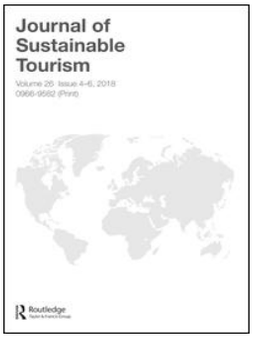

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Sustainability-oriented Service Innovation: fourteen-year longitudinal case study of a tourist accommodation provider

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ABSTRACT

Progressing sustainable tourism requires both an innovative transition from "unsustainable" tourism and innovative research methods to develop theory and concepts for a sustainable tourism. While there are many ad hoc examples of initiatives, there are very few examples of firms systematically recording their medium-term evolutionary progress. This case study of an accommodation provider uses longitudinal data over 14 years, deductive and inductive methods, and comparison with other similar eco-friendly providers, to provide the first exploration of sustainability-oriented innovation by a firm attempting to make transitions. Findings show how important hindsight and insight are for continuous learning, and how broader community sustainability issues influence the owners' worldviews. Both learning and changing views are required to support innovation. A Sustainability-oriented Service Innovation model is recommended, recognising the characteristics of a service industry where innovation can be an organic process led by humans for humans and consequently more fuzzy in its progress than the clearly defined steps that are suggested by previous research. This model seeks to assist researchers and practitioners to better measure innovative progress of service firms, and develop more relevant strategies to ease transitions towards sustainable business practices.

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Service innovation; sustainability-oriented innovation; sustainability-oriented service innovation; sustainable tourism case study; tourism innovation

Introduction

In theory, tourism firms should be investing strongly in innovation research and developing innovative solutions for their future sustainability. As one of the world's largest industries, tourism is expanding at a prolific rate across the globe. Tourism has become a major generator of employment (Global Sustainable Tourism Dashboard, 2017) and has also been identified as an important contributor to cultural and natural heritage conservation. At the same time, the resource-intensive tourism industry already faces significant sustainability challenges with regard to energy consumption and water scarcity, factors that contribute strongly to its cost (Gössling & Peeters, 2015). Evidently, innovation must be a critical component for the long-term commercial success of the tourism industry.

The industry has a clear imperative to become more sustainable through innovation and to apply innovative sustainable tourism research (Bramwell & Lane, 2012). Pressures, for example in relation to energy and water, are felt most acutely among the smaller medium accommodation providers (SMAP). These represent the largest category in terms of business numbers (Hotel

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Energy Solutions, 2011), but often have low energy and water management knowledge and skills (Coles, Dinan, & Warren, 2016). SMAPs are particularly vulnerable to inertia because of their small size: they lack sufficient economies of scale to develop new products (Pikkemaat & Peters, 2006). They also often have a low awareness of sustainability (Tzschentke, Kirk, & Lynch, 2008), a lack of technical expertise (Orfile-Sintes, Crespi-Cladera, & Martinez-Ros, 2005), and are risk-averse (Coles et al., 2016). The motivations of owners play a key role in making progress on innovation (Tzschentke et al., 2008); however, many other factors also influence the extent and success of innovation initiatives, including owners' worldviews, their self-efficacy, beliefs, and their orientations and knowledge (Sampaio, Thomas, & Font, 2012).

Innovation is considered the life-blood of business (OECD, 2005). It is defined as the implementation of organisational learning, new ideas, new processes and products within an organisation (Calantone, Cavusgil, & Yushan, 2002). Innovation is an indication of firm performance (Coyne, 2008) and staff collaboration (Hu, Horng, & Sun, 2009), and it ensures that the business keeps up with, or is ahead of, societal trends. Just like any other businesses, tourism businesses have to innovate and reinvent themselves to remain competitive. However, surprisingly, tourism innovation is under-researched (Hjalager, 2010), with only a small number of sustainability-themed tourist accommodation innovation papers published (e.g. Horng, Lui, Chou, Tsai, & Chung, 2017).

Empirical case studies are needed to understand better *how* small firm owners' values translate into innovative action, *what* successful owners have done and by *when* (Coles, Zschiegner, & Dinan, 2014). To the best of the authors' knowledge, there have been no studies that have considered sustainability-oriented innovation (SOI) applied to SMAPs. This article concentrates on a single case study that offers robust data on a tourism Small Medium Enterprise progress towards greater sustainability over a 14-year period. The study uses sustainability-oriented innovation as the primary conceptual framework, and contributes to existing theoretical models from a service industry perspective. By drawing on the evolution of sustainability innovations and reflections of one operator, we contribute to addressing the shortfall of documented tourism innovation experiences (Omerzel, 2016). A case study approach is highly suitable (Starman, 2013), as it allows comparison of onsite observations and longitudinal data with previously published research on the evolution towards and adoption of SOIs (see Warren & Becken, 2017; Warren, Becken, & Coghlan, 2017; Warren & Coghlan, 2016).

Literature review

Progress in innovation theory has been hampered by inconsistent use of terms, a lack of shared concepts and opportunistic studies (Adams, 2006; Hall & Williams, 2008). Specific conceptual and theoretical interpretations of innovation are comparatively recent (Leger & Swaminathan, 2006). Innovation has traditionally been applied to manufacturing, and has been less well studied in the service sector, which may contribute to its narrow application in tourism (Hjalager, 2010). Identifying typologies is an important first step in social science inquiry and knowledge development (Lambert, 2015). This review briefly discusses innovation theory, reflects on the relevance of service innovations for SMAPs, and examines SOI.

Categorising innovations

There are three widely used approaches to categorise innovations: newness, the area of focus and attributes. "Newness" was assessed by Garcia and Calantone (2002), who identified that innovation can be affected by forces of marketing (new sector or internal skills) and technology (new scientific paradigm or technology). As these forces progress, the degree of newness evolves from "imitative," "incremental" and "discontinuous" to "really new" and "radically innovative." The

most advanced stage, "radical innovations," holds both new technologies and penetrates (or generates) new markets. The "really new innovations" stage replaces either technology or market (but not both) externally of the firm and internally (either or both). The "discontinuous innovations" stage comprises line extensions or new product lines that do not replace existing infrastructures. "Incremental innovations" occur through ongoing product development and "imitation innovations" are new to a firm but similar to existing market products or services (Garcia & Calantone, 2002). It is these last two innovation types that are discussed most frequently in accommodation studies (e.g. Green Lodging Survey, 2017), indicating that accommodation has been reactive rather than proactive towards sustainability.

The second approach to innovation categorisation, the area of focus, consider innovation practices within the areas of product, process, organisation, technology (Adams, Tranfield, & Denyer, 2011) and marketing focus (OECD, 2005). This approach has been broadly considered by Hjalager (2010), although studies frequently only explored one of these aspects (Hu et al., 2009; Jacob, Tintore, Aguilo, Bravo, & Mulet, 2003; Orfila-Sintes et al., 2005). This limits interpretation and knowledge development because innovations often involve multiple areas of focus. Applying an area of focus approach is important because it helps to identify in more detail where a firm concentrates its innovation practices – for example, Virgin Atlantic's areas of focus is on-board technologies and brand identity/tone of voice (The Marketing Society, 2010). By fixing resources on areas of focus, a firm's innovativeness can be enhanced (Salomo, Talke, & Strecker, 2008). Understanding area of focus is particularly important for resource-constrained SMAPs.

The third type of categorisation considers innovation attributes. These are more descriptive properties, features or intangible qualities that reflect people's perceptions of an innovation. Rogers (2003) identifies six attributes required for successful market diffusion for innovation: relative advantage, status (social kudos), rate of adoption, compatibility, complexity (too complex is a negative) and trialability. Comparative service industry research shows, however, that no one attribute is essential to classify an innovation (Adams et al., 2011), as they are independently appreciated and promoted by individuals (Garay & Font, 2012; Greenhalgh, Robert, MacFarlane, Bate, & Kyriakidou, 2004; Pikkemaat & Peters, 2006), and owners/managers adopt innovations at different rates (Coles et al., 2014). Considering innovations by attributes, therefore, requires the researcher to identify important attributes and their interrelations, and their impact on SMAPs sustainability decisions and specific characteristics of service industries as human-focused activities, thus providing a useful framework.

Service innovation

Innovations in the area of service delivery are distinct from manufacturing innovations and are attracting increasing attention as a form of social technology, which divides labour and coordinates through flexible routines (Nelson & Sampat, 2001). The important role played by customers in the process of co-creating experiences also differentiates service innovations from those in other industries (Hall & Williams, 2008). Such co-created activities can contribute positively to sustainability by involving service recipient participation, which stimulates positive experiences (Warren & Coghlan, 2016) as part of social technology. However, such approaches are not common in the accommodation sector because traditional management structures and staff systems restrict guest engagement (Chathoth et al., 2014). "Smart systems" are rarely developed to customise experiences and facilitate co-creation (Warren, 2018). Notwithstanding the important role of guests in resource consumption at SMAPs, service innovation research is still evolving (Horng et al., 2017).

Service firms can be characterised by their level of innovativeness, which among other things reflects their tacit knowledge to co-create with customers by using their practical, observational

and encultured awareness. For example, innovative firms know their customer base and understand how to change customer behaviour to, for instance, choose takeaway coffee in reusable cups instead of disposable, single-use containers. Salter and Tether (2013) categorise three service firm innovations: traditional services firms with a low staff skill level and owners being risk-averse – for example, rural SMEs (Pikkemaat & Peters, 2006); system firms, which apply really new innovations encompassing division of labour, technology and organisation – for example, booking platforms and loyalty programmes (Tsai, 2015); and professional service firms, which innovate through highly skilled labour and close collaboration with clients – for example, training in interpersonal communication (Warren et al., 2017). The lack of progress made by SMAP managers (Coles et al., 2014) may reflect the fact that most businesses fit within the traditional service firm definition. What may be required is a higher level of organisational innovation so staff collaborate with guests, suppliers and education bodies to progress towards sustainable consumption and production.

Sustainability-oriented innovation

The concept of SOI provides a sharper focus to firms seeking to progress towards sustainability (Adams, Heanreaud, Bessant, Denyer, & Overy, 2016). It has been applied to SMEs (Klewitz & Hansen, 2014), though not to SMAPs. SOI is the deliberate action of becoming more sustainable by purposefully improving all functions, products, and services, changing the firm's role within society, and linking sustainable goals and technical methods (physical and social) to achieve a competitive advantage. Both Adams and colleagues (2016) and Klewitz and Hansen (2014) conducted literature reviews that identified characteristics of sustainability behaviour that seeks to make societal change. Strikingly, both reviews acknowledge that technological solutions are not sufficient on their own: collaboration with staff, customers, suppliers and external actors is essential. This makes SOI particularly relevant to SMAPs, where guests are part of the process of sustainable consumption and production (Juvan, Jajibab, & Dolnicar, 2018).

The SOI models developed by Adams and colleagues (2016) and Klewitz and Hansen (2014) used areas of focus, rather than newness (Garcia & Calantone, 2002) or attributes (Rogers, 2003). Both frameworks describe a firm's progression towards greater SOI, emphasising that we should think of this as a progression towards relative improvements in sustainability – hence the term "orientation." Adams and colleagues' (2016) model identifies three stages of SOI evolution that are narrow functions of manufacturing (operations, organisation, and system-building), making them less suitable for accommodation services; however, they do identify the important role of learning and linkages in building SOI expertise. Klewitz and Hansen (2014) separate SOI into a "ladder" of five development steps (see Figure 1), which closely follow the progressive clusters found by Coles et al. (2014) in small tourism firms. Thus, while not being developed directly for the tourism sector, the Klewitz and Hansen framework seems suitable to the study of SOIs in tourism and is adopted in this present study.

In their progression towards SOIs, Klewitz and Hansen (2014) found that firms in the early steps of SOI were merely complying with legislation, and their focus was directed at the process and operational optimisation. Firms in this step will imitate other firms using similar technologies (Horng et al., 2017), or take advantage of legislative opportunities. These steps form the resistant (ignore sustainability issues) and reactive (to external stimuli, with a focus on efficiency) stages, with few internal drivers towards SOI and little deliberate strategy towards sustainability. As firms apply broader actions to seek new markets, they develop greater levels of organisational innovation and enter the anticipatory step. The inherent value of sustainability becomes internalised, and organisational innovation begins to appear. This step involves staff and customers, as firms seek stronger competitive advantage from SOI and introduce increasingly innovation-based strategies – for example, the Marriott supply chain which involves supplier sustainability assessments

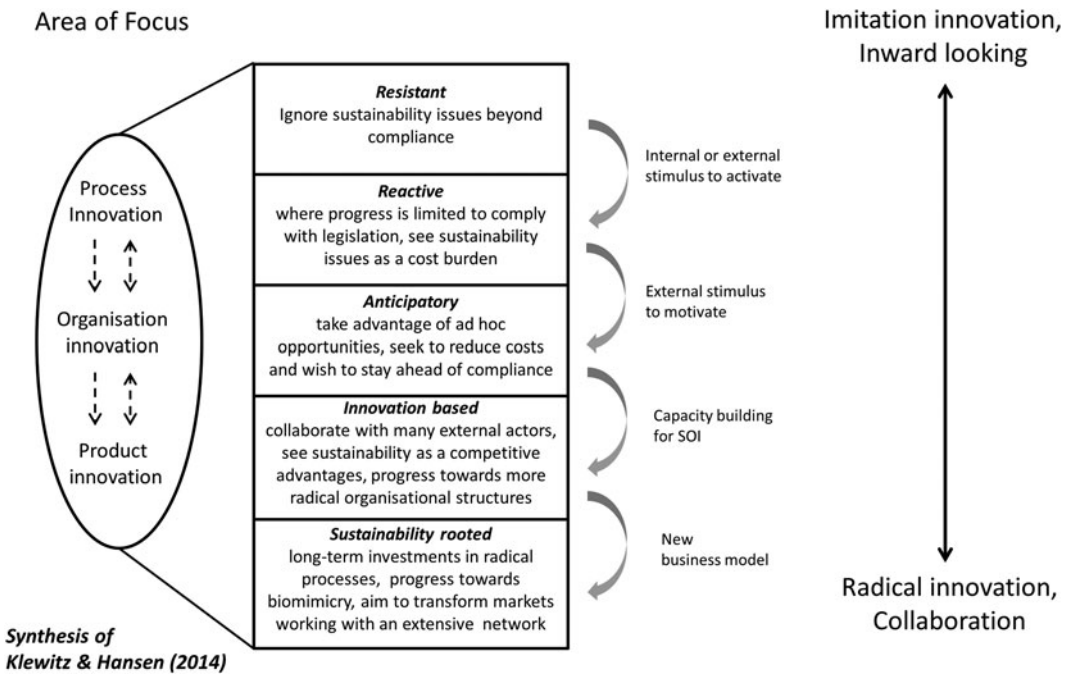

Figure 1. Sustainability-oriented innovation transitions (based on Klewitz & Hansen, 2014).

using a performance index platform with responsible purchase information to reassure guests (O'Neill, 2015).

In further progressive steps, proactive measures, integrative approaches and often a first mover advantage are taken. Firms that apply new business models and achieve higher levels of SOI require the participation of external strategic partners to help deliver their goal to transform markets through institutional change. As firms become more adept at SOIs and organisational learning occurs, and partnerships with external agents are built, we find that SOIs progress towards biomimicry solutions that deliver radical SME innovations. To achieve such system-building progress, increasing levels of staff, supplier and network collaboration are required, and most importantly willing customers who value the proposition are cultivated. These might become "social technologies" (Nelson & Sampat, 2001), which are crucial to the firm's progress from being inward-looking to implementing radical innovation.

Research gaps and approach

Models such as Klewitz and Hansen's (2014) offer frameworks to explain how SMAPs progress towards the adoption and implementation of SOIs. However, earlier research often focuses on literature reviews, conceptual papers or secondary data (e.g. Hjalager, 2010; Omerzel, 2016). Few papers offer empirical data on SOIs and only one was identified that provided longitudinal insights into SMEs' adoption of SOIs Moreover, little or none of the research into SOIs in tourism adopts the type of longitudinal research that could test developmental frameworks as shown in Figure 1. Making the transition between steps is a key area for future research to better understand what types of capabilities and learnings influence SOI evolution (Adams et al., 2016). For SMAP, we need to know how hindsight stimulates sustainability insights: do managers apply oversight learning from their actions to generate foresight for sustainable progress, and what is the context that drove their innovation, whether through creativity (Simonton, 2012) or formal structures (Kaivo-oja, 2006)? This study, therefore, adopts a longitudinal methodology to address

a lack of research into how progression to radical SOIs in tourist accommodation occurs. Our research questions are:

1. Can the SOI model be successfully applied to a real-life SMAP context, using the steps presented by Klewitz and Hansen's framework?
2. Does doing so generate new insights regarding the SOI behaviour and innovation type within SMAPs?

Method

Research framework

To answer these questions, an exploratory approach is required that generates in-depth data. Our method follows steps recommended by Doorewaard (2016) and integrates related previously published research (Warren & Becken, 2017; Warren et al., 2017; Warren & Coghlan, 2016) and conceptual themes into a coherent innovation framework.

Case study design

Case studies can help explain the nature of SOI, which quantitative data alone cannot do (Hjalager, 2010), and they have been used to study organisational innovation in hotels (Bayraktaroglu & Kutanis, 2003). Further examples of SOI case studies can be found in the grey literature, although these often represent descriptions of particular initiatives without explaining the "how" and the historic evolution of innovation. A longitudinal case study approach allows for a better understanding of operational issues, the challenges for owners and the approach taken to design social technologies for value creation (Smith & Ng, 2013). Beeton (2005) argues, however, that while case studies can offer holistic inductive insights from a specific site, they should rely on multiple sources of evidence, be complete and consider alternative perspectives. This study, therefore, combines both a deductive and inductive method that relies on qualitative reflections guided by existing frameworks (allowing for new insights) and quantitative data on resource use to ascertain the impact of different SOIs.

The case study approach has known limitations of generalisability, particularly because the author is both researcher and owner of the property in question, and so part of what is being studied. However, taking a deliberately reflexive approach, this research provides the insights from the perspective of the person applying SOI, noting that, "Preconceptions are not the same as bias, unless the researcher fails to mention them" (Malterud, 2001, p. 484). To address this limitation, the researcher(s) disclose motive, background and perspective in order to provide transparency and validate their interpretations and analysis by considering alternative views. The authors' motives are to contribute to SOI theory and tourist accommodation policy development for SMAP. The main author has a background of commercial practice. To avoid bias and ensure reflexivity, transferability and strength of interpretation and analysis, the author has applied the following procedure (Malterud, 2001):

1. Prepare notes while examining the data to assist self-analysis and observations.
2. Systematically go through key projects with the co-owner.
3. Compare and reflect on the multiple discussions/observations held with other similar eco-friendly accommodation with which the author has worked in the same community (training session, carbon audits, public meetings, site visits).
4. Decontextualise materials to consider issues and patterns and compare analysis with the above steps.
5. Account for SOI costs, savings and income through discussions with the accountant.

This is a longitudinal study as defined by Starman (2013), looking back over the duration of ownership from 2003 to the end of 2017. This longitudinal study used data from 14 years, including reports, documents, financial reports, emails, award submissions and accreditation documentation, the company manual, finished guest materials, website direct observation and carbon audits of neighbouring accommodation businesses, ServQual surveys, and analytical memos. Data that was systematically collected falls into two categories (i) resource use since 2006 collated on a quarterly basis and carbon emissions calculated for each quarter and divided by total number of guest nights; and (ii) reports, official council/government documentation and emails for the operation of the business and socio-environmental community projects, including the Green Kangaroo carbon calculator.

Site description

The case study site was Crystal Creek Meadows in Kangaroo Valley, New South Wales, Australia. The property has four 4.5-star-rated cottages that can accommodate 14 persons. During the research period, the SMAP was not marketed as an eco-resort. Potential customers are attracted by the rural setting, interior comforts, children's activities, day spa services and self-catering facilities. The buildings are between 10 and 30 years old, using timber frames and boards; the energy mix is electricity, LPG and firewood; rainwater is harvested. There is no specific seasonal peak (temperate climate) as the property is located two and a half hours from Sydney and Canberra. The property is hosted, with a management team living on site. Comparisons with other local accommodation are made and can be found on www.visitkangaroovalley.com.au; they share the same climate and occupancy trends, energy mix and guest motivations for short breaks.

Findings

Question 1: Can the SOI model be successfully applied to a real-life SMAP longitudinal context, using the steps presented by Klewitz and Hansen's framework?

Reactive: 2003-2005. The first stage, "resistant," where sustainability is ignored, was characterised in this case study by business decisions around budgeting and increasing the natural beauty of the property as a core feature of the business, and was central to its marketing. In reviewing data from that time, it is clear that the owners established the family-run enterprise to enable them to bring up their young family in a rural community. Neither partner had any formal training or tacit knowledge of the environment beyond a visual appreciation of nature. Nor did they have formal hospitality training, but they had been professionally involved in service industries prior to taking over this business.

In hindsight, the documents from this establishment period, reminded the first author that many building codes were seen as barriers (e.g. BASIX and accessible toilets), as official documentation did not provide an explanation/benefits for action. The owner-builders licensing process contained little information on thermal comfort, climate conditions and reusable materials from sustainable sources, renewable water opportunities or how to optimise solar panel location, so these were poorly understood and minimal planning for sustainability occurred during this stage. Moreover, while the environmental considerations for development approval covered native flora and fauna, the context was not overtly relevant to land that had already been cleared for farming by previous owners, and other than wastewater there was no reference to sustainability criteria that could have guided the owner. Indeed, few SOIs were implemented during this stage and (a full breakdown of all the projects is available from the first author). Examples of SOIs, in this case, were the development of a business strategy (organisational SOI)

and garden landscaping (product SOI). Contrary to the SOI model in Figure 1, the data did not show an emphasis on process innovation during this time.

Anticipatory: 2005-2007. Promotion became the firm's primary focus following completion of two new cottages and some garden development, and adoption of SOIs was for competitive advantage. A two-pronged marketing approach was taken, building service quality on a "generous hospitality" ethos (ample supply of provisions and amenities) and offering guests a two-tier tariff system with a higher priced option offering a locally sourced breakfast hamper. This required the design of a booking sheet that also permitted personalisation of guest stay requirements. A tentative entry into the local tourism awards was made to raise awareness of the business.

The owners attended an aromatherapy course to make personal care products and provide massages in order to create a demonstrable nature connectedness for guests with gardens that carried exhibit plants. A wastewater treatment system had already been approved as part of the development approval for the additional cottages, so the owners took advantage of the opportunity to plant citrus trees using this grey water and the citrus orchard was incorporated into the landscape architectural plans. While the landscape architect might have viewed this action from a sustainability perspective, the owners were unaware of such an approach. Projects to save energy were ad hoc – like roof ventilation and insulation, and key tags in the cottages. While these were cost-saving moves, quarterly electricity, gas and wood fire bills were paid but not analysed or compared, so there was no hindsight, and no resource baseline to generate insights. Thus, while energy-saving actions had been taken, their impacts were not analysed.

Attendance at state tourism workshops and feedback from local tourism judges raised the owners' awareness of improvements that could be made to the visitors' experience, in particular creating authentic experiences. Guests were encouraged to collect their food scraps and feed them to the chickens; however, no connection was made to reducing methane from landfill. It was seen as a guest experience rather than a carbon-reduction system. In reviewing the business's 2005 eight one-day itineraries comparison chart, it was clear that a number of ecotourism experiences were packaged with the firm's product to meet forthcoming state government marketing opportunities, but there was no sustainable proposition regarding benefit distribution or local partnerships. No link was made between accommodation business practices, the nature-based setting, and sustainability, as demonstrated in the business's customer service manual (Crystal Creek Meadows, 2005):

> Our Identity. How We Do It. Personal attention that provide the added touches to ensure guests enjoy a very relaxed holiday. We ensure that they accommodation is pristine, that guests enjoy little touches of charm and indulgence while located in the most beautiful gardens with magnificent view of Kangaroo Valley.

In summary, examples of SOIs in this stage included greater eco-efficiency through house and cottage veranda insulation (Organisation SOI) and a charity programme directed at the local community (marketing). More SOIs were implemented during this stage than in the reactive stage, with the primary focus of conserving the local sense of place as one of the owners had lived in the United Kingdom and learnt that heritage had a value.

Innovation-based: 2007-2010. This step was marked by proactive solutions to environmental and social issues, as well as by innovation designed to establish a first-mover advantage. It appears that this period saw a shift towards a better understanding of sustainability. In this stage, the SME sought institutional change by encouraging greater sustainable tourism collaboration. It was during this period that the most process innovations occurred. The State Tourism Awards were an important stepping stone to greater innovation because they provided a self-guided submission format with advisory tips on risk management and good business practice, which might be

new to the firm. The owners attended award-related workshops that explained the importance of visitor experiences. Together, these lessons guided the owners to emphasise home-made products, local attractions and sponsoring the bush poetry competition.

The owners' learnings about community and environmental sustainability factors also grew. They gained an appreciation of promoting the nature experiences responsibly through information sheets (e.g. on walking, biking and canoeing), which included a visitor code of conduct and were shared with community tourism groups, and had the foresight to reduce carbon by offering guests the use of free bikes and the opportunity to plant trees:

> *Newsletter, 2008:* Holiday in Neutral. Crystal Creek Meadows is now officially a carbon natural tourism business & residence so spending your holiday here won't harm the environment. Plus if you want to offset your journey here, we offer a tree planting CO_2 programme for only $3.50.

The State Tourism Awards submission became a surrogate annual action plan and the owners' self-efficacy grew as they became aware that their sustainable practices were appreciated by Awards judges and the local council The effort to comply with an ecotourism accreditation scheme resulted in a marked jump in SOI activities in 2008.With the business focus placed increasingly on customising bookings and on building a rapport with guests, the owners began to improve their social technology expertise. Telephone bookings were encouraged, enabling owners to recommend activities and later advise guests during their stay, evolving the firm towards a Professional Service Firm, which has contributed to its strong social media review ranking.

From 2007, the owners' worldview changed after three local environmental events occurred: community action against proposed increasing height of local dam; cutting down an avenue of 96 mature trees (*Kangaroo Valley Voice*, 2007); and experiencing an extended drought, highlighting the issue of finite resources. While the campaign to protect the trees failed, the events emphasised a community capacity gap and the campaign's media coverage increased the owners' self-efficacy to articulate social sustainability values.

With increasing climate change media coverage and community debate, the owners gained greater insight into the need for more community action. In his role as president of the local community tourism group, the first author commissioned a carbon calculator (Bray, 2008). The owners conducted carbon audits for their firm and 24 other local businesses, which gave them positive mastery of the topic, and they subsequently were invited to speak at over 20 public events across the country (e.g. Cradle Coast "Shades of Green Forum," 8 August 2009). However, there was no ascertainable competitive advantage from reducing carbon emissions as the methods were not well understood by guests. Thus this stage was motivated primarily by valuing sustainability, gaining insights into the firm's operations and a desire to solve environmental and social problems. The size and scope of SOI implementation was extensive during this stage, with the major learning being an oversight for a more integrated approach towards sustainability.

Sustainability rooted: 2010-2017. In this step, we expect to see business models firmly rooted in sustainability principles, as well as strong interactions with external actors, and new innovation principles such as biomimicry. Indeed, it was during this stage that one of the owners undertook a Masters degree in responsible tourism management. This new knowledge enabled an additional income stream from consultancy and a stronger engagement with external agents. The new expertise gave the business the foresight to conduct informal guest behaviour observations, establishing a resource baseline and monitoring records to establish carbon emissions on a quarterly base backdated to 2006–2007. The monitoring also included the results of earlier eco-efficiencies. Clearly, the firm had reached a "green ceiling" where either the technology was not available or it was unaffordable. There were further barriers, such as low guest uptake of the firm's public transport incentives (e.g. Evidence-Based Trial; Warren, 2012, p. 58), high guest

resource use without thought of consequences (e.g. using large quantities of firewood) and the termination of government renewable energy grants, resulting in a decline in the number of community members using the carbon calculator.

As capabilities evolved, the projects became more structured to reduce the firm's resource use through guest participation, which enhanced the firm's innovativeness and competitive point of difference. This occurred through comparing past experiences, analysing current issues through the lens of sustainability (as a result of formal education) and ascertaining how it could be applied responsibly through reflection and self-analysis. For example, the manager's residence was included within the business carbon footprint, a foresight that enabled a comparison between the manager's impacts (transportation) and the firm's green message. The combination of explicit knowledge (accreditations/degree) and tactic knowledge (observation and reflection) enabled the owners to identify activities that needed to be addressed (Warren, 2011) and invested in (e.g. trial of smart electricity monitor). Observation of, and informal conversations with, guests, together with ongoing research outputs, also built the owners' insights and confidence in guest engagement (e.g. explaining the carbon benefits of guests saving food scraps) and encouraged them to design more complex experiences (e.g. a cradle-to-cradle model of a firewood plantation, changing the size of logs in the cottage fireplaces and briefing guests in detail about firewood use). Indeed, almost half of all the product innovations occurred during this time, in line with SOI model. This also included advocating for widespread risk-management from bushfires and building rural tourism's resilience by working with the NSW Tourism Advisory Council:

> 17 December, 2013: Key Priority 5/point 4: Destination management plans carry a comprehensive risk management plan including for extreme weather events and bushfires

This was in addition to collaborating with Rural Fire Service to run a Bush Fire and Tourism Seminar in 2013 and publishing a Bush Fire Preparedness Plan for Tourist Accommodation (ICRT, 2013).

Confidence was built from multiple learnings converging to direct guest participation in co-producing their sustainable accommodation experience. Utilising their experience of building rapport, the owners began to approach guests directly, asking them to be mindful of resources (e.g. water use in droughts), and suggesting the use of bicycles to explore local areas. The feedback from these approaches led to a really new smart service innovation that encouraged coproduced guest participation. It required collaboration with experts in software, metering and collaborating with other accommodation providers around the world (UNWTO, 2016; Warren, 2018). During this stage, there had been a progressive integration of all the previous ad hoc, opportunistic and strategic amenities and services, enabling the firm to move towards biomimicry through social technology involving guest participation and co-created experiences.

Summary

In summary, the number of SOI activities (Figure 2) surged in 2008, at the time of the first accreditation compliance period, and State Tourism Award submissions, as well as the resources and focus of the business, were directed to guest engagement. Some activities covered more than one year – for example by providing policy contribution to the local tourism community (12 years) (Shoalhaven Tourism Board, 2011). Furthermore, the cut-off between each stage could not be established clearly, based on the types of SOI being implemented at different times.

Figure 2 shows how the evolutionary progress is not synchronised cleanly for each SOI phase. The reactive phase was relatively short, and also involved projects that were anticipatory and innovation-based. As outlined in the methods section, projects were categorised by comparing the nature of the project, by making notes, checking data (systematically reviewing key projects and discussing with co-owner) and reflecting on the owners' intentions, and comparing with

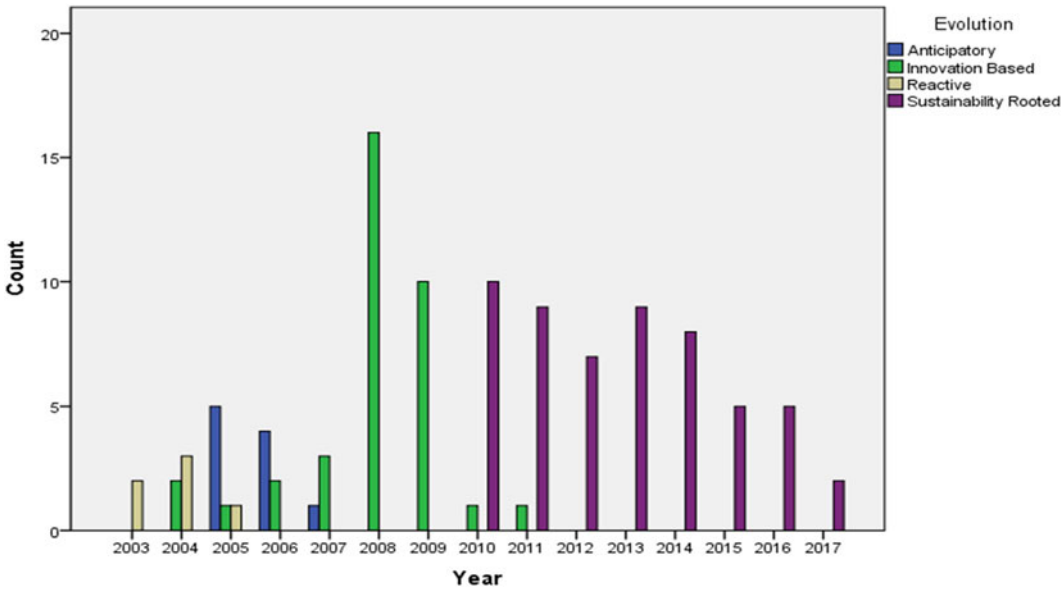

Figure 2. Transitions from reactive, anticipatory to innovation based and sustainability rooted SOI.

other local tourism firms, considering the owners' goals for the firm at that time (Malterud, 2001). In each of the three examples from 2005, the goals were clearly different, and while they can be matched to the SOI framework, they show that several stages may overlap temporarily.

Question 2: Does applying the SOI model to a real-life case study generate new insights regarding the sustainability behaviour and innovation type within SMAPs?

The above chronological analysis tested observations against the expected pattern as provided by Klewitz and Hansen (2014). Identified overlaps and gaps will be expanded upon in the discussion. The second objective of this retrospective longitudinal study was to assess whether applying such as model allowed additional understandings and explanations on SOI behaviour and innovation type. In particular, three specific sub-questions could be addressed:

1. Grouping innovations
2. Challenges and how they were overcome
3. Evaluating SOIs, opportunities for the service sector

Grouping innovations. Based on the literature, the SOI area of focus identifies in more detail the types of innovative practices upon which a firm concentrates. Klewitz and Hansen (2014) categorise SOIs into process, organisation, and product, and for this study, an additional marketing category has been included (OECD, 2005). Marketing SOIs in tourism is believed to be a key driver of product development for sustainable tourism (Font & McCabe, 2017). To provide a greater understanding of the area of focus, the authors considered whether further patterns of innovation types could be identified within the organisation, process, product and marketing categories. Doing so revealed eight different themes, some of which were more likely to be associated with a particular SOI category than with others (Table 1). For example, organisation SOIs related more often to knowledge, process SOIs were often linked to eco-efficiency, and both product and marketing SOIs were linked to guest engagement. The implications of these varied types will be further explained in the discussion section.

Table 1. SOI project types and SOI focus.

SOI	*n*	Organisation	Process	Product	Marketing
Guest engagement (reaching out to customers)	29	2	9	10	8
Knowledge (benefiting from explicit knowledge – for example, training)	24	14	5	3	2
Eco-efficiency (saving resources)	14	3	11	0	0
Plan (preparation of business, marketing or service involving cognitive assessment)	10	6	3	0	1
Community (external projects in Kangaroo Valley village)	9	4	0	1	4
Construction (building new structures on site)	8	5	0	3	0
Policy (influencing tourism policy at local, state and federal government levels)	6	6	0	0	0
Renovation (retrofitting existing structures)	7	1	3	3	0
Total *n*	107				
% share		38	29	20	14

Table 2. Projects by triple bottom line and focus.

	n	Organisation	Process	Product	Marketing
Environment	51	19	22	6	4
Social	35	16	6	9	4
Economic	21	6	3	5	7
Total *n*	107				
% share		38	29	20	14

Each project was also categorised from a triple bottom line perspective (Table 2). Sustainability is a complex concept that requires broad knowledge across social, economic and environmental considerations. Studying a firm's triple bottom line approach to innovation is, therefore, an indication of the owners' applied learnings (Adams et al., 2016). Our findings showed a strong bias towards environmental practices (48%), followed by social (33%) and economic (20%) – a similar result to that of Klewitz and Hansen (2014). Findings show this environmental emphasis was primarily through process and organisation, while social innovations were developed primarily from organisational innovation and marketing concentrated on economic projects. These findings would reflect the owners' capabilities, indicating both areas for improvement (Adams et al., 2016) and marketing strengths (The Marketing Society, 2010).

Challenges and how they were overcome. Another outcome of systematically reviewing the chronology of SOI implementation within the context of the managers' knowledge, values, experience and other factors (Q1) was that this reflective process provided a deeper comprehension of the challenges associated with SOI implementation. These challenges were classified into four groups: time, human resources, newness and finally complexity. These are explained further below.

New concepts require additional time and energy over and above "normal" business. For example, after installing solar panels the firm was not permitted to buy green energy from the NSW Government. It took time to find an accredited energy supplier to accept a supplementary payment for renewable energy as a grid supply top-up. Solar panels have to be cleaned and inverters checked regularly: occasional voluntary overseas visitors (WWOOFAS) were assigned these additional roles. Conducting quarterly and annual comprehensive audits for carbon emissions required additional time. Solutions were found, such as automating expenditure by code number so it was picked out in the monthly expenditure transactions, but this was only partly effective as some expenditure (firewood) was paid by cheque. While the State Tourism Awards were important contributors to knowledge and morale boosters, considerable time was required to prepare and submit entries.

Additional human resources became a solution to the time limitation. One solution was to arrange a university work experience student to stay on site. After training, they became valuable

support. However, sourcing a student, training them and ensuring a harmonious home life with WWOOFAS (and with the owners) while working on site proved domestically stressful from time to time. Overcoming these challenges required flexibility from everyone involved. The owners found other challenges where peak bodies poorly understood the relative advantages of sustainability. Only with the support of the local community tourism group was it possible to introduce a degree of SOI. However, when the owners reduced their involvement in community projects in favour of other long-term research work, the original organisational innovations regressed. The inconsistent quality of students and WWOOFAS meant that training had to be repeated regularly, and jobs were not always automatically transferrable. Solutions included detailed manuals, longer briefing sessions, and reduced expectations.

Third, the level of newness of an innovation – not only to the managers, but also to the part-time staff, volunteer WWOOFAS and students – meant organisational practice was often changed, resulting in feelings of frustration for one of the owners. This often required additional training time to explain changes to part-time staff who may not be familiar with or motivated by SOIs. For example, with waste management, introducing dedicated composting, cardboard and newspaper recycling bins required training staff and advising guests, bin checks and rewriting food scraps bucket information. Good composting alone requires skill compared with easy disposal of waste to landfill. Individually, such a matter might not be questioned; however, new organisational innovations led to changes in daily routines. For these reasons and others, seeking social technologies becomes difficult with temporary staff and changing projects.

Finally, the complexity of the SOI also led to many challenges. Satisfactory results were not always achieved because, as SOI activities increased, support from temporary staff added to complexity and mistakes (e.g. over-ordering of local food). The greater awareness of climate change risks (bushfire threats) and the firm's resource constraints sometimes seemed to represent insurmountable challenges. This was compounded by increasing legislation (e.g. water testing) with which the owners complied, but in the knowledge that others did not because it was not strictly enforced. Contradictions in building codes added costs and frustration. Poor advice deflated what originally had been thought to be good initiatives (locating the generator by the power pole, only to be told by the fire chief that surrounding pine trees were the primary risk). The positive guest response to requests to participate in saving resource was a successful demonstration of social technology: it integrated pro-environmental amenities and boosted the morale of the managers so that there was a sense of all the cogs turning together and not pulling in opposite directions.

Evaluating Sustainability-oriented Innovations. A holistic triple bottom line approach was taken to assessing results from SOI (Table 3). Carbon footprint auditing commenced from 2006. Energy types were converted to kWh and renewable energy assets. Environmental impacts over the following 11 years resulted in the firm halving electricity, reducing LPG by 30 per cent and petrol by 20 per cent while doubling firewood consumption.

The energy mix moved from almost totally non-renewable at the beginning to one-third renewable (electricity, firewood). The solar farm's output to the grid has not been included as a corresponding amount was purchased based on the NSW energy arrangements at that time. Electricity was reduced through eco-efficient technologies (pumps, lightbulbs), firewood increased as more fires were added to provide an alternative to reverse-cycle air-conditioners and improve the guests' experience with the thrill of a real log fire. LPG for hot water reduced due to smaller bath sizes and water restrictions. Petrol use reflected changes in cars, the number of journeys and preference given to home deliveries. Likewise, organisational SOI was involved in reducing landfill by three-quarters, achieved by preventing waste (packaging) and guests feeding their food scraps to chickens. However, as the firm pursued knowledge, the number of flights increased. The overall impact has been to cut carbon by 68%, which still leaves 4.05 CO_2 kg per

Table 3. Key sustainable tourism indicator results.

Environmental	2006–2007	2016–2017	Social	
Electricity (kWh)	32,717	16,952	Aboriginal events	3
Firewood (kWh)	2100	4500	Awards (international, national, state)	12
LPG (kWh)	12,240	8568	Community carbon calculator	24 members
Petrol (kWh)	47,035	38,063	Education staff and school field visits	5
Total energy (kWh)	94,092	68,083	Interpretive heritage walk and wooden benches through village	8 signs, 6 benches
Non renewable	97.80%	68.50%	Sponsorship of local poetry competition	7 years
Renewable	2.20%	31.50%	Campaign for conservation of local wooden suspension bridge	Restored
Landfill (L)	37,440	10,400	*Economic*	
Flights	4	14	Local procurement in region	79%
CO_2 (kg) (a)	10.68	4.05	Expenditure directed to small and micro firms	58.5%
Waste water quality	Approved	Approved	Annual additional guests expenditure in local area (b)	$550,000
Trees planted by managers	80	2500	Total donations (c)	$61,329
Trees planted by guests	0	421	Multiple added value options maximising booking income (d)	Tripled EBIT
Bird species sighted	20	95	Occupancy	69%

(a) Scope 1, 2, and part 3 including managers residence personal flights [carbon factors 0.89 × kWh, 3.35 × kg LPG, 0.021 × kg firewood, 1.912 × L E10 fuel, 0.137 × L landfill, 330 × number of flights over 1600 km] and car use per person per night; (b) based on survey conducted in 2006/2007 and 2016/2017 spend over and above to accommodation and petrol; (c) commenced 2005; (d) earnings before interest and tax.

person per night. As the business expanded the number of cottages, a new aerated wastewater system was installed; council inspections have passed wastewater quality throughout the period, which has seen guest numbers rise. Low levels of chemical use and a tree-planting programme have resulted in a significant number of new birds appearing on site.

Social impacts have focused on community and guest engagement with Aboriginal events, school field trips, creating a village interpretative walk and designing a carbon calculator shared with the community, and helping 24 competitor firms to conduct carbon audits. The most significant organisational project was the campaign to restore the local heritage bridge and install interpretation. The economic projects involved a dual tariff system, which promotes local food and handmade spa personal care products, donations and procurement policies, and guest engagement and encouragement to buy local. Overall impacts have seen earnings triple and the economic impacts passed onto local suppliers and attractions.

Only through annual monitoring have insights led to an overview of the firm and a perception of what was significant to tackle next, by resource reduction, positively enhancing the property (tree planting), building good community relations (social activities) (e.g. The Big Picture Report 2016–17; Warren, 2017). However, the returns on resource input to progress nature and social initiatives are not quickly apparent, and comparable economic returns are unclear. Consequently, if resources are stretched, selecting initiatives can cause friction between owners. The costs of the projects were also calculated using invoices or reports (Table 4). It was decided that if the project was solely SOI, then all costs were allocated; if only an element was SOI, then only that cost was attributed. Also calculated were savings from reduced resource use and income benefits from SOI. The most notable income benefit was selling local produce and homemade products, sustainable tourism award prizes, and consultancy. This additional income was valuable in building confidence in engaging guest participation and co-produced experiences. The largest cost saving has been energy estimated at over AUS $20,000 over nine years. The

Table 4. Direct expenditure, savings and income from SOI.

Category	Expenditure (A$)	Savings or income (A$)
Guest engagement	19,607	36,489
Knowledge	92,760	184,000
Eco-efficiency	58,630	57,702
Plan	0	72,000
Community	3800	1000
Construction	51,796	23,000
Renovation	49,297	(included in eco-efficiency and guest engagement)
Policy	600	43,000
WOOFFA, intern costs	38,800	
Total	**315,290**	**374,191**

financial summary includes tradesmen's labour costs and materials, but excludes the owner's time. The capital expenditure associated with SOI was A$315,290, the direct savings A$190,191 and additional income from sharing knowledge through consultancy A$184,000. The costs for the support staff, which permitted the owners to take progressive SOI steps, have been calculated as a separate line item. The owners' salaries and costs have not been included as they are pre-existing overheads.

Monitoring and measuring on their own do not appear to be sufficient for managers making SOI decisions. Had the owners conducted a concurrent cost and time analysis, taking a long-term view, greater efficiency and focus might have been achieved. However, this reflection benefits from hindsight and a greater knowledge, which was not self-evident from the beginning.

Discussion

This study had two research goals: to determine whether the SOI model could be applied successfully to a real-life SMAP context; and to establish whether this could generate insights regarding sustainability behaviours and innovation type. With growing calls for sustainable tourism development, there are very few research examples of SMAP innovation to assist theory development and policy design. This lack of understanding makes this single case study a valuable contribution to better understanding and reflecting on the evolution of sustainability in SMAPs, particularly as it traces the evolution of that business along the ladder of SOI, covering each step listed by Klewitz and Hansen (2014).

Klewitz and Hansen's (2014) framework is developed by aggregating findings from 84 papers. It clearly delineates progressive steps from resistant to sustainability-rooted innovation and defines the triggers that enabled those steps. The SOI model's sustainability behaviour stages were applied to this case, although we found that the tightly defined steps were not homogenously delineated across time, nor were they as sharply defined as in the model (see also Adam et al., 2016). This is because the owner's knowledge, values and resources were not evenly split in the same way across the firm. This led to different sustainability behaviours applied, on occasion, during the same time period. Thus drivers and barriers did not trigger the sustainability behaviour to innovation in a systematic manner. The SOI model is a helpful foundation for better understanding the progression, but longitudinal analysis shows a less defined profile. It was the owners' changing learnings and worldview that were the essential levers to transition to progressive SOI stages. If the owners had not analysed past information and current sustainability issues, they would not have learned enough to gain an oversight of the firm's impacts and their complexities. This led to the informal understanding that consumption and production needed to be adjusted for both organisational innovation and social technologies, rather than relying on hard technologies and waiting for policy developments.

The SOI model uses area of focus to categorise innovation-related activities. It was applied to the case's projects but did not match previous findings, insofar as the reactive phase did not

strongly involve process innovation. However, this may be because selecting a project's innovation type can be fuzzy (Klewitz & Hansen, 2014). Area of focus is therefore context specific and might be interpreted differently from manufacturing or service industry type, which makes area of focus less precise in terms of correctly assessing the firm's strengths and weaknesses.

We wanted to understand this better, so we coded projects into types which were more descriptive (e.g. guest engagement) and cross-referenced them with area of focus (Table 1). The original SOI model did not provide this level of analysis. For a researcher to understand the specific characteristics of a firm's innovations and its owners' values and goals, a deeper level of interpretation may be required than area of focus along traditional lines. The benefit for further analysis has been illustrated (Table 1), as we have demonstrated specifically how this firm specialises in innovation that involves guest engagement, knowledge and saving resources, thus revealing strengths – but not from a marketing perspective. Likewise, cross-referencing triple bottom line with area of focus (Table 2) again spotlights the firm's sustainability beyond the dimension of a single innovation type and can be comparable to its triple bottom line results (Table 3).

In summary, the SOI model can inform "real-world" cases but requires deeper analysis to identify the firm's strengths and weaknesses. This is pertinent because Klewitz and Hansen (2014) suggest that future research should focus on identifying SME unique advantages to achieve radical innovations, and in particular to consider business-to-customer markets. We propose a modification to the SOI model for service industries called Sustainability-oriented Service Innovation, which shows sustainability behaviours with fuzzy boundaries because they are not rigid progressions. The new model has a fuzzy frame because sustainability is an evolving field in terms of its social, policy and science dimensions (Figure 3).

Sustainability-oriented Service Innovation progress is made through learnings, formal education and collaborations. Importantly, all of these influence worldviews. These stimulate owners through hindsight and insight, to give them an oversight of their firm's standards and the foresight to take transitions from reactive to sustainability-rooted SOI by overcoming challenges of

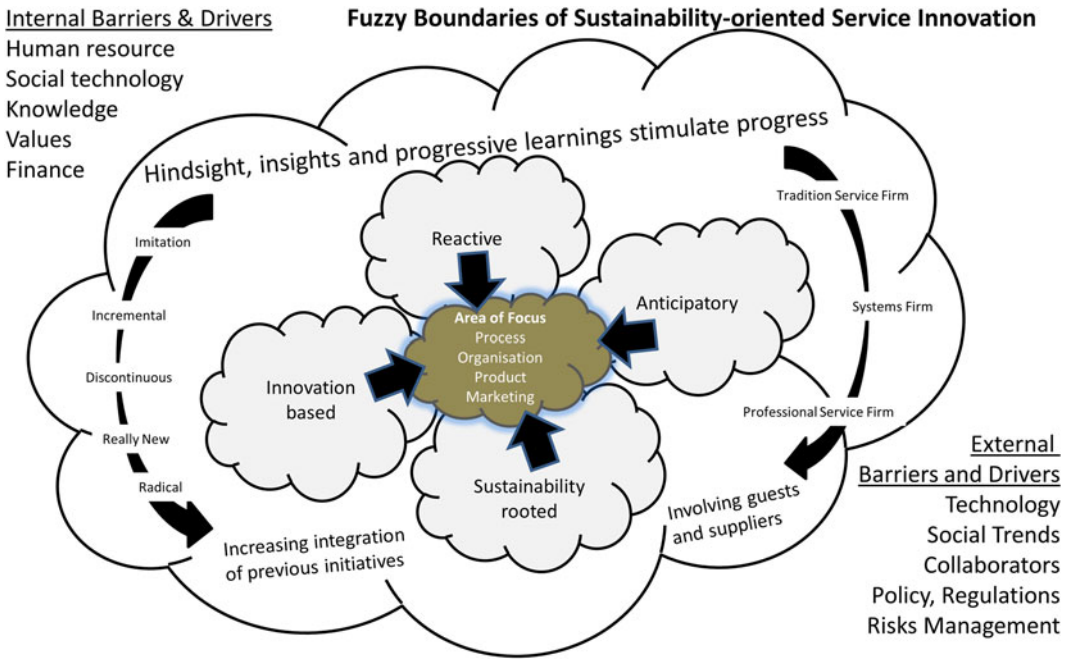

Figure 3. Sustainability-oriented Service Innovation model powered by the application of hindsight, insight and progressive learning.

newness and service delivery. Learnings increase service industry skills that help to develop strategies for risk management and customised use of hard technology. The greater the guests' personalised involvement, the greater their level of self-motivation to be part of a social technology. Researchers can adapt area of focus, reflecting a context influenced by internal and external barriers and drivers. Sustainability-oriented Service Innovation is an organic process led by humans for humans, a co-created process, and supported by technology. As progressive new steps are taken, each builds upon the one before, propelling increasing integration – but not uniformly, as context, resources and knowledge accentuate or defuse strategies.

We can improve our understanding of sustainability behaviour by considering newness and service innovation types. We justify this SOI adaption for SMAPs because our findings found newness to be an important driver and barrier, yet newness was not identifiable in area of focus. The capacity to manage newness is relevant to SMAPs because of their lack of resources: many small firms are lifestyle enterprises involving an older generation who might be less prepared to try new technologies (Coles et al., 2014). Some medium-size firms may follow traditional management approaches, which may limit innovation (Chathoth et al., 2014). However, newness challenges can be overcome through improved capabilities and learnings, which help the transition to another SOI stage. They depend on the manager's relative knowledge to provide insight, their application of hindsight, how much they have to learn, what support is available and how these factors provide oversight to influence their worldview. This makes collaboration with like-minded people (from the community or trusted peers) a key consideration in sustainability behaviour. A forward-looking vision then becomes a central element in service industries as a social technology, where guests must also participate in sustainability behaviour to achieve sustainable consumption and production outcomes. This makes social technology an important research focus for sustainability and service innovation type and is an indicator of firm's ability to exploit its unique advantages (Salter & Tether, 2013). Further research is required to better understand the scope for social technology as an innovation to achieve sustainability outcomes within the hospitality sector.

The SOI model has a number of limitations. First, projects may not all be of the same scale, but may be counted individually, thus making the total number of projects misleading in terms of impacts and resource use. Second, area of focus innovation type is too stringent for service industries, where staff and suppliers can be strongly involved in co-production. Third, risk management and social technology are not included, yet they have an important influence and effect on service firms. Finally, the authors recognise that this article focuses on a single case study, and findings reflect the characteristics of this particular SMAP, however, they have reflected upon the characteristics of similar SMAPs in the destination and wider region when preparing this discussion.

Conclusion

Understanding that SOI in SMAPs is in its infancy, this case study of a single firm provides insights into the transitional steps that can lead to sustainability-rooted behaviour. This article advances the field of sustainable tourism innovation for small to medium accommodation firms by successfully applying the SOI framework in a "real-life" context. It represents the first longitudinal study of tourist accommodation and makes an important "real-life" contribution to the theoretical body of SOI knowledge. As illustrated in Figure 2, we suggest that progressive sustainability behaviour is not uniformly applied in sharply defined stages across a service firm, and that identifying innovation types by area of focus alone does not provide sufficient comprehension for an inductive research investigation. In order to identify SMAP unique advantages to achieve radical innovations in the business-to-customer market, we recommend a Sustainability-oriented Service Innovation conceptual model. This model reflects the characteristics of service

industries by acknowledging the organic evolutionary qualities of innovation led by human intervention and 'social technologies'. It emphases the important role that formal knowledge, insight and applying learnings have on embracing "newness". This enables the firm to have the foresight to take progressive service innovations steps, similar to a 'Professional Service Firm', to involve guests in sustainability behaviours. Meaning they may go beyond the 'System Firm', currently found in many leading hospitality chains which concentrate on 'hard technology', to progress 'social technology' between host and guest (Warren, 2018).

For tourist accommodation, as a globally significant and growing industry facing multiple sustainability challenges, this Sustainability-oriented Service Innovation model could be applied to co-create customer experiences where firms are pioneering service design in a world of changing social trends and sustainable lifestyles. Achieving sustainable consumption and production outcomes requires further research in this important field, to develop practical tools to help practitioners evaluate and accelerate the progress of service firms and the direct involvement of their customers. Furthermore, a roadmap to help firms transition from resistance to sustainability-rooted innovation would provide a realistic yet inspiring vision of what this transition looks like.

Disclosure statement

No potential conflict of interest was reported by the authors.

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