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Massachusetts
Amherst

Slow roll: A longitudinal analysis of sustainable energy implementation

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Authors	Schneider, ingrid E.;Orr, Madeleine;Qian, Xinyi;Heyn, Michelle;Simmons, Patrick
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Abstract

The importance of adopting sustainable practices in the tourism industry is well established but widespread implementation is still wanting. Institutional theory framed an assessment of tourism professionals' perceptions of constraints and benefits to sustainable practices, as well as actual implementation of energy practices between 2007 and 2016. Perceptions and practices were tracked through an Internet-based questionnaire among professionals in three-year intervals in a Midwestern U.S state. Professionals consistently agreed that attracting new clientele, improving consumer perceptions, and organizational image were benefits of sustainable practices, while initial financial costs constrained implementation. The most frequently implemented energy practices were using daylight and compact fluorescent light bulbs (CFL). Overall, adoption of sustainable practices was varied and implementation rates remained minimally changed. Reasons for the varied adoption and lack of change may be explained by perceived lack of resources, consistent with organizational capacity, or lack of pressure from socio-cultural environment, per institutional theory.

Introduction

Energy use is implicit in travel and tourism. According to the most recent data available, global tourism accounted for 8% of global greenhouse gas (GHG) emissions from 2009 to 2013 (Dunne, 2018), increasing from 3.9 to 4.5 billion tons of CO₂ annually (Yale University, 2019). If tourism does not adapt but instead remains on a business-as-usual pathway, it is primed to be a key driver of GHG contributions (Gossling, Scott & Hall, 2013). Given tourism's relative importance in local and national economies (Bader, 2005; Zaman, Shahbaz, Loganathan & Raza, 2016), as well as the growing awareness and subsequent criticism of its impacts on the environment (López-Gamero, Pertusa-Ortega, Molina-Azorín, Tarí-Guilló & Pereira-Moliner, 2016) questions about sustainable practices are increasingly commonplace (Kelly & Williams, 2007). Thus, improving energy efficiency and conservation in the tourism industry is of great importance (He, Zha & Loo, 2019) to individuals, individual companies, and tourism overall (UNWTO, 2019).

Literature Review

As of 2020, energy-related tourism research is still a relatively small portion of the published literature (He et al, 2019; Ninerola, Sanchez-Rebull & Hernandez-Lara, 2019) and, when conducted, usually is a single snapshot assessment. Existing research focuses primarily on the accommodation sector (Hall, Dayal, Majstorović, Mills, Paul-Andrews, Wallace & Truong, 2003) and on energy-technology (Day & Cai, 2012). Subsequently, opportunity exists to study multiple sectors across time, with consideration to organizational behavior as the driving force of choice to impact overall industry change (Surroca, Tribo & Zahra, 2013). Of particular importance, organizational capacity is essential to understand energy implementation and constraints to such implementation. Organizational capacity takes into account organizational resources and if and how the organization performs over the long term, based on resource use (Linnell, 2003; Wernerfelt, 1984). As organizational capacity is multidimensional and context-relative (Christensen & Gazley, 2008), its use in tourism is both appropriate and opportune. Addressing organizational capacity over time is even more appealing due to the plethora of one-time assessments in tourism research (Nicholls & Kang, 2012).

As such, with attention to organizational capacity, this project assessed implementation of energy practices across time in one U.S. state, addressing calls for longitudinal research in sustainable tourism and an urgent topic of interest, energy consumption. Based on organizational capacity literature, we hypothesized that over time, the perceived barriers to sustainable energy practices would decrease and sustainable energy practice implementation would increase.

Methodology

Tourism organizational energy efficiency and conservation practices were assessed through an online questionnaire to tourism professionals in one U.S. state across time in four years: 2007, 2010, 2013 and 2016. Eight questions focused on perceived constraints to implementation and were measured on a 5-point Likert scale from strongly disagree to strongly agree. Eleven energy practices were assessed using an ordinal scale where 0=No Attempt, 1=Under Consideration, 2=Just Beginning, and 3=Completed/Ongoing (with a "Not Applicable" option). Energy conservation practices included: using daylight to the greatest extent possible, installing window film, and using occupancy sensors. Energy efficiency measures included using Energy Star equipment, using compact fluorescent light bulbs (CFL), replacing PTAC units and LED exit

signs. Four additional items included use of renewable energy sources, providing customers with energy saving ideas, using energy audits and energy management systems. The questionnaire was distributed to listings in a statewide tourism entity database with representatives from lodging, events/festivals, convention and visitors bureaus, and government (2007 $N=2,374$; 2010 $N=3,418$; 2013 $N=3,550$, and 2016 $N=4,090$). A modified tailored design method (Dillman, Smyth, & Christian, 2009) achieved response rates from 16% to 26%, comparable to similar projects (Bohadanowicz, 2006; Nicholls & Kang, 2012). Completion rates ranged from 8% to 19%. Analysis described the extent of practice implementation and assessed significant implementation changes across time with Kruskal-Wallis tests.

Results

Energy practice implementation ranged from 5% to 73% completion across time periods. The most frequently implemented energy practices were using daylight and compact fluorescent light bulbs (CFL), while the least frequently implemented practices were using renewable energy sources and replacing package terminal air conditioner (PTAC) units with more efficient heat pump technologies. Across the four time periods, only two energy practices significantly increased: using CFLs and energy-star equipment ($\chi^2 = 41.55$ and $\chi^2 = 19.52$, respectively). Two practices decreased and then increased between the time periods: using daylight to the greatest possible extent decreased significantly from 2007 to 2010, then gradually increased back to the 2007 level in 2016 ($\chi^2 = 8.06$); similarly, using occupancy sensors decreased significantly from 2007 through 2013, then increased significantly in 2016 to surpass the 2007 level ($\chi^2 = 8.15$).

In terms of constraints to practice implementation, professionals consistently agreed that initial financial costs were an issue and disagreed that customer or staff opposition constrained implementation. Between 2007 and 2016, two perceived constraints significantly decreased: perceived respondents a lack of information ($F=4.04$, $p<0.01$) and a lack of interest in the consumer base ($F=3.38$, $p<0.05$).

Conclusion and Discussion

Online surveys of tourism professionals across four time periods in one state provided baseline and comparative data on perceived constraints to sustainable practice implementation, and actual implementation of energy efficiency practices. In contrast to a resource-based view of organizational capacity and hypotheses, perceived barriers did not decrease nor did adoption of energy practices increase across the four time periods.

Perception differences are both similar to and different from past research and point toward opportunities. Like findings from Font, Garay, and Jones (2016) and Scott, Peeters and Gössling (2010), respondents consistently identified costs as a barrier to energy-related practice implementation. This finding is consistent with the resource-based view (Heckmann, Steger & Dowling, 2016) as financial resources are a core dimension of organizational capacity (Hall et al. 2003; Barman & McIndoe, 2012). Without sufficient funding and perceived financial feasibility, organizations are unlikely to adopt sustainable energy-practices. Also for consideration is the timing of the research which spanned the U.S. fiscal crises in the late 2000s and may have impacted investments in energy-related practices.

Different from Scott et al. (2010), respondents indicated information was increasingly available and subsequently less of a constraint through the course of data collection, and clearly, both local and global information on sustainable practices increased during this time. The differences in these

results from Scott et al. may relate to the single-vs multiple year data collection efforts. Future research can continue to monitor and shed light on the situation. Despite its availability, the information for energy-related practices did not spur action. As such, assessing its timing, content and utility seems warranted.

The wide adoption of using daylight and compact fluorescent light bulbs may be explained by either their low cost or immediate direct savings (Howarth, 2000). Notably, in the United States, entities are highly aware of these practices (Environmental Protection Agency, 2017) due in part to promotion through energy corporations (Brown, Webber & Koomey, 2002) and government information that is widely available. However, the lack of change in the other practices reflects the lack of pressure from the business environment and other stakeholders to adopt sustainable energy practices, consistent with institutional theory (Barman & McIndoe, 2016). Combined with perceived insufficiency of financial and infrastructural resources needed to adopt new practices, the low change between 2007 and 2016 is unsurprising, and consistent with similar studies on adoption of sustainable practices.

This research addresses important literature gaps. Specifically, this work advances knowledge with respect to the adoption of sustainable practices over time. Considering that previous research only offered information at one point in time, this work offers original insight into how adoption of sustainable practices differs over time and the pace of change. Further, given the importance of energy for reducing carbon footprint (Kelly & Williams, 2007; He et al. 2019; WTO, 2019; Zaman et al. 2016) the focus on energy practices is particularly salient and should be a focus of continued research. Energy practice improvements in organizations is considered to be understood and attainable. Repeating this research in Minnesota, and beyond, would be useful to understand if and how adoption is proceeding and at what pace.

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