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Mixed methods in sustainable tourism: an analysis of prevalence, designs and application in JOST (2005 to 2014)

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Abstract

This article analyses the use of mixed methods in papers published in the *Journal of Sustainable Tourism* (JOST) over a ten year period, 2005 to 2014. The main purpose of this paper is to examine how and why mixed methods research is being used in the sustainable tourism field. First, a content analysis of the articles shows that the purposes are primarily expansion and development of the results, and less often triangulation or complementarity. Sequential designs are slightly more popular than simultaneous designs, with qualitative research preceding the quantitative element. In the majority of cases, both the quantitative and qualitative methods are equivalent in importance, yet where one is dominant this is usually the quantitative part. Second, we contextualise the content analysis by exemplifying the use of mixed methods with selected papers and interviews with their authors to reflect on the practices, reasons, strengths and weaknesses of using mixed methods. We argue that mixed methods provide sustainable tourism academics with more opportunities for pragmatic transformative research for societal change, and increases research reliability in relation to social desirability bias, stakeholder comparisons and interdisciplinarity.

INTRODUCTION

Mixed methods research (the combination of qualitative and quantitative methods within a single study) has developed rapidly in recent years, emerging as a research methodology with a recognised name and identity (Denscombe, 2008). This approach is becoming increasingly articulated as the third methodological movement, alongside each of its component methods, qualitative and quantitative research, independently (Tashakkori and Teddlie, 2003). This enquiry approach is championed by methodologists from the fields of education, sociology and the health sciences who have published specific books on mixed methods research (for example, Creswell and Plano Clark, 2007; Greene, 2007; Mertens, 2005; Niglas, 2004; Plano Clark and Creswell, 2008; Tashakkori and Teddlie, 2003, 2010; Teddlie and Tashakkori, 2009).

However, to date, the combined use of quantitative and qualitative methods in the same study has not been studied in the field of sustainable tourism. The main purpose of this paper is to examine how and why mixed methods research is being used in the sustainable tourism field. In doing so, we hope

to raise awareness of the process and the potential added value of a mixed methods approach for sustainable tourism scholars. This article is a methodological review of the use of mixed methods in sustainable tourism, examining the articles published in the *Journal of Sustainable Tourism (JOST)*. As JOST reaches its 25th anniversary, and having grown into a high ranking journal within the Social Sciences Citation Index and other impact measurement instruments, it is timely to review the evolution of its content in recent years, to complement earlier reflections (Bramwell & Lane, 2012) and assessments (Lu & Nepal, 2009). Analysing the history of research topics and methodologies in journals gives a good indication of the direction and sophistication of a field and provides an opportunity for self-assessment (Baloglu & Assante, 1999). In tourism, emphasis is often placed on the value of qualitative studies (Botterill, 2001) rather than seeing the qualitative-quantitative complementarity. The purpose of this review is to champion diversity and innovation in research designs through the use of mixed methods research.

Most past studies of tourism journals have reviewed the diversity of literature topics (e.g. Bramwell & Lane, 2012; Buckley, 2012) rather than the spread of research methods. Exceptions include Riley and Love (2000) who evaluated the use of qualitative research, Baloglu and Assante (1999) on quantitative research, and Xiao and Smith (2006) on case studies. Mason, Augustyn, and Seakhoa-King (2010) reflected on designing an exploratory qualitative phase informing, sequentially, a more detailed, larger quantitative phase, and Azzopardi and Nash (2014) examined the ontological, epistemological and methodological assumptions of some alternative philosophical paradigms behind choosing mixed methods for tourism studies. However, there is no current assessment of the use of mixed methods, or review in the literature of the value of mixed methods research, specific to tourism in general or to sustainable tourism in particular. This is the main contribution of our study.

The article is organised as follows. First, we outline the literature review of mixed methods research. We then describe the search strategy for identifying mixed methods studies and the prevalence and main characteristics of the resultant articles. We further examine several examples of mixed methods papers to emphasise why and how their authors have used this approach in the sustainable tourism field. Next, we summarise some recommendations and implications regarding the application and added value of mixed methods research. Finally, we offer some conclusions.

LITERATURE REVIEW ON MIXED METHODS RESEARCH

A monomethod study uses only one type of method, quantitative or qualitative. In a quantitative study, numerical data is analysed using statistical techniques. In a qualitative study, the information, mainly in textual form, is analysed employing a wide range of qualitative techniques. A multiple methods study uses more than one method. These multiple methods studies can be divided into multimethod research (multiple qualitative *or* quantitative methods, but not both) and mixed methods research (integration of quantitative *and* qualitative methods) (Creswell & Plano Clark 2007).

Different definitions of mixed methods research all have in common that this approach involves the combination of at least one quantitative method (designed to collect numbers) and one qualitative method (designed to collect words, photos or objects) into the research methodology of a single study (Greene, Caracelli & Graham 1989; Tashakkori & Teddlie 1998). Johnson and Onwuegbuzie (2004) indicate that in mixed methods research the researcher mixes or combines quantitative and

qualitative research techniques, methods, approaches, concepts or language into a single study. Creswell and Tashakkori (2007) identified four perspectives that mixed methods scholars have taken: method, methodology, paradigm and practice perspectives. A method perspective is adopted in this article, which views mixed methods as focused on strategies for collecting and analysing quantitative and qualitative data. Therefore, in this paper, following Plano Clark (2005), mixed methods research has been considered as the research that combines qualitative and quantitative data collection and data analysis within a single study.

Purposes

Mixed methods research is not intrinsically superior to research that relies on a single method. An important consideration prior to designing and conducting a mixed methods study is whether a mixed methods design, as compared to a monomethod design, will best address the research problem and question. Mixed methods studies are more expensive and time consuming than monomethod research as the researcher has to learn and implement multiple methods. In some contexts, the potential added value justifies the added investment, as the central premise of mixed methods studies is that the combination of quantitative and qualitative approaches may provide a better understanding of research problems and complex phenomena than either approach alone (Creswell and Plano Clark 2007).

Better understanding can be obtained, for example, by triangulating one set of results with another and thereby enhancing the validity of inferences. The concept of *triangulation* of methods was the intellectual wedge that eventually broke the methodological hegemony of the monomethod purists (Tashakkori and Teddlie 1998). Jick (1979) discussed triangulation in terms of the weaknesses of one method being offset by the strengths of another. It is often stressed that different methods have different weaknesses and strengths, and therefore the main effect that triangulation can offer is to overcome the weaknesses of any single method. Thus, if we use several different methods for investigating the phenomenon of our interest, and the results provide mutual confirmation, we can be more confident that our results are valid (Niglas 2004). Other purposes and advantages of mixed methods research can be indicated. Greene, Caracelli and Graham (1989) suggest that further strengths are *complementarity* (the elaboration, illustration, enhancement and clarification of the results from one method with the findings from the other method), *development* (the use of the results from one method to help develop or inform the use of the other method) and *expansion* (the extension of the breadth and range of enquiry by using different methods for different enquiry components).

Designs

Two main factors that help researchers design and conduct a mixed methods study are the implementation approach and prioritisation of data collection methods (Morse 1991; Morgan 1998; Tashakkori and Teddlie 1998). Implementation of data collection refers to the sequence in which data is collected. The options consist of gathering the information from different studies at the same time (concurrent, simultaneous or parallel design) or collecting the information in phases (sequential or two-phase design). Regarding priority, mixed methods researchers can give equal priority to both quantitative and qualitative research, or place the emphasis on certain aspects. Determination of where to place the emphasis may result from research questions, practical constraints for data

collection, the need to understand one form of data before proceeding to the next, the audience preference as well as researcher preference and expertise. Mixed method designs can therefore be divided into *equivalent status* designs and *dominant - less dominant or nested* designs.

These two dimensions and their possible combinations can lead to the establishment of several designs that are represented using the notation proposed by Morse (1991, 2003). In her system, the main or dominant method appears in capital letters (QUAN, QUAL) whereas the complementary method is given in lowercase letters (quan, qual). The notation “+” is used to indicate a simultaneous design, while the arrow “→” stands for sequential design. Thus, the following four groups and nine types of mixed methods designs can exist using these two dimensions, as seen in Table 1:

Table 1. Groups and types of mixed methods

Group I	Equivalent status/simultaneous design	QUAL+QUAN
Group II	Equivalent status/sequential designs	QUAL→QUAN QUAN→QUAL
Group III	Dominant/simultaneous designs	QUAL+quan QUAN+qual
Group IV	Dominant/sequential designs	qual→QUAN QUAL→quan quan→QUAL QUAN→qual

Source: Johnson and Onwuegbuzie (2004)

The next section examines the main characteristics of mixed methods articles identified in the literature on sustainable tourism. The framework used to classify the mixed methods articles includes purposes, priority, implementation of data collection and types of mixed methods designs.

METHODOLOGY

To study how sustainable tourism scholars use the mixed methods approach, an analysis of articles that appear in JOST was carried out. Our sampling frame was constrained to only articles published in JOST to avoid the problematic definition of what is sustainable tourism and, similarly, how to determine which articles published elsewhere would fit within this category. We chose JOST as all its articles have already undergone an assessment of pertaining to the field of sustainable tourism and because it is widely recognised as the leading sustainable tourism journal. The 2014 Journal Citation Reports assigned this journal an overall impact factor of 2.392 for 2013, placing JOST in the 4th position out of 39 journals in the category “Hospitality, Leisure, Sport & Tourism”.

Articles published from 2005 to 2014 were examined. We chose this time period because it is recent, giving us the opportunity to see how research designs are applied in the current settings, and it spans ten years, providing a long enough interval to fully represent research within the field. In addition, by 2005 it was possible to start to see the influence of two publications with a pivotal role in providing both visibility and credibility to the field of mixed methods: Tashakkori and Teddlie’s (2003) landmark *Handbook of mixed methods in social and behavioral research*, and Johnson and Onwuegbuzie’s (2004) seminal article titled *Mixed methods research: a research paradigm whose time has come*.

The present article itself can be considered as a mixed methods study, with a dominant quantitative content analysis followed by a qualitative part through interviews with some authors who have published mixed methods articles in JOST. For the quantitative part, all articles published in JOST from 2005 to 2014 were read, reviewed and classified into two main groups: non-empirical and empirical articles. Non-empirical articles do not report data, and include theoretical development articles, conceptual articles and literature reviews. Empirical articles were divided into three types: quantitative, qualitative and mixed methods articles. A study was considered quantitative if the primary data were in numerical form and the analysis was statistical or numerical, and qualitative if the information, usually in textual form, was analysed employing qualitative techniques. An article was considered to be a mixed methods study if it employed both quantitative and qualitative data collection and analysis.

Whether a study used mixed methods research was determined by examining its characteristics because authors often do not indicate it explicitly. Firstly, the title, abstract, executive summaries and keywords were examined to ascertain if they included words such as “quantitative and qualitative”, “mixed methods” or other related terms to signify the collection and analysis of both quantitative and qualitative data. Next, the introduction section was reviewed to identify the purpose, research question(s) or other statements indicating whether the researchers intended to collect both quantitative and qualitative data during the study. Subsequently, the methods section was examined, where the authors addressed data collection and analysis, and identified if researchers discussed forms of quantitative data and qualitative data. Most mixed methods studies were identified in this section. Finally, the results, discussion and conclusion sections were also examined. This process is well established and has been applied in previous reviews of the use of mixed methods in strategic management (reference after reviewing), entrepreneurship (reference after reviewing) and environmental management (reference after reviewing).

Often case studies spoke of having used two methods but little evidence of one was available in the results (typically of the qualitative exploratory part). We did not classify these studies as mixed methods papers. Furthermore, we found evidence of case studies in particular not having a methodology section and not identifying the sources, instead drawing from experience and documentary evidence. We chose to classify these as qualitative papers, out of necessity to locate them somewhere, yet we understand this is questionable. These were clearly not mixed methods due to the lack of empirical evidence.

In the qualitative part of this study, we expand our understanding of the use of mixed methods following the advice of Creswell et al. (2003) for analysing several mixed methods studies and exploring the features that characterise them as mixed methods research (as explained in Table 1). We shall do this in two ways: firstly, by exemplifying each of the four groups of mixed methods, and secondly, by presenting the results of interviews with some mixed methods authors in JOST.

TYPES OF ARTICLES AND THEIR CHARACTERISTICS

In this section, we describe the types and characteristics of mixed methods articles published in JOST. Table 2 shows the number and types of articles that appeared in JOST by year in the period studied.

Table 2. Types of articles in JOST (2005 to 2014)

	Total	Non-empirical	Empirical	Of the empirical articles:		
				Quantitative	Qualitative	Mixed methods
2005	29	4	25	7	13	5
2006	34	7	27	9	13	5
2007	39	7	32	15	13	4
2008	37	9	28	13	12	3
2009	39	10	29	8	18	3
2010	54	5	49	26	20	3
2011	50	11	39	13	21	5
2012	59	6	53	21	25	7
2013	64	9	55	24	23	8
2014	63	12	51	18	20	13
2005-2014	468	80	388	154	178	56

A total of 468 articles have been published in JOST in the period 2005-2014. These articles were read and reviewed. 388 articles (82.9%) were empirical studies. Among these 388 empirical articles, 154 were quantitative (32.9% of the total and 39.7% of the empirical articles), 178 were qualitative (38% of the total and 45.9% of the empirical articles) and 56 were identified as mixed methods (12% of the total and 14.4% of the empirical articles). Each of the 56 mixed methods studies was reviewed to determine the purpose of combining methods, the priority of methods, the sequence of implementation in which the methods were used, and the type of design. The study was then coded accordingly. It is important to note that the authors of the original studies did not use these terms, design names or types, but their main characteristics were determined ex-post with content analysis. Most coding was done by one author, who listed articles with possible doubts for inter-coder comparison, where a team discussion on the pros and cons of the different possible classifications led to justifications for the final choices. Table 4 summarises the characteristics of the 56 mixed methods studies, while a more detailed table summarising the characteristics of each of these studies can be found in the supplementary online information available to download from the journal.

Table 3. Summary of characteristics of mixed methods studies

Characteristics	N = 56
Purposes ^a	
- Triangulation	2 (3.6%)
- Complementarity	9 (16.1%)
- Development	19 (33.9%)
- Expansion	31 (55.4%)
Designs	
- Equivalent	36 (64.3%)
- Dominant	20 (35.7%)
- Dominant part: qualitative	4 (7.1%)
- Dominant part: quantitative	16 (28.6%)

- Simultaneous	26 (46.4%)
- Sequential	30 (53.6%)
- First part: qualitative	20 (35.7%)
- First part: quantitative	10 (17.9%)
- Equivalent / Simultaneous	18 (32.1%)
- Equivalent / Sequential	18 (32.1%)
- Dominant / Simultaneous	8 (14.3%)
- Dominant / Sequential	12 (21.5%)

^a Two different purposes were identified in five studies, hence total of 61.

We shall first look at the purpose of using mixed methods, using the framework from Greene, Caracelli and Graham (1989) explained earlier. The most common purpose for combining qualitative and quantitative approaches was *expansion* (31 articles, 55.4%), which seeks to extend the breadth and range of enquiry by using different methods for different enquiry components. In this regard, the quantitative part examined a specific aspect of the topic studied and the qualitative part analysed another aspect. Therefore, here the authors used different methods to assess different facets of a phenomenon and sometimes the authors used different methods with different stakeholders. For example, McKercher, Mak and Wong (2014) adopted a mixed methods approach in their study about climate change. Semi-structured interviews were conducted with senior managers of four of the largest travel agencies in Hong Kong with another four interviews conducted among owners/operators of small- and medium-sized businesses. This qualitative part focused on general questions about the perceived importance of climate change and its likely impact on the tourism industry. Then, a survey of front line staff from five of the largest retail agencies in Hong Kong was conducted. In this quantitative part, participants were asked a series of questions to assess their knowledge of the relationship between tourism and climate change, awareness of the existence of low-carbon products and understanding of the role travel agencies can or could play to educate the tourist and mitigate possible impacts of climate change.

The next most common purpose after *expansion* was *development* (19 articles, 33.9%). In these articles, we found that the qualitative part helped improve the understanding of a specific context and facilitated the development of theory and hypotheses. Moreover, the in-depth knowledge of specific industry and local and regional contexts acquired through qualitative research was used to inform the design of survey questions for structured interviewing and self-completion questionnaires. For example, Wu and Pearce (2014) reported that focus groups provided emic-based information that was then used to construct the questionnaire-based survey used in their research.

Complementarity was used in 9 articles (16.1%). Complementarity refers to the elaboration, illustration, enhancement or clarification of the results from one method with findings from another method. For example, Wu and Pearce (2014) indicated that the focus groups were used not only to construct the questionnaire-based survey (development) but also to assist in the interpretation of the quantitative results (complementarity).

Finally, *triangulation* was found only in two papers (3.6%). Triangulation strictly refers to the use of quantitative and qualitative data to investigate the same phenomenon looking for confirmation or

corroboration. For example, Yang, Ryan and Zhang (2014) indicated that data were triangulated in their study of stakeholder relationships in destination planning and management. Primary sources included participative and non-participative observation in village life and tourism operation, oral accounts and interviews. Secondary data included academic literature, official documents and statistics. Additional quantitative data were generated from visitors and residents.

Design of studies

We shall now move on to consider the design of these studies, which can occur concurrently or in sequence. The implementation approach used for data collection was generally straightforward to identify. Researchers usually described the data that were collected within the studies and the timing between the collection and analysis of the qualitative and the quantitative data. Sequential implementation was the most common implementation used in the studies analysed (30 articles, 53.6%) and in this group of studies, the qualitative part was the first stage in 20 papers. The remaining 26 articles (46.4%) used simultaneous implementation.

The analysis of the priority or importance of methods, and whether one of the methods was dominant or whether both of them had an equal status, was difficult. While there was much agreement in the literature regarding the importance of priority as a feature of mixed methods designs, there was little guidance as to how the priority should be decided (Plano Clark, 2005). The priority designations were subjectively based upon the importance of the different aspects to the study, in terms of its overall purpose, and the relative attention paid to each aspect; furthermore, the designations were cross checked for accuracy during interviews with a sample of the authors of these articles. The most common design was equivalent status, where both parts had the same importance (36 articles, 64.3%). A major or dominant method was observed in 20 studies (35.7%), of which 16 studies had a primarily quantitative dominant part and only four studies had a qualitative dominant part.

With regard to the type of design, we chose the typology based on the two aforementioned characteristics (implementation of data collection and priority). Combining these two aspects, there are four main groups as seen in Table 1. The most important group was Group IV (dominant/sequential designs). In 48 studies (59.3%) there was a dominant method with a sequential implementation. The next most important classification was Group II (equivalent status/sequential designs), which included 18 articles (22.2%), followed by Group III (dominant/simultaneous designs) with 9 studies (11.1%) and finally, Group I (equivalent status/simultaneous design) that included 6 studies (7.4%) that used a QUAL+QUAN design.

EXAMPLES OF MIXED METHODS STUDIES

In Group I studies, the quantitative and qualitative methods have equivalent status and their design is simultaneous (QUAL+QUAN). The article by Puhakka, Cottrell, and Siikamäki (2013) is representative of this type. This paper provides an example of conducting mixed methods research by analysing the sociocultural sustainability of tourism as perceived by local stakeholders. Semi-structured interviews (qualitative part) were linked concurrently to survey data (quantitative part). Discourses were identified based on 40 interviews about tourism development, and differences between the representatives of the discourses were examined using non-parametric statistics. Results of the

qualitative and quantitative analysis supplemented each other i.e. *expansion* was the main purpose. The survey results supported the identification of four discourses and provided information about their representatives. The discourse groups differed according to their length of residence in the area, distance from the park, gender, employment in tourism, satisfaction with tourism and park development, importance of the environmental dimension and other aspects. This article demonstrates that a better understanding of a problem may be acquired by using a mix of interviews and survey methods.

Papers in Group II have equivalent status for both quantitative and qualitative methods and their design is sequential (QUAL→QUAN or QUAN→QUAL). Canavan's (2014) paper shows how a QUAL→QUAN approach is used to understand the development, decline and de-growth of a destination. 32 in-depth interviews were conducted over a 24-month period, primarily with residents with varying involvement in tourism, but also with four tourists. This process assisted in the immersion in the data and the process of developing emergent theory, particularly as more interviews were processed. Qualitative findings assisted in the development of the quantitative research tool (mixed methods purpose of *development*) and interpretation of quantitative results (mixed methods purpose of *complementarity*). The quantitative part was a self-completion questionnaire of residents, consisting of 30 closed-style items, that required respondents to rate their level of agreement with each on a five-point Likert scale from strongly agree to strongly disagree.

In Group III (different status and simultaneous implementation), Walker and Moscardo (2014) used a QUAL+quan design. They studied the experience of passengers on expedition cruises including the interpretation provided, perceptions of the benefits of these experiences and sustainability values. The authors point out that most mixed method studies come from a more qualitative perspective using inductive and interpretive approaches and this work fits within this tradition seeking to explore and explain rather than predict. They combined ethnographic techniques, such as participant observation, with a passenger survey. The analysis involved an interviewing technique known as laddering, whereby respondents are asked to identify the attributes of products or services that are important to them and to consider why, identifying their perceived benefits. Then respondents are asked why that benefit is important to them and the questioning continues, seeking the identification of personally significant values. These elements and the links between them are referred to as attribute-benefit-value chains and are typically summarised in hierarchical value maps. The authors note that this technique is an example of a mixed methods approach, with a qualitative approach to data collection and coding, with quantitative measures in the analysis, such as cross tabulations of the relations between the attributes, benefits and values of the respondents.

Finally, Group IV papers are characterised by the dominance of one method, and a sequential design, with four possible variations: qual→QUAN; QUAL→quan; quan→QUAL; QUAN→qual. Mayer's cost-benefit analysis of a national park (2014) is an example of QUAN→qual design. The bulk of the study was formed by three quantitative tests (economic impact analysis, travel cost method and opportunity cost analysis). He then used the literature, miscellaneous data sources and some interviews to estimate the direct costs of the national park, the remaining direct and indirect use values, and the opportunity costs and indirect costs. Interviews were used to ensure participation because a previous

postal survey had not delivered satisfactory results. The interviews were also used to interpret results, examine different aspects of the topic and provide context.

AUTHOR INTERVIEWS

Together with the analysis of some examples of mixed methods studies, we considered it would be interesting to interview some authors of mixed methods papers published in JOST in order to know their opinions and insights about several aspects of mixed methods research. The corresponding authors for the latest mixed methods papers in each of the four groups outlined above were invited to participate, in reverse chronological order, until we had two examples of papers for each group. Eight scholars were interviewed via Skype, each interview lasting between 30 and 60 minutes, except for one case where written responses were provided. Researchers are named so the readers can make links between the answers given and the actual articles they authored. All interviewees were sent this article for comments and accuracy. This level of transparency is important because many of the choices regarding method are determined by the researcher, as well as the study's needs. The questions were:

1. Why did you choose a combination of qualitative and quantitative methods (mixed methods) and not a single method?
2. What advantages or added value did you see to using mixed methods for your study?
3. What advantages or added value do you see to using mixed methods for sustainable tourism studies?
4. What barriers or challenges did you come across in using mixed methods for your study?
5. What barriers or challenges do you see in using mixed methods for sustainable tourism studies?
6. Do you think you could have published two articles, separating the results for each method? If yes, why did you choose to publish in one article both methods rather than attempt to publish two separate articles?
7. If you have multiple authors, did different authors specialise in individual methods?

A summary of the responses is given next. The choice of mixed methods was primarily justified as resulting from the needs of the project itself, when no single method would have suited the exploratory aims of the research (Moscardo). Mixed methods provided a balance between the required depth of data for some stakeholders and the speed of collecting survey data for others (Cole), and the methods themselves were chosen pragmatically because they collectively yielded a better story (Mustika). Quantitative methods were included to increase the speed of data collection (Cole) and facilitate data reduction (Knežević Cvelbar). Qualitative methods were used to design the questionnaire (Mustika), to provide depth to the questionnaire (Mustika, Moscardo), to increase response levels (Mayer) and to interpret the questionnaire findings (Cottrell). Different methods were used either for different research questions (Mustika) or for different stakeholders (Cole, McGehee). In some studies, the choice came from the funders' requirements (Knežević Cvelbar, McGehee) and in others, it was for personal reasons.

Canavan, Mustika and Mayer stated that they used mixed methods in their papers to gain the breadth of data required for a PhD and reflected on the benefits of becoming trained in more than one method. Canavan, Cottrell, McGehee and Moscardo made an explicit use of mixed methods terminology, to purposefully frame their research as mixed methods to raise awareness in other researchers of the strengths of this approach. Cottrell commented that there are too many monomethod studies that are flat and unidimensional, they don't show the depth necessary to understand why a phenomenon occurs.

In the other papers, both qualitative and quantitative elements were used but the outcomes were presented separately and less effort was made to relate the nuances in the findings to the specific methods adopted (see for example the papers from Mustika, Mayer and Cole). Cottrell, McGehee, Moscardo reported that an advantage of mixed methods for their studies was the added rigour gained from being able to fully understand an issue. While quantitative methods provided large amounts of data in a short time (Canavan, Cole), the interviews provided access to data (Mayer), context and a reality check (Canavan, Mayer). Most of the comments made about the advantages of this approach related to the ability it gave the researchers to contextualise the quantitative research by the use of qualitative techniques. This created a story from the numbers, as it yielded good narratives and multiple interpretations (Mustika) and consequently provided depth to the studies (Cottrell). Moreover, this approach let the researchers identify patterns (Mustika) and see a story evolve (Knežević Cvelbar), particularly for exploratory questions, "allowing for description of both the range of experiences and the extent to which these are common or shared versus idiosyncratic" (Moscardo).

Regarding question 3 on the benefits or advantages of mixed methods to sustainable tourism research, the respondents considered that the benefits of mixed methods studies are common to all social science research, especially in the exploratory stages of a topic (Moscardo) or to test the social acceptance of quantitative findings (Mayer), rather than specific to sustainable tourism studies. As the ethos of sustainability is engagement with diverse stakeholders, a full suite of techniques allows engaging more people (Canavan) as different audiences respond to different types of enquiry (Cole, McGehee). Mixed methods were good for sustainability studies by encouraging teamwork, ideally cross-disciplinary, which facilitated reflection and the advancement of ideas (Cole, McGehee).

The barriers to using mixed methods in their works were primarily stated as the added workload (Canavan, McGehee), reflected in the overall time needed to learn two methodologies (Canavan, Cottrell) and operationalise them (Cottrell, Cole, Mayer), which led to more risks (Mustika), additional costs (Cottrell, Mayer) and a greater volume of data (Cole), particularly qualitative (Moscardo). The challenges for publishing came from the lack of space to do justice to all the data in one paper. This meant researchers had to find a balance between too much description and not enough retention of key elements (Moscardo). Integrating findings from different methods led to "compromises, losing detail and the ironing-out of inconsistencies" (Canavan), particularly loss of qualitative data whether it is exploratory or causal (Knežević Cvelbar, Mayer, Mustika). All too often the initial exploratory phase went unreported in journals as authors chose to publish the quantitative phase only (Mason et al., 2010).

The key challenges for sustainable tourism studies more generally were seen as the lack of training in mixed methods through our disciplines (Cole), leading to an assumption that mixed methods is just

practicing two methodologies, rather than understanding the added benefits of their combination (Moscardo), and in particular missing out on the interface of how one method and its results inform the other (Cottrell, McGehee). Researchers often had to make choices between the two approaches because they were seen as unnecessarily increasing risk and complexity at best, or as incompatible at worst. Mason et al. (2010) and Kwok (2012) reflected on the complexities involved in switching between research paradigms and how this resonated with the interview data. The perception that mixed methods potentially could be used to hide insufficiently robust data from either method (Mayer) confirms the prejudices against mixing (Cole). It is not clear whether mixed methods are more (McGehee) or less (Cottrell) likely to attract funding, depending on the funder's understanding of the value of mixed methods and interdisciplinarity. There was a perception that quantitative articles are shorter than qualitative articles and much shorter than mixed methods articles, which has an impact on the possible publication outlets (Cottrell). Mixed methods were thought to take longer to publish, due to having to please different reviewer requirements (Cottrell, Mayer, Mustika). Once published, mixed methods might potentially limit readership, being rejected by purists of either methodology (Mustika).

Maybe for the reasons stated above, most authors had published multiple articles from their research and the mixed methods papers we reviewed usually brought together the different strands into a summative, overarching paper, as in the case of Canavan, Cole, Cottrell, Knežević Cvelbar, Mayer, McGehee and Mustika. One method alone would not have been strong enough to warrant publication (Mustika) and the strength of the paper was the pattern of results that came out of the combined methodology (Moscardo, Mayer, Cottrell).

Regarding the last question on the specialist areas of the authors, Cottrell, Knežević Cvelbar, McGehee, Mustika stated that in their articles different members of the team specialised in different methods. This, includes the studies from Cole, Mayer with a single author, where research assistants were used. There were two exceptions, one with a single author who did the whole study (Canavan) and one with multiple authors who had equal involvement (Moscardo).

DISCUSSION

The use of mixed methods in tourism research is not insignificant. Table 4 shows that a review of tourism articles in 12 key journals between 1994-2005 (Ballantyne, Packer, & Axelsen, 2009) and a review of sustainable tourism articles in JOST between 1993-2007 (Lu & Nepal, 2009), both showed that 6% of all research studies used this approach.

Nunkoo, Smith, and Ramkissoon (2013) found that 13.5% of residents' perceptions articles (1990-2010) were mixed methods, and Griffin (2013) found it was 9.5% of papers in research on visiting friends and relatives for 2004-2010, growing from 5.3% in 1997-2003 and none in 1990-1996. Yet there remains a general perception that mixed methods studies are rarely put into practice in tourism (McGehee et al., 2013). As the subject of sustainable tourism has come of age, from a reactive to more proactive form of managing tourism informed by societal changes, the writings in JOST have evolved accordingly (Bramwell & Lane, 2012). Lu and Nepal (2009) show a trend over 15 years of JOST papers towards more general tourism, rather than specifically nature tourism or ecotourism articles. Below

we explain four key reasons why we believe a mixed methods approach lends itself particularly well to the study of sustainable tourism and why its use is likely to grow.

Table 4. A comparison of the use of mixed methods

	Sustainable tourism 2005-2014 results Source: authors	Sustainable tourism 1993-2007 Lu and Nepal (2009)	Tourism 1994-2005 Ballantyne et al. (2009)
Qualitative	38%	41%	19%
Quantitative	33%	37%	59%
Mixed Methods	12%	6%	6%
Non-empirical	17%	16%	16%

Promoting societal change

First, mixed methods research can purposefully promote societal change. The use of mixed methods in tourism has been proposed from the perspectives of critical realism (Downward & Mearman, 2004), feminism (Heimtun & Morgan, 2012) and pragmatism (Pansiri, 2006) for example. What these studies have in common is an intention to cause positive societal change. This central tenet of the transformative paradigm (Mertens, 2007, 2011) also reflects the intention behind much sustainable tourism research that informs societal change (Bramwell & Lane, 2013; Liu, 2003). Cole for example spoke of the advantages of mixed methods for the activist researcher because one can adapt the content for different audiences and communication is at the heart of activism. She acknowledged the value of quantifying, and particularly monetising, tourist behaviour to then use the data to convince other stakeholders to behave differently in the future. Mustika also believed that quantitative data was needed to capture the attentions of the government officials who are not easily convinced by qualitative data. She stated that in developing countries, despite the increasing understanding of the importance of quantitative biological data, social and economic data will still be the main agents of change. So, mixed methods were used to demonstrate the potential social and economic consequences of an environmental issue. Mayer used mixed methods to ensure that government decision-makers in charge of funding protected areas had a more complete, monetised picture of the costs and benefits of nature. For McGehee, it wasn't the quantification so much as the information loop, of residents and stakeholders seeing that the qualitative data collection they had just participated in was making headlines in their regional press, that created the sense of trust and transparency that was necessary to generate change.

Both Buckley (2012) and Lane (2009) reflected on the increasing gap between the objective of sustainability and the contribution of tourism researchers towards it. They argued that reclaiming the transformative purpose of research could help reengage research outputs with society. Cole in particular spoke overtly about the imperative of research as a means of activism and reflected on the need for research to have an impact. She used a mixture of quantification and qualitative outcomes, in the form of quotes from senior stakeholder interviews and business cases, to speak to different audiences. For example, she used this approach to adapt her findings on tourism and water in an

attempt to persuade stakeholders through publishing and discussing her research also in industry and NGO publications, radio, newspaper, blogs, trade presentations and specialist seminars. As today's judgement of academic work increasingly emphasises the impact that research has on society, mixed methods seem to offer valuable opportunities.

Managing social desirability

Second, applying mixed methods to sustainable tourism helps manage social desirability, that is, the tendency of answering self-reported questions in a way that is seen as acceptable to others (Randall & Fernandes, 1991). There is evidence of a bias towards social desirability in ethics research that begs the use of more sophisticated methods and triangulation of results (Auger & Devinney, 2007; Carrington, Neville, & Whitwell, 2010). While much quantitative market research tells us there is a market for sustainable tourism (Dolnicar, Crouch, & Long, 2008), qualitative studies tell us tourists behaviour is far more complex (Miller, Rathouse, Scarles, Holmes, & Tribe, 2010). Quantitative methods alone are more prone to social desirability bias (McKercher & Prideaux, 2011), while mixed method approach can provide the checks and balances needed to critically understand the 'green gap' in attitude-behaviour so often reported in surveys on customers' willingness to purchase sustainable tourism products; likewise, it can do the same for behavioural gaps in adopting technologies or developing policies. Knežević Cvelbar reflected how she was moving away from quantitative studies to understand sustainability behaviour and towards a preference for mixed methods and experiments in particular, rather than surveys of attitudes. Mayer also acknowledged that sensitive or complex data are better collated through interviews (although his purpose was then to provide quantitative estimates).

By using a means-end analysis combined with the laddering technique, Walker and Moscardo (2014) aimed to trace the values behind the benefits sought from purchasing decisions made. These attribute-benefit-value chains were identified through a structured open-ended questionnaire. They believed that this in turn helped to reduce a bias towards social desirability in the responses and to improve traceability of the patterns of reasoning. Moscardo responded that mixed methods "allows for the benefits a more emic approach grounded in the participants' reality and less influenced by the researcher's views, and the benefits of using a quantitative technique to determine patterns in the data that are not easily recognised by just perusing the responses in total". McGehee explained how their entire study was based on the premise that results from one method need to be cross-referenced for accuracy with another, and she exemplified this with, for example, having exact data from their GIS boxes to compare against the survey data.

Data robustness through stakeholder triangulation

Third, mixed methods research allows data robustness through stakeholder triangulation. For our society to become more sustainable, we need systemic changes that require multiple stakeholders to be pushing in the same direction (Urry, 2011). Mixed methods studies allow stakeholder-comparative analyses and are able to link causes and consequences in a way that would not be possible with mono-method studies. A good example of this was Cole's (2014) use of a mixed methods approach to develop a stakeholder map for a tourist destination to identify rights and responsibilities towards water as a basic human need. The interviews with key figures, questionnaires with tourists and focus groups with community groups were used to gather evidence yet had an overt activism purpose in

raising their awareness of their rights and duties. The article is purposefully written to promote stakeholders to acknowledge their responsibilities, with the survey of tourists being used to back up the argument for industry taking greater responsibility.

It is worth considering two further examples. First, the study by McGehee et al. (2013) is arguably the most complex mixed methods study published in JOST during this 10 year period. It summarises six interdisciplinary research phases that studies discrepancies between tourism resources, and visitor and community needs. The results informed a large scale sustainable tourism development project. The six methods used were a community resource assessment (GIS-based Inventory), stakeholder interviews, a visitor survey and GPS visitor tracking, the development of seven potential scenarios, a potential visitor survey and an economic analysis. The emphasis was that of a gap analysis, with the purpose of presenting a range of viable options for the development project, over two years, which required considerable stakeholder checks and balances not only to ensure their opinions were heard but also, that the final proposals would meet their different needs. In addition, we have the example from Knežević Cvelbar and Dwyer (2013), who developed an importance-performance matrix to identify which sustainability indicators required attention by the hospitality sector. A Delphi study was used to reduce an initial list of 169 indicators to 69 which they considered to be the most widely used and understood by industry. These were then used for an online questionnaire for hotel managers to identify relative importance. The results were subsequently used to refine the indicator list to 33 and for hotel managers to then evaluate their performance using the indicators. Data reduction was then used to correlate the variables and identify factors that would explain the variance, from which they were able to simplify the presentation of the importance-performance grids. In our interview with Knežević Cvelbar, she made it clear that much more emphasis was dedicated to this stage of research than the funder had required precisely to secure the industry's future buy-in to providing data against these indicators.

Sustainability through inter-disciplinary cooperation

Fourth and finally, mixed methods research allows the advancement of the concept of sustainability through inter-disciplinary cooperation. Using two methods is not necessarily interdisciplinary, since the latter refers to working across disciplines, not methods. Yet it is more likely that two methods reflect the collaboration of two different approaches to jointly understand a phenomenon. A systemic change in tourism behaviour requires focusing technological, behavioural and political means towards a sustainability goal (Buckley, 2012). Mixed methods lend themselves to the inter-disciplinarity of tourism (Beeton, 2005; Oppermann, 2000; Tribe, 1997). Bramwell and Lane (2012) suggest that developments such as triple bottom line accounting, corporate social responsibility and climate change do not emerge from tourism research. While disciplinary or methodological innovations may not come from tourism per se, the industry of tourism is arguably well-placed to be a test bed for integrated sustainability change because traditionally, it is more predisposed to accept interdisciplinarity than some other industries that seek parallel approaches to sustainability. Mixed methods allow a combination not only of data sources but also of foci.

For Cottrell, an advantage of interdisciplinarity is dialogue, because learning is built into the method of working by reflecting on the different perspectives of looking at a problem. In their study they were particularly interested in the sequential or concurrent dialogue data from interviewees alongside the

quantitative surveys (Puhakka, Cottrell, & Siikamäki, 2014). McGehee et al. (2013) summarised the challenges in inter-disciplinary research in relation to terminology, research framing and ontological/epistemological differences. They saw the difficulty in creating a cohesive team that responded to the idiosyncrasies of each researcher in the team, each method applied and the funder's requirements. When interviewed, McGehee said that it was key to create, early on, a theoretical foundation to understand how each method fits in the framework, which ultimately drives how data is handled. Further research is needed to understand how inter-disciplinary mixed methods teams wrestle with these semantic and methodological challenges.

CONCLUSIONS

The appropriate application of mixed methods research needs an adequate knowledge of this methodology. In this regard, the literature base about mixed methods research may not be well known to individuals in specific fields (Creswell and Tashakkori, 2007). Despite the availability of books, book chapters and journal articles related to mixed methods, few of the 56 studies that applied mixed methods actually referenced the literature on mixed methods to justify their approach. In this regard, only nine works (Lynch, Duinker, Sheehan y Chute, 2010; Ryan, Chaozhi and Zeng, 2011; Chancellor, Norman, Farmer and Coe, 2011; Su and Wall, 2012; Canavan, 2014; Ong and Smith, 2014; Puhakka, Cottrell and Siikamäki, 2014; Albrecht, 2014; Walker and Moscardo, 2014) included in their lists of references any methodological studies about mixed methods from the main mixed methodologists (works by Creswell, Greene, Johnson, Onwuegbuzie, Tashakkori, Teddlie, among others). On this evidence it seems likely that the advantages and potential benefits of mixed methods research may be unknown to the majority of sustainable tourism researchers. Therefore, although mixed methods research is used, most mixed methods studies may not exploit its full potential.

Mixed methods require the researcher to open up to the complementarity of different forms of data collection and interpretation, but also to interrogate themselves as researchers (Thomas, 2004). Based on her QUAN->Qual study, Thomas (2004) reflects on the transition from a positivist study design to the need for qualitative interpretation of the outcomes and an appreciation of alternative paradigms to critically evaluate the process of research. The mixed method approach challenges the researcher to move beyond the agreed conventions of quantitative research for a given topic by asking broader questions on the validity of such approach and gaining meaningful insights. Mixed methods research may strengthen the epistemology of tourism. Positivist traditions dominate tourism with set parameters to conduct research in many topics (Riley & Love, 2000) and with "blurring of entrenched truisms in reductionist thinking and scientism comes the challenge of developing new ways of thinking, description and knowledge construction" (Jamal & Hollinshead, 2001:66). This paper does not have the space to debate different ontologies, epistemologies and subsequent methodologies of research paradigms, already studied by Azzopardi and Nash (2014), but instead focuses on explaining and exemplifying how mixed methods research produces more holistic results than single method studies do (Lane, 2009).

The advancement of sustainable tourism research requires improved understanding of the application of a variety of research methods. In this regard, mixed methods research may play an important role in the use of diverse methods. Mixed methods research shows great promise, but only if researchers understand the purposes and design options that accompany this methodological choice. We hope

that this paper may help to improve the understanding of mixed methods research and may contribute to the development of the sustainable tourism field.

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Appendix. Characteristics of mixed methods studies in JOST (2005 to 2014)

Article	Purpose	Priority	Implementation	Design	Topic/Country
Rodway-Dyer and Shaw (2005)	Complementarity	Quantitative	Sequential	QUAN→qual	Outbreak of foot-and-mouth disease on visitors/England
Spenceley (2005)	Development	Equivalent	Sequential	QUAL→QUAN	Nature-based tourism and environmental sustainability/South Africa
Connell (2005)	Complementarity	Equivalent	Simultaneous	QUAN+QUAL	Impact of children's TV Programmes on tourism/Scotland
Ralston, Lumsdon and Downward (2005)	Complementarity	Equivalent	Sequential	QUAN→QUAL	Volunteers in events tourism/England
Reiser and Simmons (2005)	Expansion	Quantitative	Simultaneous	QUAN+qual	Effectiveness of ecolabelling/New Zealand
McIntosh and Bonnemann (2006)	Expansion	Qualitative	Sequential	quan→QUAL	Willing workers on organic farms/New Zealand
Clifton and Benson (2006)	Expansion	Equivalent	Simultaneous	QUAN+QUAL	Planning for sustainable ecotourism/Indonesia
Byrnes and Warnken (2006)	Development	Equivalent	Sequential	QUAL→QUAN	Greenhouse gas emissions from marine tours/Australia
Quinn (2006)	Expansion	Qualitative	Simultaneous	QUAL+quan	Festival tourism and sustainable development/Ireland
Van der Duim and Van Marwijk (2006)	Expansion	Equivalent	Simultaneous	QUAN+QUAL	Implementation of environmental management systems in tour operators/Netherlands
Coghlan (2007)	Development	Equivalent	Sequential	QUAL→QUAN	Image-based typology of volunteer tourism organisations/Australia
Pan and Ryan (2007)	Development	Quantitative	Sequential	qual→QUAN	Mountain areas and visitor-usage motivation and satisfaction/New Zealand
Woodland and Acott (2007)	Complementarity	Equivalent	Sequential	QUAN→QUAL	Sustainability and local tourism branding/ England
Akama and Kieti (2007)	Expansion	Quantitative	Simultaneous	QUAN+qual	Tourism and socio-economic development in developing countries/ Kenya

Reichel, Uriely and Shani (2008)	Development	Quantitative	Sequential	qual→QUAN	Ecotourism and simulated attractions/ Israel
Okazaki (2008)	Expansion and complementarity	Equivalent	Simultaneous	QUAN+QUAL	Community-based tourism model/Philippines
Smith, Broad and Weiler (2008)	Expansion	Equivalent	Sequential	QUAN→QUAL	Impact of zoo visits on visitor behaviour/ Australia
Laing, Lee, Moore, Wegner and Weiler (2009)	Complementarity	Equivalent	Sequential	QUAN→QUAL	Partnerships between protected area agencies and the tourism industry/ Australia
Randall and Rollins (2009)	Expansion	Equivalent	Simultaneous	QUAN+QUAL	Visitor perceptions of the role of tour guides in natural areas/ Canada
Kasim (2009)	Expansion	Quantitative	Simultaneous	QUAN+qual	Managerial attitudes towards environmental management in SME hotels/Malaysia
Dawson, Stewart, Lemelin and Scott (2010)	Complementarity	Quantitative	Sequential	QUAN→qual	Carbon cost of polar bear viewing tourism/ Canada
Lynch, Duinker, Sheehan and Chute (2010)	Expansion	Equivalent	Simultaneous	QUAN+QUAL	Mi'kmaw cultural tourism development: motivations and satisfaction/Canada
Kim and Han (2010)	Development	Equivalent	Sequential	QUAL→QUAN	Intention to pay conventional hotel prices at green hotels/ Korea
Ma, Egan, Rotherham and Ma (2011)	Expansion	Equivalent	Simultaneous	QUAN+QUAL	Monitoring framework during the planning stage for a sport event/ Taiwan
Bonilla-Priego, Najera and Font (2011)	Complementarity	Quantitative	Sequential	QUAN→qual	Environmental management decision-making in certified hotels/Spain
Nault and Stapleton (2011)	Development and expansion	Equivalent	Sequential	QUAL→QUAN	Community participation process in ecotourism development/Mongolia
Ryan, Chaozhi and Zeng (2011)	Triangulation	Equivalent	Simultaneous	QUAN+QUAL	Impacts of tourism at a UNESCO heritage site/ China
Chancellor, Norman, Farmer and Coe (2011)	Development	Quantitative	Sequential	qual→QUAN	Natural resource conservation/USA
Coghlan (2012)	Expansion	Quantitative	Simultaneous	QUAN+qual	Natural resource and tourist satisfaction/ Australia
Orchiston (2012)	Expansion	Equivalent	Simultaneous	QUAN+QUAL	Seismic risk scenario planning and sustainable tourism/ New Zealand
Mihalic, Zabkar and Knežević Cvelbar (2012)	Development	Quantitative	Sequential	qual→QUAN	A hotel sustainability business model/ Slovenia

Somarriba-Chang and Gunnarsdotter (2012)	Expansion	Equivalent	Simultaneous	QUAN+QUAL	Local community participation in ecotourism/ Nicaragua
Polo, Frías and Rodríguez (2012)	Development	Equivalent	Sequential	QUAL→QUAN	Value of rural tourism: effect on rural tourist behaviour/ Spain
Su and Wall (2012)	Expansion	Equivalent	Simultaneous	QUAN+QUAL	Global-local relationships and governance issues at the Great Wall/China
Hornig, Hu, Teng and Lin (2012)	Development	Equivalent	Sequential	QUAL→QUAN	Energy saving and carbon reduction in natural attractions/ Taiwan
Kaltenborn, Thomassen, Wold, Linnell and Skar (2013)	Development	Quantitative	Sequential	qual→QUAN	World Heritage status as foundation for building local futures/ Norway
Mustika, Birtles, Everingham, and Marsh (2013)	Development	Equivalent	Sequential	QUAL→QUAN	Human dimensions of wildlife tourism/ Indonesia
McGehee et al. (2013)	Expansion	Equivalent	Sequential	6 phases	Development of a regional sustainable tourism project/USA
Knežević Cvelvar and Dwyer (2013)	Development	Equivalent	Sequential	QUAL→QUAN	Sustainability factors for long-term strategy planning/Slovenia
Hu, Horn, Teng and Chou (2013)	Development	Equivalent	Sequential	QUAL→QUAN	Restaurant energy conservation and carbon reduction/ Taiwan
Io (2013)	Expansion	Equivalent	Simultaneous	QUAN+QUAL	Effective interpretation to boost the heritage tourism experience/ Macao
Mair and Laing (2013)	Development	Quantitative	Sequential	qual→QUAN	Sustainable events to encourage pro-environmental behaviour/Australia
Pratt (2013)	Expansion	Equivalent	Simultaneous	QUAN+QUAL	Food travels and climate change/Fiji
Coles, Fenclova and Dinan (2014)	Expansion	Equivalent	Simultaneous	QUAN+QUAL	Corporate social responsibility in airlines/several countries in Europe
Cole (2014)	Expansion	Qualitative	Simultaneous	QUAL+quan	Tourism and water/ Indonesia
Canavan (2014)	Development and complementarity	Equivalent	Sequential	QUAL→QUAN	Development, decline and de-growth of a destination/ UK
Jackie Ong and Smith (2014)	Expansion	Equivalent	Simultaneous	QUAN+QUAL	Managing sustainable coastal tourism in emerging destinations/ Cambodia
Wu and Pearce (2014)	Development and complementarity	Equivalent	Sequential	QUAL→QUAN	Sustainable livelihoods/ Tibet

Puhakka et al. (2014)	Expansion	Equivalent	Simultaneous	QUAN+QUAL	Sustainability in national parks/ Finland
Mayer (2014)	Expansion	Quantitative	Sequential	QUAN→qual	Nature-based tourism benefits/Germany
McKercher, Mak, and Wong (2014)	Expansion	Equivalent	Sequential	QUAL→QUAN	Tour operators, climate change and travel trade/ several countries
Albrecht (2014)	Complementarity	Quantitative	Simultaneous	QUAN+qual	Micromobility patterns/ New Zealand
Dimmock, Hawkins, and Tiyce (2014)	Expansion	Equivalent	Simultaneous	QUAN+QUAL	Whale-watching industry/Australia
Yang, Ryan, and Zhang (2014)	Triangulation	Equivalent	Simultaneous	QUAN+QUAL	Sustaining culture and tourism development/ China
Walker and Moscardo (2014)	Expansion	Qualitative	Simultaneous	QUAL+quan	Ecotourism, interpretation and values in cruises/ Australia
Choi and Ritchie (2014)	Development	Quantitative	Sequential	qual→QUAN	Willingness to pay for flying carbon neutral/ Australia