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CONSUMER BEHAVIOUR AND DEMAND RESPONSE OF TOURISTS TO CLIMATE CHANGE

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Abstract: The influence of climate change on tourism demand patterns will be shaped by the response of tourists to the complexity of mitigation policy and its impacts on transportation systems, the wide range of climate change impacts on destinations, as well as broader impacts on society and economic development. Tourists have the largest adaptive capacity of elements within the tourism system because of their flexibility to substitute the place, timing and type of holiday, even at very short notice. Consequently, understanding tourist perceptions and reactions to the impacts of climate change is essential to anticipating the potential geographic and seasonal shifts in tourism demand, as well as the decline or increase of specific tourism markets. Yet, despite a wide range of publications assessing reactions of tourists to various environmental and climate-related changes, little is actually known about the complexity of demand responses. The paper reviews and discusses existing studies, and provides a framework for a better understanding of perceptions of change, as well as identifying major current uncertainties and research needs. **Keywords:** behaviour, climate change, demand responses, perceptions, travel motivation. © 2011 Published by Elsevier Ltd.

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INTRODUCTION

Climate, the natural environment, income and discretionary wealth, personal safety, and travel costs are key factors in travel motivations and destination choice (Hall, 2005). Because all of these factors appear likely to be affected by climate change (Scott, Hall, & Gössling, 2012), the implications for tourist behaviour and patterns of demand at local, national and international scales could be profound. Understanding tourist perceptions and reactions to the impacts of climate change is therefore essential to anticipating the potential geographic and seasonal shifts in tourism demand, changes in specific tourism markets, and the overall competitiveness of businesses and destinations. Yet, despite increasing numbers of publications on tourism and climate and environmental change, substantial knowledge gaps remain with respect to demand responses (Gössling & Hall, 2006a; Gössling & Hall, 2006b; Hall, 2008a). This paper therefore aims to systematically review existing studies in order to develop a coherent outline of major current uncertainties and research needs.

TYPES OF CLIMATE CHANGE IMPACTS ON TOURISM

Because the impacts of climate change on tourism operations and destinations are closely entwined with tourist behaviour, four major types of climate change impacts on tourism demand can be distinguished: direct impacts of a changed climate; indirect impacts of environmental change; mitigation policy and tourist mobility; and societal change related to reduced economic growth, consumer cultures and social-political stability. The majority of literature focuses on the direct and indirect consequences of climate change. There appear to be no studies that provide direct behavioural evidence of how reduced economic growth or social and political stability linked to climate change would affect tourism, and few studies that assess the consequences of mitigation policy in tourism (cf. Scott et al., 2012). The following section discusses examples of relevant studies regarding tourist responses to a changing climate, climate-induced environmental change, and mitigation policy, together with a discussion of their shortcomings or prevailing uncertainties. Building on this discussion, the paper goes on to present a model for the assessment of demand responses along with a systematic review of research gaps.

Tourist Responses to a Changing Climate

There is considerable evidence demonstrating the intrinsic importance of weather and climate for tourist decision-making, including motivations, destination choice and timing of travel, as well as experience (Scott & Lemieux, 2010). Consequently, changes in the spatial and temporal distribution of climate resources will have important consequences for tourism demand at various scales. Changes in global demand patterns have been assessed in top-down simulation models

(Bigano, Hamilton, & Tol, 2007; Hamilton, Maddison, & Tol, 2005) in conjunction with a range of other macro-scale factors, such as population growth and per capita income. The anticipated impacts included a gradual shift in international tourism demand to higher latitude countries. Tourists from temperate nations that currently dominate international travel were projected to spend more holidays in their home country or nearby regions. Relative demand for international travel to sub-tropical and tropical nations was projected to decline.

However, global scale simulation models of tourism demand are necessarily highly simplified and have important limitations, including a wide range of tourist-response related uncertainties (Bigano, Hamilton, & Tol, 2006; Eugenio-Martin & Camos-Soria, 2010; Gössling & Hall, 2006a, 2006b; Hamilton et al., 2005; Moore, 2010; Weaver, 2011). For instance, because ‘temperature’ has been found to be statistically significant in econometric studies of climate and tourism demand, it has been used as the proxy variable for climate. However, as a number of studies have shown, ‘climate’ is more complex than just temperature as tourists consider a range of meteorological variables in their decision-making (Gössling, Bredberg, Randow, Sandström, & Svensson, 2006; Ruttty & Scott, 2010; Scott, Gössling, & de Freitas, 2008). Furthermore, while changes in average temperatures have been considered in the models, the consequences of changes in climate variability (e.g., temperature extremes) are not considered. In spite of these and other shortcomings, simulation studies are well cited in the climate change and tourism literature, scientific and governmental reports—yet in virtually all cases, a discussion of the limitations has been omitted (Scott et al., 2012).

Winter tourism has been a focal point for tourism and climate change research. Winter tourism is faced with the prospect of less natural snowfall and shorter, more variable, seasons. One of the first studies by König (1998) was based on a survey at Australian ski resorts in which respondents were confronted with a scenario in which “the next five winters would have very little natural snow”. The survey, which identified significant negative demand responses, was repeated by Pickering, Castley, and Burt (2010), and its main scenario was also used in Switzerland (Behringer, Buerki, & Fuhrer, 2000). Unbehaun, Probstl, and Haider (2008) also asked respondents about reactions to ‘several consecutive years of snow deficiency’. However, such studies raise the question of how ‘very little snow’ is to be interpreted. Does that mean snow fall has been so deficient that ski areas did not open at all, are open only half as long as usual, or open an average length of time, but have poor conditions (e.g., bare patches) or have to rely heavily on snowmaking? Depending on respondent perceptions, scenario responses could be very different. Furthermore, these studies did not examine how individuals have responded to previous marginal snow conditions. Steiger’s (2011) examination of the impact of the record warm winter of 2006–07 in the Austrian Tyrol, found that skier numbers had significantly declined, with his results standing in contrast to the stated responses found in regional surveys (Behringer et al., 2000; Unbehaun et al., 2008). Other studies (Dawson, Havitz, & Scott,

2011; Dawson, Scott, & McBoyle, 2009) also show limited variation between responses during past conditions (observed behaviour) and future seasons (stated behaviour), indicating that behavioural adaptation to future climate change may be similar to what has been observed in recent analogously warm winter seasons.

With regard to adaptation, studies of winter tourism indicate that skiers may become more flexible in time and space under climate change scenarios (Dawson & Scott, 2010), while the acceptance of technical adaptation to climate change is accepted in some areas (snowmaking), though probably not in others, such as indoor skiing to substitute foregone cross country skiing opportunities (Landauer & Pröbstl, 2008). However, acceptance of further technical adaptation solutions should natural winter landscapes change remains unclear. Evidence is similarly limited with regard to other forms of tourism (Martinez Ibarra, 2011; McEvoy, Cavan, Handley, & Lindley, 2008; Scott et al., 2008).

Tourist Responses to Climate-Induced Environmental Change

Tourist perceptions of environmental change are particularly important for destinations that are sensitive to climatic change (Gössling & Hall, 2006a; Hall & Lew, 2009; Scott, 2006; Scott, Jones & Konopek, 2008). For instance, the perceived quality of the alpine environment is an important attraction for mountain tourism. Studies of how tourists might respond to changes in North American mountain landscapes indicate non-linear responses, with an increase in visitation under moderate warming scenarios (Richardson & Loomis, 2004; Scott, Jones, & Konopek, 2007), but a decline in an “extreme heatwave” scenario (Richardson & Loomis, 2004). Receding glaciers have been cited as a reason not to visit parks in the future (Yuan, Lu, Ning, & He, 2006). However, the perception of contemporary visitors may not be shared by future generations (Scott et al., 2007). Despite concerns that climate-induced environmental change may adversely impact mountain destinations, the temporal scale of these changes are such that, with the exception of a few high profile attractions (e.g., snow capped tropical peaks like Mt. Kilimanjaro) or specialised market segments (e.g., mountaineers), the eventual impact on visitation to mountain destinations may actually be lessened as the frame of reference of mountain landscapes evolves.

The impact of climate change related reef degradation and loss on dive tourism destinations is also an area of uncertainty (Gössling et al., 2007; Kragt, Roebeling, & Ruijs, 2009). Reef health, including the impacts of coral bleaching, is regarded as important to the experience and satisfaction of dive tourists (Fenton, Young, & Johnson, 1998; Roman, Dearden, & Rollins, 2007; Zeppel, 2011). Studies for Zanzibar and Mombasa found that awareness of bleaching among tourists was low (28–45%), but appeared to increase after bleaching events (Ngazy, Jiddawi, & Cesar, 2002). However, there is a lack of longitudinal research in assessing long-term environmental changes on tourist awareness, activities, satisfaction and destination choice. Significantly, in a

study of divers in Mauritius, Gössling, Lindén, Helmersson, Liljenberg, and Quarm (2007) found that the state of coral reefs was largely irrelevant to divers and snorkelers, as long as a certain threshold level, defined by visibility, abundance and variety of species, and the occurrence of algae or physically damaged corals, was not exceeded. This is consistent with the findings of Main and Dearden (2007) that 85% of recreational divers failed to perceive any damage to reefs in Phuket after the 2004 Indian Ocean tsunami.

In the case of beach change, a survey of tourists to Barbados and Bonaire found that under a severe scenario where “beaches largely disappeared”, 77% would be unwilling to return (Uyarra et al., 2005), though again it is unclear how such a scenario was interpreted by respondents. Greater complexity was revealed in a study of perceptions of beach erosion and restoration in Playcar, Mexico (Buzinde, Manuel-Navarrete, Kerstetter, & Redclift, 2010a; Buzinde, Manuel-Navarrete, Yoo, & Morais, 2010b). Those with a positive view largely focused on the additional recreational opportunities provided by the erosion control structures in the water. Those with negative reactions were often unaware of the eroded beaches and had expected the state of beaches as reflected in marketing images. A third “reconciliatory” group viewed beach erosion control measures as aesthetically unpleasant but appeared to understand their role in beach protection. The study also found that some tourists associated degraded beach conditions with climate change and expected this to become more common in the future.

The pollution of water bodies and outbreaks of species perceived as harmful or unpleasant have been studied in various locations. Accumulation of jellyfish appears to have affected tourist destinations in Hawaii and the Gulf of Mexico (Purcell, 2012). Algal blooms may affect water quality, cause skin irritations, smell, and in some cases may be poisonous, but their long-term consequences for destinations is largely speculative (e.g. Englebert, McDermott, & Kleinheinz, 2008; Galil, Gershwin, Douek, & Rinkevich, 2010). Gasperoni and Dall’Aglio’s (1991) survey of tourists in the Adriatic, all of whom had some knowledge of algal blooms before travelling to the coast, found that 73% reported a negative influence of the algae on their holidays, especially swimming. Similar findings were presented for algal blooms in the Baltic (Nilsson & Gössling, 2012).

Demand Implications of Mitigation Policies and Tourism Mobility

While most countries have not adopted strict emission reduction goals, these do exist in the European Union and a few countries (OECD & UNEP, 2011). Mitigation policies, especially tax and market-based instruments, may lead to an increase in the costs of travel as well as increase awareness of climate change and travel emissions. Studies of such effects have so far focused entirely on air travel, the most energy intense tourism sub-sector, and the results vary considerably (Gillen, Morrison, & Stewart, 2003). Leisure travellers appear

more price sensitive than business travellers, and short-haul travellers more than long-haul. The reason for this is that there are more choices and possibilities for substitution for shorter trips compared with long ones (Brons, Pels, Nijkamp, & Rietveld, 2002), while the commitments of business travellers makes them more willing to accept higher prices so that they have flexibility and certainty in their travel arrangements (Hall, 2009).

Studies examining the potential impact of current aviation sector mitigation policies have found little effect on overall international tourism demand. Although all studies project a small decrease in the growth of international tourist arrivals versus a scenario with no emission reduction policies, in all cases demand for air travel and international tourism continues to increase (Gössling, Peeters, & Scott, 2008; Mayor & Tol, 2007; Mayor & Tol, 2010; Pentelov & Scott, 2010; Pentelov & Scott, 2011). Consequently, there is no evidence to suggest that mitigation policies for international aviation would have even a moderate impact on tourism demand in the immediate future. Likewise, growing awareness of the energy intensity of travel, reflected in various surveys (Becken, 2007; Brouwer, Brander, & Van Beukering, 2008; Gössling, Haglund, Källgren, Revahl, & Hultman, 2009; Higham & Cohen, in press; McKercher, Prideaux, Cheung, & Law, 2010), appears unlikely to affect travel behaviour (Cohen, Higham, & Cavaliere, 2011; Gössling et al., 2009; Hares, Dickinson, & Wilkes, 2010). Such results indicate that customer attitudes toward flying are unlikely to have a meaningful impact on tourism demand in the near term.

Demand Implications of Climate-induced Societal Change

Long-range scenarios for global tourism beyond the year 2030 do not exist (cf. World Tourism Organization (UNWTO), 2011). Consequently, it has not been possible to examine the implications of climate change for the socio-economic conditions that are the foundation of long-range tourism scenarios. It is clear, however, that reductions in global or regional GDP resulting from climate change would reduce consumer discretionary wealth available for tourism and have negative repercussions for anticipated future growth in tourism demand (Hall, 2010a).

Overall, the discussion has shown that while there are various insights to be gained from existing tourist response studies, these are also severely limited by geographical, thematic, or socio-cultural focus and methods, the latter involving, for instance, qualitative in-depth approaches with a few interviewees to broad quantitative surveys with thousands of respondents. Analogues may provide more robust insights (Scott et al., 2012), while econometric studies have a wide range of uncertainties with regard to behavioural response. For this reason, the following section outlines a conceptual framework for the analysis of tourist responses to climate change, along with a discussion of key research gaps concerning tourist perceptions of change.

A CONCEPTUAL FRAMEWORK FOR ANALYSIS OF TOURIST RESPONSE TO CLIMATE CHANGE

Climate change is but one aspect affecting tourist motivation and demand, and its varied influence on motivation has received little consideration in tourism literature, although the psychological effects of climate change have been noted elsewhere (Doherty & Clayton, 2011; Hulme, 2009; Figure 1). Some motivations will be unaffected by climate change, while others will be positively or negatively affected. For example, safety and security needs may be broadly affected by climate and environmental change (Hall, Timothy, & Duval, 2004). For the majority of travel motivations (Pearce & Lee, 2005), the influence of climate change is anticipated to be negligible or mixed (positive and negative) (Maher, Johnston, Dawson, & Noakes, 2010). Not all motivational factors for travel are equally important, with factors relating to 'novelty', 'escape/relax' and relationship' having greater importance than others (Pearce, 2005). However, there is little empirical understanding of how these specific motivational factors will be affected by climate change.

Motives for travel are also interlinked with destination attributes. The destination or site chosen for a given holiday or leisure activity has to meet motivational demands and provide satisfactory experiences in order to be successful. However, destinations appeal to tourists for a number of reasons, including their uniqueness; perceived authenticity; tourist resources, including climate; travel time and travel cost; perceived safety and security; existing facilities, services, and access; and host hospitality (Hall, 2005). The respective combination of destination attributes and travel motives results in a destination's specific attractiveness (see Figure 1, points 1 and 4). It appears that all of these destination attributes will be influenced by climate change, though some will be more affected than others (point 2).

There are fundamentally different timelines as to when the impacts of climate change will become relevant for tourism transport and destinations. Impacts resulting from extreme climate events or climate-sensitive environmental changes (e.g., coral bleaching), for instance, can occur at anytime and are difficult to project (Gössling & Hall,

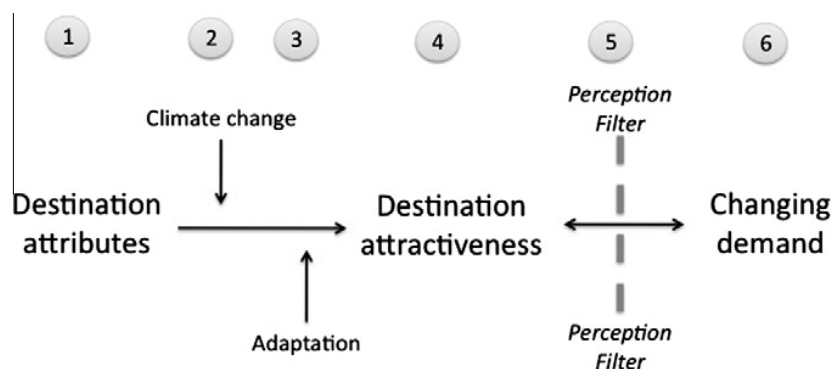


Figure 1. The Role of Perceptions in Defining Destination Attractiveness. See text for explanation of numbers

2006a). Increasing transport costs as a result of global and national climate policy are not likely to become significant in most parts of the world for many years (Nawjin & Peeters, 2010; OECD & UNEP, 2011). The increasing costs of oil and issues related to overall economic conditions in tourist generating regions are likely to have a far more immediate impact on travel behaviour than costs that arise from climate change *per se* (Gössling & Hall 2006a; Hall, 2010a, 2010b; Scott, Jones et al., 2008). Even less relevant to the immediate future of tourist behaviour are long-term changes in climate parameters or environments (Scott, Jones et al., 2008). Destinations may be able to respond to long-term changes through both anticipatory and reactive adaptation (point 3). For instance, changed business and destination price structures may offset increasing transport costs, while product and marketing innovations may also be used to attract new customer groups (Uyarra et al., 2005). The outcome of all of these processes would then represent destination attractiveness at a given point in the future and constitutes the basis for changing demand (point 6).

The greatest uncertainty is represented by tourist perceptions of change (point 5). Perceptions play a major role in tourist decision-making, representing an important intermediary stage of information processing, and are consequently highly important in influencing the actual outcome of the individual traveller's personal negotiation of reported or experienced change. While there appears to be consensus on the significant role of perceptions (Gössling & Hall, 2006a; Moreno & Becken, 2009; Nawjin & Peeters, 2010; Scott et al., 2007; Scott, Jones et al., 2008), these are insufficiently understood and represent a major research gap in the tourism and climate change literature.

COMPLEXITIES AND UNCERTAINTIES REGARDING TOURISTS PERCEPTIONS OF CLIMATE CHANGE

Perception, understood in this context as the “process of receiving and interpreting ‘information’ through all senses” (Gössling et al., 2006, p.423), includes visual, audio, olfactory, haptic or sensual personal experiences, as well as written, audio or visual accounts provided by third parties (Decrop, 2006; Tasci, Gartner, & Cavusgil, 2007). Some of the complexities of tourist perceptions in the context of climate change are offered below and summarized in Table 1.

Perceptions Vary Depending on Holiday Type and Role

Different forms of holidays, such as daytrips, short trips, the main annual holiday, or the ‘once-in-a-lifetime’ trip are characterized by varying planning horizons and different expectations depending on the socio-cultural function of the trip and travel motives (Hall, 2005). Consequently, it can be assumed that climate change will impact differently on a trip with a high degree of commitment and planned several months prior to travel than a spontaneous daytrip (e.g. March &

Table 1. Characteristics of and Issues Surrounding Tourist Perceptions of Climate Change Impacts

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- Perceptions vary by holiday type and role
 - Perceptions change with age, culture and other socio-demographic variables
 - There are considerable differences in individual preferences, values and personalities
 - Perceptions evolve over travel careers and with the degree of specialization
 - Perception is comparative
 - There are significant differences between ex-situ and in-situ perceptions
 - Perceptions are heavily influenced by media
 - The media will increase interest in 'last chance' tourism
 - Single events can have wide-ranging consequences for perceptions
 - Perceptions are complex, adaptive and hierarchical
 - Perceptions are context-dependent
 - The accurateness of the understanding of climate variables and resources (e.g. weather parameters) is insufficiently understood
 - Adaptive behaviour is insufficiently understood
 - Public perceptions of climate change can be ill-informed and highly polarized
-

Woodside, 2005). The temporal sequence of climatic related information is one important difference, where longer planning horizons would generally be focused on longer-term weather averages (climate), while shorter day or weeklong trips will be heavily influenced by weather forecasts and on-site weather (Scott & Lemieux, 2009). Depending on the type of holiday or trip, there may also be varying degrees of resilience to climatic conditions, especially with respect to the degree that new climate extremes may be tolerated (Scott & Lemieux, 2009). Rutty and Scott (2010) found that travellers to the Mediterranean have different perceptions of unacceptably warm temperatures, depending on whether their destination was a coastal beach resort or an urban sightseeing tour. They also found that media stories about heatwaves at their intended destination had a different impact on travel decisions depending on the level of commitment to the trip, i.e., more influence if still planning a trip than if travel and accommodations already booked. Similarly, Ceron (2009) and Hewer and Scott (2011) show that French and Canadian campers accept higher maximum temperatures than tourists staying in other accommodation, and that temperatures perceived as unacceptably warm depended on activities. Different resilience to climate change-induced environmental changes was also found among market segments visiting national parks in Canada's Rocky Mountains, where long-haul tourists that travelled specifically to see certain attractions were much less willing to visit these parks if these attractions were impacted by climate change than tourists from the region (defined as six hour travel time) (Scott et al., 2007; Scott, Jones et al., 2008b).

With respect to changing transport costs associated with climate policy, many segments of air travel are price inelastic, i.e. higher prices are

tolerated because of the relative importance ascribed to air travel. However, price elasticities are different for short-haul and long-haul travel, and business, VFR and leisure travel (Brons et al., 2002; Gillen et al., 2003; Mayor & Tol, 2007; Schiff & Becken, 2010). These findings are also relevant for special interest travel motivations. Although related to the motivations and travel careers of leisure tourists as identified by Pearce (2005), “serious leisure” (Stebbins, 1979) tourists commitment to the pursuit of their interests may be such that some of the impacts of climate change on transport systems and destinations may be less likely to affect them. Indeed, in some cases environmental change may even provide a motivation to engage in volunteering or other activities (Curtin, 2010). Similarly, VFR (Visiting Friends and Relations) tourism is also often marked by a strong social commitment that may mean that the tourist will travel to a destination for family or relationship reasons, despite the effects of climate change (Gössling & Hall, 2006), while business travel is also related to employment commitments (Forsyth, Dwyer, & Spurr, 2007). Consequently, there is an important situational context in which perceptions of climate change and possible tourist responses need to be studied.

Perceptions Change with Age, Culture and Other Socio-demographic Variables

Perceptions of climate and climate change impacts also differ among tourists from different cultural and climate contexts, as well as with other socio-demographic variables such as age or family status. For instance, there are differences in preferred beach temperatures among young adult travellers from different countries (Rutty & Scott, 2010; Scott, Jones et al., 2008), as well as differences in climate preferences among young adult and senior travellers in Germany, the Netherlands, and Canada (Hewer & Scott, 2011; Moreno, 2010). Research on weather perceptions of French travellers by Ceron (2009), shows that temperature preferences vary regionally within France, and between age cohorts, with older people (+60 years) being more heat sensitive than younger people (18–24 years). Perceptions of suitable weather and concerns about weather risks during travel were found to differ with family status, with single professionals far more resilient to weather than families with children (Limb & Spellman, 2001). Similarly, Buzinde et al. (2010a, 2010b) found that families interpreted efforts to correct beach erosion at Mexican coastal resorts differently than tourists that preferred natural beach conditions, because children enjoyed playing on beach protection structures while the reduced wave action also created safer swimming conditions.

Culture plays an extremely important role in travel behaviour and what may be perceived as unattractive in one culture may be attractive in another. For example, although many international travellers avoid the torrential downpours of the monsoon season, in the Indian context it is a time of refreshment and renewal. Monsoon tourism is promoted to domestic tourists as well as to the Middle East market (Dhanesh, 2010) for whom the cultural value of heavy rain is different. Denstadli,

Jacobsen, and Lohmann (2011) also found inter-cultural differences in summer time weather preferences among northern Scandinavian tourists. Although there are different values attached to aspects of weather, such as rain, storms and snow, and seasonality in different cultures (Hulme, 2008; Olwig, 2005), there is a major knowledge gap as to the role that such culturally based perceptions play in tourist decision-making and responses to climate change (Hall, 2008a). Most research on tourist climate preferences has come from Europe, North America, and Australasia and an improved understanding of cross-cultural differences is an important future research area (Scott, Jones et al., 2008).

Variation in Individual Preferences, Values, and Personalities

It is generally accepted that there are considerable differences between individual holiday preferences and value systems (Gilg, Barr, & Ford, 2005). Depending on the belief systems constructed out of these value dimensions, norms may not translate into changes in behaviour (cf. Hansla, Gamble, Juliusson, & Garling, 2008), or lead to the acceptance of change. For instance, the studies referred to in the previous two sections have found that personal differences exist in climate preferences for holidays and interpretations of climate-induced environmental change, even among similar market segments and demographic cohorts, while Gössling et al. (2009) indicate varying degrees of responsibility taken by air travellers for emissions, as well as their willingness to act on these through offsetting (McKercher et al., 2010; Wells, Ponting, & Peattie, 2011). Overall, these examples would indicate that tourist perceptions are value-dependent and not homogeneous. Likewise, traveller personalities are not identical and allow for differing responses to climate change, including the degree of loyalty to certain locations (Dawson et al., 2011).

Perceptions Evolve Over Travel Careers and With the Degree of Specialization

Pearce and Caltabiano (1983) argued that travel experience changes motivation, showing that the importance of 'self-development' and 'nature seeking' increases with travel experience. Climate change should consequently have different consequences for experienced and specialized travellers depending on their interests. Research by Gössling et al. (2007) and Dearden and Manopawitr (2010) indicates that novice divers are less impacted by climate change, as they have a more limited knowledge of what constitutes healthy coral reefs. Moreover, diving may not be their primary holiday motivation. In contrast, highly specialized divers may be very aware, not the least through special interest media, of the status of coral reefs in specific destinations. Similar differences were found among the perceptions of risk posed by climate change to ski tourism and the potential behavioural responses of expert skiers versus novices (Behringer et al., 2000; König, 1998;

Dawson & Scott, 2010; Dawson et al., 2011; Pickering et al., 2010). Overall, climate change will thus be perceived differently depending on individual travel careers and degree of specialization.

Perception is Comparative. Tourists comparing destinations over time and space will also perceive climate change impacts relatively. For instance, with warmer winters and reduced natural snow a number of destinations will become snow unreliable (Scott, Jones et al., 2008; Steiger, 2011). However, less favourable conditions for winter sports in one location may be compared to other locations, with the possible outcome that identically 'marginal' conditions in several destinations within a given distance may lessen perceived impacts. Similar comparative situations will emerge with respect to other environmental assets impacted by climate change. If a large proportion of destinations share similar resource attributes then degraded conditions may become the new 'normal' status. This could particularly be the case for new generations of tourists that did not know previous conditions and therefore do not have perceptions of change (Scott et al., 2007).

Differences Between Ex-situ and In-situ Perceptions

Differences in perceptions also exist depending on how information about climate change is derived. For this purpose, it is useful to distinguish ex-situ and in-situ perceptions. In an ex-situ situation, a travel decision is made without previous direct knowledge of a destination. The understanding of the destination is consequently building on images, text and verbal communication by third parties, including, for instance, advertisement, guidebooks and other media, recommendations by friends or relatives or travel agents. For such 'externally' derived information, credibility plays an important role (Hall, 2002). Advertisement is generally understood as controlled information, and perceived as less credible than uncontrolled information, such as newspaper articles or word-of-mouth information, including travel commentary websites and social networks (Tasci & Gartner, 2007). Importantly, in ex-situ situations, all information about a destination is derived from 'outside'.

This situation is more complex where visits to a destination have been made previously, in which case perceptions are at least partially derived from in-situ experiences (Tasci et al., 2007). In-situ perceptions will be shaped in three phases, i.e. a pre-visitation, visitation and post-visitation stage (e.g. Fridgen, 1984; Figure 2). In the pre-visitation phase, tourists are likely to rely on a mix of previously acquired in situ knowledge (personal experiences) and third party information. The understanding of a given destination or site is then shaped during the stay, where the experience of particular favourable or unfavourable conditions will affect perceptions. Depending on travel motivation, socio-demographic variables, geographical origin, costs, and other variables, such as experience resulting in attachment to place or familiarity with a given destination, deviation in personal experiences

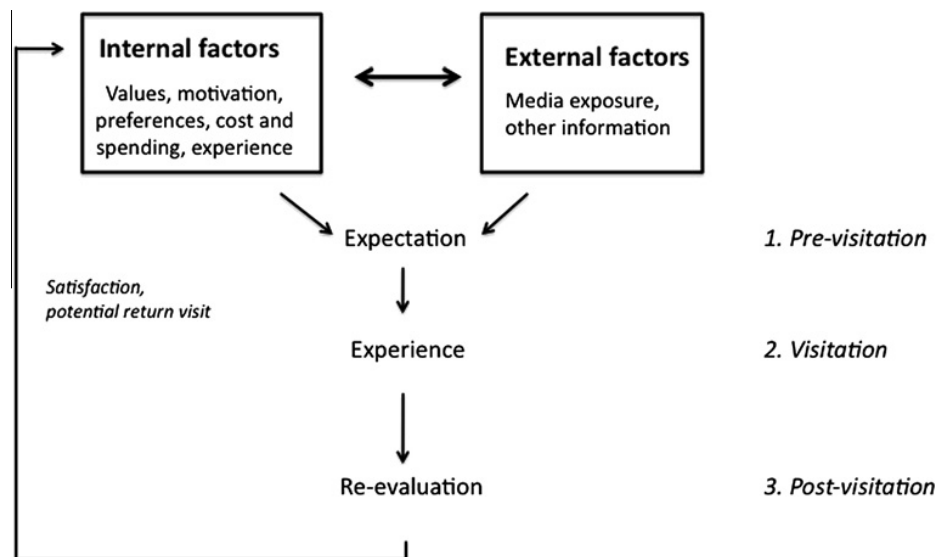


Figure 2. Tourists' Evolving Understanding of Destinations

from expectations and preferences would then be interpreted and reflected upon in the post-visitation phase, leading to a re-evaluation of the suitability of the destination in terms of satisfaction for continued holiday-making. In-situ perceptions are consequently more complex.

Tourist Perceptions are Heavily Influenced by Media

Media headlines about the impacts of climate change on tourism have often suffered from speculative and sensationalistic reporting (Hall & Higham, 2005; Scott, 2011; Scott & Becken, 2010). Headlines declaring the Mediterranean to be “too hot” for summer tourism, or the “collapse” of ski tourism in the Alps or Rocky Mountains, are examples (Scott et al., 2012). Where media speculation is convenient, tourism stakeholders may be quick to pick up on headlines, which then can then turn into truth systems, despite a lack of credible scientific evidence. An example is the ‘Baltic as the new Mediterranean’, which is now considered a ‘fact’ in climate change adaptation plans in Sweden and Germany (Regeringskansliet, 2007; The Federal Government, 2008). In the absence of credible information and recurrent exposure to such messages, consumers may eventually accept these speculative impacts as reality, particularly when consumers have only limited geographical knowledge of destinations (Selby, 2004), and adjust their behaviours accordingly. Where this occurs, the reputational damage caused by disinformation to destinations could have a greater near-term impact on tourism visitation than the actual impacts of climate change (Gössling & Hall, 2006a; Scott, 2011; Scott, Jones et al., 2008). Similarly, media coverage of high-magnitude weather related events such as cyclones, hurricanes, floods, and heatwaves can also create misleading perceptions about a destination (Hall, 2010a).

In an attempt to gain insight into how climate related media stories might influence travel decisions to the Mediterranean, Rutty and Scott

(2010) used excerpts from a ‘heatwave’ story in a popular UK newspaper to evaluate the influence on respondent travel plans to the region. While the largest proportion of respondents (39%) were unsure how the media story would influence their Mediterranean travel plans, 32% stated that such stories would have a strong or very strong influence on their plans, and only a small percentage (12%) were not influenced by this type of media story. For those planning a Mediterranean holiday, but had not yet booked their travel reservations, 52% stated that they would change their travel plans in some manner (28% would still book a Mediterranean holiday in a location that was not experiencing the heat wave; 19% would change the dates of their holiday, and 5% would go to another region). If their holiday reservations had already been booked, fewer respondents would change their plans, with the majority (58%) stating they would still go forward with their Mediterranean holiday reservations as originally booked.

Even though Hall (2002, p.44) cautions that unless a crisis “continues for a substantial length of time then it is extremely unlikely to have permanent impacts on destination [or activity] perceptions”, indicating that media impacts may be short-lived, it can be assumed that where information is repetitive and fits existing understanding, the media can shape perceptions fundamentally. This is exemplified by Cohen and Higham’s (2010) finding that media coverage on the impacts of air travel has led to generally raised awareness of emissions, though not necessarily leading to behavioural change. Another example is the “last chance tourism” phenomenon, where the media suggest that visitation to some destinations is inspired by climate change or travel to a location is advised “before its gone” (Lemelin, Dawson, Stewart, Maher, & Lueck, 2010). However, with the exception of some very low lying islands or especially vulnerable attractions, such as glaciers, tourism destinations and attractions will not physically ‘disappear’ or ‘vanish’ as a result of climate change (Scott et al., 2012).

Further research is needed to specify how the media shapes perceptions of tourism under various climate change scenarios, and the consequences this has for behaviour and destination choice. There is also a need to identify more effective communication and marketing campaigns to correct tourist misperceptions about climate impacts on a destination as part of government and industry tourism adaptation strategies.

Single Events Can Have Wide-ranging Consequences for Perceptions

Negative perceptions can result in abrupt changes in travel behaviour, as well as longer-term behavioural modification (Gössling & Hall, 2006; Hall, 2006). Importantly, negative perceptions can arise out of single events. For instance, the 2003 European heat wave led to fundamentally changed travel patterns in 2004 (Gössling & Hall, 2006a). Other extreme events may have similar consequences (Denstadli et al., 2011; Nilsson & Gössling, 2012). Evidence suggests that travellers put great weight on single positive or negative events when recollecting

holiday experiences, although such weight may change over time (Andressen & Hall, 1988/89). Further research is needed to understand the impacts of extreme weather and environmental events on tourist behaviour in both the short and longer term.

Perceptions are Complex, Adaptive and Hierarchical

Perceptions are complex, in the sense that they are always influenced by various parameters, e.g. temperature alone never represents “climate” or “weather” (Gössling et al., 2006; Scott, Jones et al., 2008), while considerations by individual tourists may result in unexpected outcomes. Perceptions are shaped by media reports, with uncontrolled information (e.g. newspaper articles, word-of-mouth, social media) having greater weight in influencing individuals. However, where information does not fit already existing beliefs, the result may be cognitive dissonance, where “deviating” information is ignored (Tasci & Gartner, 2007). A general uncertainty is also whether there are trade-offs, in the sense that changes perceived as ‘negative’ are weighted against ‘positive’ change, or other factors perceived positively (Verhallen & van Raaij, 1986). Likewise, there is an assumption that increasing temperatures will be positive for northern European tourist destinations. Yet, this perception does not consider the impact of other, potentially negative, environmental changes in the region (e.g. Hall, 2008b; Gössling & Nilsson, 2011) or that tourists will still want to travel to regions where climatic resources are anticipated to degrade. For example, Moreno (2010) found 72% of respondents from Belgium and the Netherlands would still travel to the Mediterranean for holidays even if their self-defined preferred climatic conditions were available in Northern Europe.

The potential acceptance by tourists of environmental change is also related to the expectations that have been created in tourism promotion as well as the product package (Hall, 2008b). For example, in a survey of Christmas tourists to Rovaniemi ‘the official home of Santa Claus’ in Finland, Santa Claus was the most important reason to choose Rovaniemi as a destination (Tervo, 2009). Other important factors included snow, ‘real winter’, the season, activities, reindeer and a child friendly environment. Respondents were provided with a number of different future climate change related scenarios for Christmas tourism in Rovaniemi, with less than one-fourth of respondents stating to have considered travel if there were no snow. It is unclear, however, how many tourists knew about the likelihood of snow before planning or booking the trip, or whether this destination attribute was implicitly expected. In contrast, Buzinde et al. (2010a, 2010b) noted how industry representations of “stable and pristine” beaches are increasingly being challenged by tourists using online social networking sites, raising questions regarding marketing ethics and threshold conditions, and the willingness of consumers to trade off environmental conditions for price discounts. Such results only reinforce that the adaptive behaviour of tourists is insufficiently understood.

It is equally unclear how negative experiences may dominate holiday experiences and impact on holiday satisfaction. Hierarchies for some aspects related to climate change have been established, however. For instance, there is consensus that selected weather parameters dominate perceptions—rain, for instance, is likely to dominate experiences of summer beach and urban holidays (Gössling et al., 2006; Scott, Gössling and de Freitas, 2008). The range and interaction of parameters involved nevertheless remains insufficiently understood.

Perceptions are Context-dependent

Depending on the situation, it can also be assumed that perceptions may vary. For instance, in a prolonged cold winter, a warm climate may be perceived as more desirable than in a warm summer; or on a rainy cold day, snow may become more desirable for a skier than on a “perfect” snow day. This is of importance for research methodologies, as various ex-situ surveys (Marshall, Marshall, Abdulla, Rouphael, & Ali, 2011; Moreno, 2010; Ritty & Scott, 2010; Scott et al., 2008) do not account for seasonality and the climatic conditions at the time of study. Further research is warranted to quantify this influence.

Accurateness of Understanding of Climate Variables and Resources is insufficiently understood

A wide range of publications assess the consequences of direct climate change for tourism, based on the assessment of changes in weather parameters (Scott et al., 2012). It remains unclear, however, to what degree tourists are able to accurately estimate temperatures and other weather parameters in either in-situ or ex-situ situations. This regards both single parameters, such as temperature, and whether they can distinguish the effect of other parameters, such as humidity and wind, in influencing felt temperatures. Similar issues emerge with understanding of emissions from different activities and transports (Higham & Cohen, in press). Consequently, it would be essential to carry out further studies to better understand the role of such complexities and the accuracy of existing studies in this regard.

The Adaptive Capacity of Tourists is Insufficiently Understood

Tourists are considered to have the greatest capacity to adapt to the risks and opportunities posed by climate change (Scott et al., 2008). However, the actually adaptive capacity of tourists remains largely unexplored. For instance, tourists may learn to accept new conditions, adjust their perception of acceptable or preferred environmental conditions, or focus on a different set of activities supported by prevailing environmental conditions. There remains much scope to better understand adaptive capacity by assessing analogue events and utilizing

research techniques from fields such as acceptable limits to change (Scott et al., 2012).

Short-term Versus Longer-term Change in Travel Behaviour is Unclear

Various short-term reactions to climate and weather conditions have been reported, including last-minute booking or spontaneous change of destinations (Nilsson & Gössling, 2012; Scott & Lemieux, 2009). However, many of the changes associated with climate change will occur in the medium to long-term future. Consequently, the stated behavioural response to climate change impacts in the extant literature usually refers to unknown, hypothetical futures (Dawson & Scott, 2010). Moreover, in longer-term scenarios, destinations and businesses may be able to adapt. Nevertheless, while the impact of individual events such as storms, drought and wildfires on tourist perceptions of a destination may be short-lived, some impacts of climate change are likely to be more enduring and may, over time, alter the perceived attractiveness of a destination. The expansion of geographical areas susceptible to the transmission of vector-borne diseases, such as malaria and dengue (Hall, 2006; Scott, 2006), to popular tourism destinations where these diseases are not now prevalent is one such example. How would travellers respond if required to take malaria medication or other preventative procedures in order to go to the Azores, South Africa, Cuba or Mexico in the future? Traveller response to media coverage of regional outbreaks and perceived changes in disease risk could have significant implications for travel patterns and remains an important area for further research.

Public Perceptions of Climate Change can be Ill-informed and Highly Polarized

General climate change perceptions of some members of the general public have been found to be ill-informed and highly polarized, such that persistent patterns of environmental ignorance and the emotional response to climate change are thought to represent important barriers to behavioural change (Hoffman, 2010). The public scepticism toward climate change has implications for how climate-induced changes in the environment are perceived and the willingness of tourists to engage in behavioural changes to reduce the carbon footprint of their holidays (Scott, 2011; Weaver, 2011).

CONCLUSIONS

This paper set out to review existing studies in order to develop a coherent outline of major current uncertainties and research needs with regard to tourist responses to climate change. As has been shown, there is an increasing body of literature on the impacts of climate change on tourist behaviour and demand. However, many of these studies make assumptions about the understanding and perception

of climate-related changes as well as resulting changes in demand and motivation for often generalized tourism populations. Key knowledge gaps therefore remain. As motives for travel are interlinked with perception of destination attributes, climate change can affect destination attractiveness. However, as destinations will also have appeal for reasons largely unaffected by climate change, including uniqueness, travel time, standard and cost of accommodation, perceived safety and security, existing facilities, services, access, and hospitality and service (Hall, 2005), it is clear that climate change is but one factor affecting attractiveness. Moreover, destinations can seek to deal through adaptation with climate change and lessen potential impacts.

Out of these observations, a model was created to conceptualize where perceptions of change become relevant, and where research gaps exist. To this end, 14 key research issues were outlined, which make it clear that advancing the understanding of tourist responses to the various impacts of climate change remains a highly challenging, but fundamental, research area, if accurate projections of changes in geographic and temporal patterns of tourism demand are to be possible. More specifically, it is clear that perceptions vary by holiday type and role, and change with age, culture and other socio-demographic variables. As these also change with individual preferences, values and personalities, and evolve over travel careers and with the degree of specialization, demand responses to climate change cannot be generalized for broader tourist populations. Overall, there is thus a need to strategically continue research into behaviour and demand responses to fill these key knowledge gaps on which much research depends and to which much government and business decision-making is oriented. **A**

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