of EMS programs is necessary to understand the certification process, the context of historical research in academia, and future research directions.

EMS can be defined as, “A transparent, systematic process known corporate-wide, with the purpose of prescribing and implementing environmental goals, policies, and responsibilities, as well as regular auditing of its elements” [20]. Furthermore, “EMS allows an organization to systematically manage its environmental matters” [21]. An EMS program creates a best practices’ framework for management to control

an organization’s environmental impact [21].

The EPA offers environmental certification for EMS programs. There are five areas of emphasis to the EPA’s certification program:

1. Environmental Policy – the business being certified must develop a clear policy dictating environmental protection. This includes an obligation to observe environmental regulation and legislation in their industry and countries of operations. The organization must create indicators and make continual efforts to improve their environmental stance. The implementation of new sustainable technologies is an oft-used approach to maintain the environmental stance.

2. Planning – An analysis of both the macro and micro aspects of the proposed EMS.

3. Implementation and Operation – Specific elements of the plan are enacted upon. This includes the development of a structure and set of responsibilities, training procedures, operational controls, and documentation.

4. Checking and taking Corrective Action – A performance evaluation takes place. Performance is monitored against ordained indicators and corrective and preventive action in cases of non-conformance is taken.

#### 5. Management Review

The Rio Summit that led to the creation of the modern day EMS also led to the creation of ISO 14001. The ISO 14000 series includes a set of twenty generic environmental voluntary process-based standards. None of the content in the 14000 series specifies levels of environmental performance. This creates a situation where standards are necessary for each specific business activity. Basically, an attempt is made to provide “a framework for a holistic, strategic approach to the organization’s environmental policy, plans, and actions” [22]. This is in lieu of the creation of set standards that can be compared across organizational boundaries. Technology implementation plays a vital role in the aforementioned process of continued certification according to Calisco Consulting and Training [23].

The framework consists of eight especially important guidelines in regards to applicability to the hospitality industry. These eight regulations are:

- ISO 14001 – Specifications and guidance for achieving EMS certification
- ISO 14004 – Guidelines in regards to principles, systems, and supporting techniques
- ISO 14010 – Guidelines for environmental auditing
- ISO 14011 – Audit procedures
- ISO 14012 – Qualification criterion for environmental auditors
- ISO 14024 – Environmental Labeling
- ISO 14040 – Life cycle assessment
- ISO 14060 – Guide for the inclusion of environmental aspects in product standards

Chan and Wong found that 36% of hotel managers in their study had only a minimal or complete lack of understanding of EMS and/or ISO 14001. The authors attempted to establish motivations for implementing, or not participating with, ISO 14001 EMS standards. Chan and Wong found that there was little external influence, from

corporate offices or market conditions to employees or government regulations, to comply with EMS ISO 14001 standards. Chan and Wong decipher the quantitative data received to formulate a belief that there exists an internal motivation in property managers to create more environmentally sustainable practices in the industry. Yet, the data also shows that the management responsible for implementation lacks motivation and customers are perceived to give little attention to purchasing decisions by property managers [7].

Babakri, Bennett, and Franchetti state in regards to EPA's EMS ISO 14000 series that hotel industry personnel are confused by the procedures. Even those that do understand the series have difficulty with implementation. Although there are numerous benefits to EMS even companies concerned with environmental sustainability have conducted cost/benefit analyses and chosen not to make alterations to their business plan. Babakri, Bennett, and Franchetti founded seven reasons companies choose to forego alterations to their business plan by distributing surveys to 584 firms in the United States [24]:

1. High cost of certification
2. Lack of available resources (such as technology)
3. Uncertainty about the benefit of implementing environmental sustainability standards
4. Additional training required
5. Lack of top management commitment
6. Lack of environmental performance improvement
7. Employee resistance.

### The role of IT

Technology implementation in hotels is a complex and convoluted area of research. Never the less, information technology has been identified as a sustainable competitive advantage in the hospitality industry [25]. Yet, there are extensive barriers preventing the implementation of new technologies. For example, Siguaw, Enz, and Namasivayam found that technologies believed to enhance employee productivity and revenue are being implemented while technologies intended to improve guest satisfaction are being implemented at much lower rates [26]. This would lead one to believe that the motivation to implement new technologies is based on the perceived outcome rather than the ease of use, understanding of technology, or importance of integration to programs such as EMS.

Executives in the hospitality industry are rarely aware of new technologies available to their organizations; in fact, hospitality executives' state IT decisions are outside their knowledge base, experiential background, and comfort zone [27]. IT personnel face distinct barriers because their supervisors often do not understand their area of emphasis, unlike operations, finance, and other control functions that executives oversee [8].

Barriers exist even after an organization decides to implement a change. Kim, Lee, and Law assessed potential barriers to such IT implementation [25]. An important finding from their study is that attitudes toward the implementation of new technologies are not necessarily aligned with the reality of the technology, particularly in regards to the ease of integration. This is particularly applicable to the integration of new technologies to EMS programs.

Chan identified five current primary barriers when creating

environmentally sound practices for the hospitality industry: limited capital budgets, lack of knowledge of available technologies, lack of performance measures, lack of institutional memory, and difficulties in quantifying sustainable measurements.

King et al. offered insight in to IT implementation by depicting six organizational actions that stimulate the adoption of new technologies: knowledge building, knowledge deployment, subsidies, mobilization, standard setting, and innovation directives. Knowledge building refers to the understanding of new technologies. Knowledge deployment consists of the dissemination of education of the usefulness of the new technology. Subsidies are the monetary funds available for disbursement for new technologies within an organization. Mobilization is the buy-in of stakeholders who will be affected by the implementation of the new technology. Standards are the indicators used for gauging the success of the implementation, such as the indicators one would use within an EMS program [28].

The inclusion of sustainability measures is important to the hospitality industry. Hospitality industry best practices in regards to sustainability rely on the inclusion of new technologies. These new technologies are best understood by IT professionals. Yet, IT professionals are facing hurdles when implementing new technologies and SOPs. The barriers IT professionals face when attempting to implement sustainability measures are not yet understood. The following naturalistic inquiry attempts to identify these barriers are perceived by IT professionals in the hospitality industry.

### Methodology

The focus of investigation in this paper, which is the perceptions, understandings, and beliefs of Texas hoteliers in relation to issues of sustainability and best practices for environmental sustainability and formation of sustainable competitive advantage using technology, calls for a qualitative approach to research. Creswell stated a qualitative approach to research should be used when "the topic needs to be explored because variables cannot be easily identified, theories are not available to explain behavior or participants, or theories need to be developed" [29].

Qualitative methodology was used while conducting this study; more specifically a constructivist grounded theory approach was taken allowing for alterations to be made throughout the different stages of the study whereas a conventional study does not allow for such changes. Grounded theory can be defined as "a set of flexible analytical guidelines that enable a researcher to focus on their data collection and to build inductive middle-range theories through successive levels of data analysis and conceptual development" [30]. Studies with this approach fall into the third Kuhnian phase of "Revolutionary Science". According to Preston this phase of Kuhnian Science deals with multiple constructed realities, which is called a social constructivist view [31]. A social constructionist assumes that each individual endorses their own version of reality based upon personal experiences because we wish to understand a phenomenon from an individual's perspective, realizing that different individuals will have different perspectives. Lincoln and Guba state, "When naive realism is replaced by the assumption of multiple constructed realities, there is no ultimate benchmark to which one can turn for justification – whether in principle or via the falsification principle" [32]. Thus, an assumption on the part of the researchers is that each person involved in the study has constructed their own reality of what the barriers to the implementation of sustainable technologies includes.

A further assumption is that the data and theories do not exist to be discovered as in naturalist science. There is no hypothesis in a naturalistic study, which implies phenomena should not be preemptively dictated.

Furthermore, the qualitative approach realized for this study stands in contrast to the primary form of research in the hospitality industry's technology implementation sector. Past research has predominantly been conducted via quantitative methodologies. A further reason for the decision to take a qualitative approach was that research in this subject area is at an early stage. Studies attempting to identify barriers to the implementation of sustainable technologies from an IT personnel point-of-view have not been conducted.

### Participants

The participants in the study were found via self-selection convenience sampling with assistance from the HFTP Research Institute at the University of Houston. Each interviewee is an employee of a hospitality organization in the United States and deals with the implementation of sustainable technologies in their organization. No incentives for participation were offered. The population size is not a large factor in this naturalistic inquiry because a high level of redundancy in lieu of a large population sample of statistical significance was found. When redundancy is reached it is called "qualitative informational isomorph" according to Jennings [33].

### Design

The study consists of personal interviews ranging from 35 minutes to 50 minutes. Each interviewee was asked eight identical open-ended questions. These questions were written by the researchers and based upon questions stemming from the literature review. There were multiple follow-up questions based upon the interviewee responses to each of the questions.

The empirical data was transcribed via a content analysis technique, which Hoyle, Harris, and Judd describe as, "The process of extracting desired information from a text by systematically and objectively identifying specified characteristics of the text" [34]. As implied by content analysis, the data was thematically analyzed in ATLAS.ti post-transcription. Field notes were also used in less formal impromptu interviews that have been omitted from this study because they are less threatening according to Dr. Liz Shapiro (personal communication, January 7, 2009). Lincoln and Guba provide reasons for the less threatening approach [32]. Field notes are not subject to technical difficulties. They keep the conversation between the interviewer and interviewee focused on the discussion. Field notes are a preferential tool for establishing fidelity because they allow for the researcher to include thoughts and feelings in the data collection. Field notes allow for a contextually rich data collection.

The "inquisitive methodology" used to collect empirical data is called credibility and enhances transferability according to Lincoln and Guba [32]. A problematic quality with this sampling methodology is that it may omit certain individuals.

### Apparatus

The first phase included a literature review. The literature review required an academic database for source-finding. The second phase necessitated space for the interviews to take place. Notes were taken during the interview on a laptop computer. The interviews were recorded for transcription purposes. ATLAS.ti was used to conduct the content analysis in the third phase of the study.

## Procedure, Results and Discussion

As with the "Procedure" section, the "Results" are unknown. In accordance with the constructivist anti-naturalist approach there is no hypothesis provided in this study. Hoyle, Harris, and Judd describe a qualitative approach to research in regards to hypothesis testing: "Instead of researchers imposing their own hypotheses, themes, and categories on the participants' responses, the participants relate stories about their lives that enable the researcher to generate hypotheses and themes." The only manner in which a "Results" section could be approached would be via a constructed hypothesis [34]. The assumptions to a hypothesis according to Lincoln and Guba [32] include:

- the belief that there is a law guiding human behavior,
- ontologically humans do not construct reality; rather, reality exists and there is a "truth" that can be identified,
- and the problems one will encounter while completing the study are already known and decided upon before the study begins.

### Perceptions of environmentally sensitive hospitality issues

During interviews all of the participants were asked which reasons existed for the implementation of sustainability measures at their property, nearly all of the respondents replied with similar responses confirming quantitative data found in the literature review. There were three answers that were contiguous with the findings in the literature involving implementation of technologies in the hospitality industry, those where: cost cutting, increased guest services and sales. Another reason was discussed by a number of the participants and that was branding or brand affiliation, however, this is not a major concern to the reasons why IT professionals would participate in finding/ implementing technologies but is more of a corporate rationale.

When asked which 'sustainability measures' have been internalized at the participants property, the researchers chose this specific phrasing to gauge the level of understanding the respondents possessed over the topic of what sustainability is, their impressions of sustainability and how it differs from environmental to competitive advantage in terms of sustainability. Two participants understood the environmental aspect behind sustainability and mentioned efficient lighting and power consumption practices to reduce cost, implying that the environment was an added benefit from participating in these measures, not a primary goal. Another participant was under the impression that sustainable technologies increased the productivity and efficiency of the property using IT technologies (servers, hardware, etc.), resulting in energy savings and reduction in cooling. Through these interviews the researchers were able to gather that sustainability is a topic that is not thoroughly understood in the hospitality industry and when it is grasped, it is not a trend and IT managers are the middlemen for their respective corporation where "the objective is to reduce energy costs, not environmental impact" [35-37].

Respondents were concise with their discourse over the barriers to implementing sustainability strategies. Many of the interviews conducted are indicative of middle level managers not having control over which technologies would be established. Startup costs, along with little support from higher level managers to supply research and development funds for implementation are large hurdles for the IT manager to face, because of the capital problems in the hospitality industry. If there is no initial or visible ROI then no argument can be made for the validity of any project, this is determined by whether

the management believes an initiative to fall under critical needs vs. discretionary spending.

Interview participants also mention the difficulty and number of problems they face if their projects are approved. Primary reasons include the expenses and that these technologies are not ready for the commercial market.

## Conclusions and Discussions

In summation the barriers inherent to the implementation of sustainable technologies resulting in environmental benefits are mainly based on the idea of value engineering. Value engineering is a process where best practices are to minimize costs and maximize returns, countering the idea of sustainable development stemming for issues of practicality because the bottom-line is a priority issue.

In the course of this study the researchers were able to delve into a small segment of the hospitality industry and gather perceptions on the qualitative level in a case study of the Greater Houston area. What the researchers have gathered will be able to aid in the directions of larger studies where more perspectives can be studied. Further points that could be discussed include corporate relationships and how a company reflects ownership, including corporate ethics and social responsibility in upper management and how that translates into the adoption of environmentally and socially responsible practices.

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**Citation:** Sahin B, Kazoglu IH (2015) A Study on Business Ethics and Perceptions of Wage Earners in Tourism. *J Tourism Hospit* 4: 152. doi:[10.4172/21670269.1000152](https://doi.org/10.4172/21670269.1000152)