

The Potential Contribution of the 2010 Soccer World Cup to Climate Change: An Exploratory Study among Tourism Industry Stakeholders in the Tshwane Metropole of South Africa

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Abstract

With increasing concern regarding global climate change, there is a growing need to ensure responsible management practices for mega events that take cognisance of the realities and challenges regarding this phenomenon. The existence of a relationship between the tourism industry and climate change has only recently been addressed by researchers. This study explores the potential impacts of mega events on climate change, with particular reference to the 2010 Soccer World Cup. The methodology used for this study was in-depth personal interviews conducted amongst key stakeholders in the Tshwane Metropole, South Africa. A combined use of purposive and snowball sampling was used to identify the target population. A key finding of the study was that the various stakeholders are not aware of the contributions their operations make to climate change. However, when these contributions are linked to an event such as the 2010 Soccer World Cup, greater consideration is given to this phenomenon in their business operations. This study indicates that it is of crucial importance to consider and responsibly manage the impacts that mega events can have on climate change. Based on this study it is suggested that appropriate environmental management strategies and guidelines are developed, not only for individual stakeholders, but also for all industries in South Africa in order to ensure that operations are conducted in a sustainable manner.

Keywords: Global Warming; Climate Change; The 2010 Soccer World Cup; Tshwane Metropole

Background and Objectives

The increasing awareness of, and concerns regarding, the future impacts of global climate change has given rise to various research initiatives in this field (Friends of the Earth, n.d.; Intergovernmental Panel on Climate Change, 2001, p. 5; IPCC, 2007; UNEP, 2007; UNWTO, 2008). Only recently has research appeared regarding the relationship between climate change and the tourism industry (Hall & Higham, 2005, p. 9; Becken & Patterson, 2006, p. 323; Dubois & Ceron, 2006, p. 399; Scott, 2008; Simpson, 2008; UNWTO, 2008). However, an extensive academic search of electronic databases, including EBSCO Host, Emerald, Google Scholar, Science Direct and the Internet for relevant articles, has revealed that very little research has

been done regarding climate change and mega events such as the 2010 Soccer World Cup. No relevant research could be identified that calculates the contributions a mega event, such as the 2010 Soccer World Cup, could have on climate change.

With increasing emphasis being placed on environmental sustainability, there is a growing need to identify the key areas where mega events can impact on climate change and to pro-actively develop and implement appropriate environmental management guidelines and processes for mega events that consider climate change factors.

While analysing information regarding the 2010 Soccer World Cup, certain components of the tourism industry came to light that could contribute to climate change. These different components, namely the transport sector; the accommodation sector; the restaurant sector; the activities and attractions sector; and the retail shopping sector, were analysed in the studies done by Becken & Patterson (2006, pp. 323-338) and Dubois & Ceron (2006, pp. 399-415).

In recent years, more and more organisations and associations have realised the impacts their actions are having on the environment. Organisers of mega events, such as the Olympic Games and the 2006 Soccer World Cup, have followed the trend and have implemented strategies to 'green' their practices (O'Brien, 2006, pp. 240-261; The Federal Environment Ministry, 2006). Previous studies only evaluated the impact of international travellers to the area and the impact of the event on climate change. Researchers have, however, failed to explore what impact the sub-sectors of the tourism industry could have on climate change. This study aimed to address these issues even further by researching how a mega event such as the 2010 Soccer World Cup could impact on climate change. The sub-sectors of the tourism industry, which includes the transport, accommodation, activities and attractions sectors, rarely focus their organisational activities in such a way as to limit the impact their operations will have on climate change. This study therefore attempted to highlight the importance of sustainable practices within the tourism industry.

The main purpose of this study was to determine, by exploratory methods, the perceptions regarding the possible impacts of mega events such as the 2010 Soccer World Cup on climate change among the tourism industry stakeholders within Tshwane, including: public tourism enterprises; private tourism enterprises; the Tshwane 2010 Organising Committee; environmental and tourism experts.

More specifically, this study aimed to achieve the following specific research objectives:

- to identify the tourism industry's perceived contributions to climate change;
- to identify the perceived possible impacts that the 2010 Soccer World Cup can make to climate change; and
- to identify and analyse possible ways in which the impacts of the 2010 Soccer World Cup on climate change can be minimized.

In this article the existing literature regarding climate change, as well as the possible impacts globally and in South Africa, are reviewed. The literature review also investigates the relationship between climate change and the tourism industry, with particular reference to mega

events as part of the tourism industry. The contributions the 2010 Soccer World Cup can have on climate change are discussed. In the second part, the research methodology and data analysis techniques are discussed. Thereafter, the results from the study are presented and these findings are summarised and discussed. The paper concludes with a discussion of the managerial and theoretical implications of this study and directions for further research are presented.

Literature Review

In the following sections the construct of climate change will be discussed. An attempt will be made to provide clear definitions for the construct, as well as broaden the reader's understanding of the construct.

An Overview of the Construct of Climate Change

Climate change can be described as the systematic change in the weather and climate patterns of the earth (Anon, 1991, p. 680; Canadian Climate Impacts and Adaptation Research Network, 2004; Friends of the Earth, n.d). Many scientific studies refer to the term climate change or anthropogenic climate changes as human causes to changes in the earth's climate patterns and climate variability as other changes in climate (Intergovernmental Panel on Climate Change, 2001, p. 5; IPCC, 2007; UNEP, 2007; UNWTO, 2008). Climate change is a natural occurrence that happens slowly over the years and is a multi-dimensional construct that can be influenced by many occurrences both natural and human induced (Anon, 1991, p. 680).

In this study, the Framework Convention on Climate Change (UNFCCC) definition of climate change will be adopted, namely: 'a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods' (IPCC, 2007, p. 943; De Freitas, n.d., p. 6).

The Tourism Industry's Contribution to Climate Change

Since the 1960s and 1970s, when the first research pertaining to tourism and climate emerged, there has been a realisation of a relationship between tourism and climate (Hall & Higham, 2005, p. 9; Scott *et al.*, 2005, p. 45; IPCC, 2007; Scott *et al.*, 2008, UNWTO, 2008).

Even though there has been a global rise in the awareness of the impacts the aviation industry is making to climate change through aircraft emissions, it appears that only recently have researchers begun to look at the rest of the tourism industry (Becken & Patterson, 2006, p. 324; Becken *et al.*, 2003, p. 267; Department of Economic and Social Affairs, 2001, p. 8; IPCC, 2007; UNWTO, 2008, Friends of the Earth, n.d.).

Tourism Transportation

Since the start of 2000, researchers have turned their interest to the wider impacts tourism activities are having on the environment. The greatest concern that was established from these

studies is the large quantities of greenhouse gas emissions generated through travellers' consumption of transportation (United Nations World Tourism Organization, 2007). Many national studies have been done, focusing on specific countries, but little global research has been done in this regard and more priority should be given to its development (Dubois & Ceron, 2006, p. 406).

When considering the impact that tourism is making to global climate change in France, Fontelle, Change and Allemand (in Dubois & Ceron, 2006, p. 405), found that tourism represented about 9% to 10% of the total French global warming footprint in 2000. Of that figure, tourism transportation represented nearly 80%. When turning considerations towards the United States of America, it was established in 2000 that 76.50% of the total CO₂ emissions from the tourism sector are caused by transportation (Dubois & Ceron, 2006, p. 408). Studies in New Zealand calculated that, in 2003, transportation contributed 73% to a domestic traveller's and 65% to an international traveller's energy bill. The same studies calculated that tourism transport will contribute as much as 90% to tourism CO₂ emissions if on-site transportation is added (Becken *et al.*, 2003, p. 274; Dubois & Ceron, 2006, p. 408). These figures clearly show the growing dependency of tourism on transportation and the negative effects of this.

The major concern with aircraft emissions is that a significant portion is emitted at altitude, where the emissions have an impact on the atmospheric composition. These emissions alter the concentration of greenhouse gasses, trigger the formation of condensation trails and may increase cirrus cloudiness, all of which contributes to climate change (Department of Economic and Social Affairs, 2001, p. 9).

Although it is clear from the above studies that transport makes up the largest part of the greenhouse emissions from the tourism industry, it is still necessary to monitor the full impact from the other sub-sectors to build the bigger picture regarding tourism and its impact on climate change.

Other Sectors of Tourism

When the contributions made by tourism activities in the United States of America were evaluated in 2000, it was estimated that 15% of the CO₂ emissions came from the accommodation sector, 2.70% from the restaurant sector, 1% from the retail shopping sector and 4.80% from activities such as water sports (Dubois & Ceron, 2006, p. 407). In New Zealand, Becken *et al.* (2003, p. 274) established that accommodation contributed 17%, while attraction and activities contributed 10% to the energy consumption of a domestic traveller. When looking at the energy consumption of an international tourist in New Zealand, Becken *et al.* (2003, p. 274) found that accommodation contributed 22% and attractions and activities 13%.

When considering the other sectors of tourism, as with transportation, it is necessary to distinguish between different uses and the greenhouse gas emissions of these sub-sectors by tourists. The same studies done in New Zealand used before did exactly this. The researchers distinguished between different types of accommodation used by both domestic and international travellers in New Zealand as well as different attraction and activities that these travellers engaged in while on their trip (Becken *et al.*, 2003, p. 274). Again, these figures cannot be seen

as global figures, but are a clear indication of the energy consumption and greenhouse gas emissions by these different tourism sub-sections.

These studies showed that the types of accommodation establishments that had the highest energy consumptions as well as highest CO₂ emissions were (ranked from the highest CO₂ emissions): hotels; bed and breakfast establishments; hostels or backpackers; motels and campgrounds (Becken *et al.*, 2003, p. 272; Becken & Patterson, 2006, p. 327). With regard to the emissions of accommodation establishments, elements within the establishments that consume energy like air-conditioning, lighting and heating all contribute to the establishment's emission (UNWTO, 2007).

According to these studies, the type of activities done and attractions visited that had the highest consumption as well as highest CO₂ emissions were (ranked from the highest CO₂ emissions): air activity; motorized water activity; adventure recreation; nature recreation; nature attractions and building attractions like museums (Becken *et al.*, 2003, p. 272; Becken & Patterson, 2006, p. 327). The emission is so high for many activities, because transport forms the core of the activity, as is the case with motorized water activities.

When the sub-sectors of tourism, excluding transport are examined, it is necessary to determine the net impact that tourism is making, as domestic tourists do not consume energy at home when they are on holiday. It would be unfair to the tourism industry to consider the total consumption. An incremental estimation needs to be done in order to allow the proper understanding of the impacts of tourism and to find adequate solutions (Dubois & Ceron, 2006, p. 407).

When looking at the energy use and CO₂ emissions from the entire tourism sector it is important to distinguish between direct and indirect impacts of tourism (Becken & Patterson, 2006, p. 324). Direct impacts are those impacts that result directly from tourism activities, but the final tourism product is made up of many activities and processes. These indirect processes could include activities such as marketing processes and the running of a distribution office far away from the tourism product or the consumer, all of which consume energy and contribute to climate change (Becken & Simmons, 2002, p. 344).

In the above studies and analyses, only direct impacts and energy use of the tourism sector were considered. In order to understand and fully grasp the impact that tourism is making, the entire picture needs to be formed by including the indirect impacts in the analyses.

To conclude, this section investigated the relationship between climate change and the tourism industry. Through the direct consumption of large quantities of energy, the tourism industry is making a significant contribution to climate change, of which the largest is its CO₂ emissions.

The next section will focus on the relationship between tourism and climate change by looking at an event such as the 2010 Soccer World Cup, as this event could make certain direct and indirect contributions to climate change.

Climate Change and the 2010 Soccer World Cup

An event such as the 2010 Soccer World Cup can be defined as a mega event. Mega events are defined as being very large events when evaluated according to cost, visitor numbers or psychology (Getz, 1991, p. 46). Events such as the Olympic Games, the Soccer World Cup and the Cricket World Cup are classified as mega events based both on the number of visitors these events attract and the vast amounts of costs generated by these events (Getz, 1991, p. 46).

As a mega event such as the 2010 Soccer World Cup is part of the tourism industry it will be part of the relationship between climate change and the tourism industry and, within the following sections, this study will look at the different facets of this relationship.

The Contributions of Mega Events to Climate Change and the Expected Effect of the 2010 Soccer World Cup

Mega events are intricate proceedings to organise and attract large amounts of visitors annually. It is clear that a mega event of this scale will have huge environmental impacts to consider.

The main environmental impacts identified by the United Nations Environment Programme (in Huggins, 2003, p. 12) associated with a sporting event are: the development of scarce or fragile land; pollution from liquid spills (such as fuels and cleaning agents for example); noise and light pollutions; consumption of non-renewable sources (such as fuels, for example); the consumption of natural resources (such as water and wood); the creation of greenhouse gasses by consumption of electricity and fuel; soil erosion during construction; and from spectators' waste and sewage plants.

Even though all of these environmental impacts are of the utmost importance, this study will only focus on the areas of operation of an event such as the 2010 Soccer World Cup, which will create greenhouse gasses through the consumption of energy and fuel. The other environmental impacts should, however, be incorporated in any further study.

According to various researchers, the major areas of concern connected with a mega event such as the 2010 Soccer World Cup, in terms of energy consumption and CO₂ emissions, include operational aspects that could be directly connected to the event, such as the stadiums and the transport connecting the spectators with the event (Huggins, 2003, pp. 30-47; Godoy, 2006; The Federal Environment Ministry, 2006). However, there are other potential contributing areas of tourism to climate change, namely the broader tourism transport sector, the accommodation sector and the activities sector, which also need to be considered when investigating the environmental impacts connected with a mega event such as the 2010 Soccer World Cup. These environmental impacts, as they pertain to climate change, are investigated in this section.

Other Mega Events

The first mega sporting event to consider the contributions its operations were making to the detriment of the environment was the Sydney Olympic Games, held in 2000 (Godoy, 2006). In 2006, the Soccer World Cup, held in Germany, followed suit with the introduction of the Green Goals project. According to a press release by The Federal Environment Ministry (2006), the Green Goals project is an environmental policy that specifies measurable ecological targets for a football World Cup and, through its application, it was possible for the organisers of the 2006 Soccer World Cup to determine the additional CO₂ emissions caused by the event (Press release by The Federal Environment Ministry, 2006).

The Green Goal project estimates that the 2006 Soccer World Cup contributed to an additional 90,000 tonnes of CO₂ emissions in Germany (Press release by The Federal Environment Ministry, 2006). However, according to Rosenthal of the German Federation for Environmental Protection (in Godoy, 2006), the Green Goal estimates for the CO₂ emissions are too low. The environmentalists calculated that the CO₂ emissions from the four-week mega event were more in the region of 250,000 tons, when considering the extra commercial flights within Germany, as well as considering the additional energy consumption from hundreds of international television broadcasts during that period. In general, Rosenthal felt that the Green Goal project only considered half the CO₂ emissions that were emitted as a result of the 2006 Soccer World Cup.

Again, it is affirmed by the above discussion that any environmental investigation of mega events is currently only focused on the direct operations of the event. When considering the possible contributions of the 2010 Soccer World Cup to climate change, this study investigates the other broader areas, which are currently ignored.

The 2010 Soccer World Cup

The Soccer World Cup is the biggest mega sporting event after the Olympic Games and also the most televised (SA Tourism, n.d.). The 2010 Soccer World Cup is expected to attract approximately 400,000 international visitors (SA Tourism, n.d.). Furthermore, the mega event will bring with it 32 soccer teams with an average entourage of 50 people per team, an expected 10,500 international media, 5000 international VIPs and 500 FIFA officials (Anon, n.d.).

During the rest of this study these groups of individuals will be referred to as the mega event population and will also include the local residents that will go to the matches.

According to Greg McManus, managing director of the Heritage Environmental Rating Programme (McManus, 2007), based on existing resource consumption patterns for tourists to South Africa, the additional international tourist are expected to consume an additional 2.50 billion litres of water and 420,000 megawatts of power and create almost 23,000 tonnes of waste in just fourteen days. The duration of the mega event will be four weeks in total.

McManus (2007) stated that the expected additional CO₂ emissions generated from the tourists travelling between the various games and around South Africa, as well as the electricity generated from the event, will exceed 180,000 tonnes for the period of the games. The severe

impact of emissions associated with the air travel to and within South Africa for the Soccer World Cup has barely been included in calculations, even though the organisers are putting a high reliance on the transport mode. All of these impacts are expected in addition to the normal contributions made by the tourism industry during this period.

This study will now identify the areas the tourism industry and other stakeholders will have to take into consideration to ensure that the 2010 Soccer World Cup is truly sustainable.

Transportation

According to Huggins (2003, p. 47), the highest environmental impacting factor from sporting events was transportation.

The geographical distance between the stadiums will increase the need for transportation to get the spectators to the games. This will be especially true for the international tourist who will go to more than one or two games. These visitors will most probably be part of a tour group that will travel throughout South Africa attending various games. This dependency on transportation is a huge contributing factor to CO₂ emissions. The studies done by Becken *et al.* (2003, p. 271) and Becken & Patterson (2006, p. 327) identified domestic air travel, diesel trains and tourist coaches as among the highest CO₂ emissions contributors. This is crucial to the effective planning of the 2010 Soccer World Cup as the majority of tourists will use one of these methods to move between the stadiums.

Accommodation

According to Huggins (2003, p. 30), the hospitality and accommodation sector is a large component of sporting events. The hospitality and accommodation sector also accounts for a large amount of resources used, especially in terms of electricity, during sporting events (Huggins, 2003, p. 30).

With a mega event like the 2010 Soccer World Cup, visitor numbers across the hospitality sector will increase dramatically. This will cause a huge rise in energy consumption and CO₂ emissions from this section.

The predicted energy consumption of the international tourists for the 2010 Soccer World Cup is based on existing energy consumption patterns of 75 kilowatts per day per tourist (McManus, 2007). This would give an indication that the higher energy consumptions from the hospitality sector were considered during this calculation. However, the predicted 180,000 tonnes of CO₂ emissions over the period of the 2010 mega event was estimated on travel patterns only (McManus, 2007). This means that the actual CO₂ emissions will most likely be higher as a result of the high energy consumption from this section and other factors in the hospitality sector that causes CO₂ emissions.

Large scale construction is also under way in this section to meet the demands for the 2010 Soccer World Cup (Nevil, 2007). During construction, huge amounts of energy and other scarce

resources are consumed that will increase CO₂ emissions and thus increase this section's contribution to climate change (Nevil, 2007).

Activities

The environmental policies and guidelines currently available do not focus on this segment. The energy consumption and CO₂ emissions patterns considered under the Green Goals project for the 2006 Soccer World Cup did not include any activities that the international tourist or other event population took part in while attending the mega event (Godoy, 2006).

The study done by Becken *et al.* (2003, p. 272) and Becken & Patterson (2006, p. 327), identified air activities, motorized water activities and adventure recreation as the highest contributors to climate change. It is necessary to consider these activities and attractions as well as the additional travelling that will result from tourists visiting attractions and taking part in activities when making assumptions about the energy consumption and CO₂ emissions as a result of a mega event, because if the event had not taken place the additional activities would not have been undertaken.

The predictions of CO₂ emissions as a result of the 2010 Soccer World Cup do include additional tourism-based trips in South Africa for the period of the mega event and are based on existing travel consumption patterns. This will indicate that the additional energy consumption and CO₂ emissions generated from additional tourist activities and visits to attractions are considered to an extent.

This section explored the relationship between tourism and climate change by focusing on a specific component of the tourism industry, namely mega events. This section provides the frame of reference for the stakeholder survey.

Methods

Sampling

The target population for this study consisted of key individuals from various stakeholder groups within the Tshwane Metropole and these groups are identified and defined in Table 1. The unit of analysis was the different stakeholder groups.

Table 1 Stakeholder Groups and Target Population of this Study

Stakeholder group	Definition
Public tourism sector	Governmental tourism departments, such as South African Tourism and the Department of Environmental Affairs and Tourism.
Private tourism industry	Various private sector tourism organisations within Tshwane, including: the hospitality industry; attractions and activities sectors; tour and transfer operators and travel agencies and wholesalers.
Tourism experts	Participants were identified as either private consultants with extensive

Table 1 Stakeholder Groups and Target Population of this Study

Stakeholder group	Definition
	knowledge about the tourism industry, or as academic experts within the different spheres of tourism applicable to this study.
Environmental experts	Participants were identified based on their extensive knowledge about climate change or involvement with environmental matters connected to the 2010 Soccer World Cup. Both private consultants and experts from within the Tshwane Municipality were identified.
Tshwane Municipality's 2010 Organising Committee (TOC)	The 2010 Organising Committee, which incorporates various departments within the Tshwane Municipality

Through the combined use of the qualitative, non-probability sampling methods of purposive and snowball sampling (Cooper & Schindler, 2006, p. 204; Grbich, 1999, p. 70), the study was able to identify key individuals within the various stakeholder groups. The sample was drawn from consultants, senior managers, executives and private tourism business owners. Throughout the period of data collection, key individuals from the respective stakeholder groups were contacted to request a personal interview, of which only 19 agreed to a personal in-depth interview. All 19 interviews were transcribed and analysed.

Table 2 shows an overview of the interview participants. For the sake of confidentiality the names of the participants have been omitted; however, each participant was assigned a code that was used during the analysis of the in-depth interviews. The distribution of in-depth interviews among the different stakeholder groups are also illustrated in Table 2.

Table 2 Interview participants for this study

Code	Stakeholder groups
PAR1	Environmental expert
PAR2	Tourism expert
PAR3	Private tourism industry
PAR4	Environmental expert
PAR5	Private tourism industry
PAR6	Private tourism industry
PAR7	Tourism expert
PAR8	Tourism expert
PAR9	Public tourism sector
PAR10	Tourism expert
PAR11	Tourism expert
PAR12	Tshwane Municipality's 2010 Organising Committee
PAR13	Public tourism sector
PAR14	Public tourism sector

Table 2 Interview participants for this study

Code	Stakeholder groups
PAR15	Tourism expert
PAR16	Private tourism industry
PAR17	Environmental expert
PAR18	Private tourism industry
PAR19	Public tourism sector

The realised sample size was limited by the focus of the tourism industry, the number of stakeholders involved with the 2010 Soccer World Cup within the Tshwane Metropole, as well as the qualitative sampling methods applied within this study. However, the realised sample size of 19 participants was in line with the average sample size that was recorded during various qualitative studies regarding climate change, tourism and mega events that either incorporated one or both of the sampling methods used during this study (Diamond, 2006, p. 16; Goodwin, 2006, p. 52; Xiao, 2007, p. 47).

Data Collection

Pre-testing of the data collection instrument

The discussion guide for the personal interviews was pre-tested by administering one interview with a surrogate participant that had more or less the same characteristics, expertise and background as the desired participants for the main study. A non-collaborative pre-test method was used (Cooper & Schindler, 2006, p. 396).

Data collection method

Data for the main study was collected during September and October 2007 through the combined use of structured and semi-structured personal in-depth interviews (Cooper & Schindler, 2006, p. 204; Grbich, 1999, pp. 93-94). Through the modified application of the convergent interview type, as well as the interview structure based on grounded theory, the researchers was able to adjust each subsequent interview based on the findings and interpretations of the previous interviews (Cooper & Schindler, 2006, p. 209). In-depth personal interviews were considered appropriate for this study, because Grbich (1999, p. 85) described the aim of interviews as to uncover the perceptions, beliefs and meanings that people have constructed. This belief was furthermore supported by the successful application of structured, semi-structured interviews or a combination of the two types, by various studies within the fields of climate change, tourism and mega events (Diamond, 2006, p. 17; Goodwin, 2006, p. 56; Xiao, 2007, p. 43).

Data collection process

The interviews were conducted face-to-face (bar one email response) at a convenient location suggested by the participants. The interviews were recorded and then later transcribed to ensure a rich level of data for the interpretation of both verbal and non-verbal behaviour (Cooper & Schindler, 2006, p. 210; Grbich, 1999, p. 96). The email interview was followed up by a

telephonic interview to try to minimise the interview errors associated with email interview types.

Possible participants were contacted via an initial email, which explained the nature and purpose of the study. After identified individuals agreed to participate in the study, a meeting for an interview was arranged. No incentives were given to the participants to motivate them to participate in the study.

Data Analysis

The data analysis process is an ongoing process in qualitative research (Seidel in Lewins *et al.*, 2005) and was conducted in conjunction with data collection and interpretation.

Data analysis process

During the data analysis phase, this study made use of qualitative content analysis to interpret the data. The data analysis consisted of the following process:

- The interview field notes and the tape recordings were transcribed, then used to organise the data into identified themes connected to the objectives of the study.
- The data were then reduced to the critical success factors and challenges within each theme. This was done through the identification of different categories mentioned by the participants through a coding process.
- The data were then analysed by linking related ideas to the different code categories.
- No statistical analysis was performed on the data. However, the researchers did record the frequency count of each critical success factor and challenge, so that the relative importance of each could be determined across the stakeholder groups.

Reliability and Validity

Validity assessment

The validity of the data was determined by the internal and external validity of the research.

Internal validity

According to Leedy and Ormrod (in Goodwin, 2006, p. 58), internal validity is the extent to which the research design and the data that it yields allow the researcher to draw accurate conclusions within the data. By comparing the perceptions of the participants against the results of the interviews, the internal validity of the interview technique was tested (Goodwin, 2006, p. 59) and found to be accurate.

External validity

According to Leedy and Ormrod (in Goodwin, 2006, p. 59), external validity is the extent to which the results of the study can apply to situations beyond the study. However, external

validity is applicable where the sample of the study is a true representation of the target population (Goodwin, 2006, p. 59). Within this study it was impossible to make generalizations about the findings or give a true representation of the target population. For this reason, the validity criteria used within this study is that the sample methods and size are plausible. However, this study did exhibit some form of external validity, as the researchers' ability to reach higher valid conclusions was enhanced through the inclusion of various stakeholder groups and through the conduction of an actual routine study (Leedy & Ormrod, in Goodwin, 2006, p. 59).

Reliability assessment

The reliability of the study may be limited, as it will be unlikely that the same results will be reached if the same study was conducted within a different context (De Ruyter & Scholl in Goodwin, 2006, 59). However, the researchers attempted to increase the levels of reliability by conducting the interviews in a systematic way through the use of a discussion guide; by connecting the views of the respondents with the theoretical framework that was researched for this study; and by selecting the appropriate participants for the study through consistently following the steps prescribed by the chosen sampling methods (Goodwin, 2006, p. 59).

Results

Within this section of the study, the results of the in-depth stakeholder interviews are presented. Specific comments were used directly from the interview transcripts to create an enhanced understanding of the participants' perceptions and feelings. Please note that the quotes from the interview transcripts have been quoted verbatim, regardless of any grammatical errors.

This section of the study commences with a discussion of the participants' views regarding the tourism industry and the climate change phenomenon. The aim of this analysis is to investigate the participants' perceptions and feeling regarding the relationship between tourism and climate change. This relationship was then further analysed through the discussion of the participants' views regarding climate change, as it pertains to the 2010 Soccer World Cup. Following this discussion, the participants' views and feelings regarding possible solutions to the contributions of the 2010 Soccer World Cup to climate change is presented. This section concludes with a discussion of the critical success factors and challenges identified by the participants regarding the dual relationship between the 2010 Soccer World Cup and the climate change phenomenon.

Climate Change and the Tourism Industry

The perceptions and feelings among the participants regarding the relationship between tourism and climate change was analysed by first identifying the perceived contributions that the tourism industry is making to climate change and by then uncovering what participants view as the impacts that the climate change phenomenon is having on the tourism industry.

Contributions of the tourism industry to climate change

All the participants felt that the operations within the tourism industry are contributing to climate change. This was highlighted by the following observation of participant PAR3:

Any tourism organisation is contributing to the climate change problem and is making it worse. The level of contribution will depend on the organisation's outlook regarding environmental practices

The main contributions identified by the participants are discussed below.

CO₂ emissions and energy usage within the tourism industry

The majority of the participants felt that the various operational aspects within the industry, which are responsible for vast amounts of CO₂ emissions and energy usage are the industry's biggest concern in terms of climate change. It was furthermore revealed that transportation is perceived to be the tourism industry's greatest contributing factor, because of the lack of a safe public transportation system in South Africa. This results in tourists making use of coach buses or hired cars to move around. Furthermore, this problem is exacerbated by the huge distances that need to be travelled between venues as a result of the geographical layout of South Africa.

Ignorance of the tourism industry

As it can be seen from the statement made by PAR14 below, a great number of participants felt that the tourism industry is either unaware or ignoring the environmental impacts associated with the products and services that they use within their organisations.

A lot of organisations have the attitude and mind set that climate change is not real and if it is, it is not affecting them.

It was further noted that the tourism industry is guilty of only focusing on the economic and sometimes social benefits of their operations, without considering the impacts their operations are having on the environment.

The production of goods and services

The majority of participants perceived the manufacturing of chain of goods and services, which are used within the tourism industry, to have a huge impact on the environment and climate change. It was stated that it is crucial that these greater indirect impacts are considered when the total contributions from the tourism industry are calculated.

Climate Change and the 2010 Soccer World Cup

The tourism industry and climate change relationship was further investigated by uncovering the participants' views and perceptions regarding the contributions that the 2010 Soccer World Cup can make to climate change.

Contributions of the 2010 Soccer World Cup to climate change

All of the participants felt that the operations of the 2010 Soccer World Cup could contribute in some way to climate change. Most of the concerns raised were regarding the different

operational aspects of the event, which result in CO₂ emissions and energy consumption. Some of the most important of these identified areas of concern include the following.

Transportation

This was the greatest area of concern for the majority of the participants. Concerns were raised connected to road and air transportation, and included the large amounts of travelling that will take place during the event as a result of the geographical layout of the event across South Africa. As a result of the lack of a safe and effective public transportation system within South Africa, most tourists will make use of a transportation mode that is high in CO₂ emissions, such as a hired car. Furthermore, because of the time constraints connected to an event like this, most of the teams and spectators will make use of aeroplanes to move around.

Construction of infrastructure

Major developments are taking place for the 2010 Soccer World Cup and a significant number of participants were concerned about the CO₂ emissions, energy consumption and other environmental impacts that emanates from this sector. This is clearly illustrated by the following observation made by PAR8:

Concentrated pockets of CO₂ emissions as a result of the large amount of construction and developments happening now.

Escalating tourism industry activities

PAR18 highlighted the following:

The actual Soccer World Cup and the matches is not the major contributing factors, but rather the greater sphere of tourism industry operators and manufacturing companies which will escalate as a result of the event.

The researchers tried to establish the contributions the greater tourism industry will make to climate change as a result of the 2010 Soccer World Cup. Participants were asked to consider the levels of CO₂ emissions, energy consumption and usage of transportation within the tourism industry and state their expectations of the levels prior to, during and after the 2010 Soccer World Cup. The majority of participants felt that the levels from all three the aspects will increase, prior to, during and after the event. The most common reasons given for these perceptions were:

- *Prior to the event.* There is an increase in awareness of South Africa as a tourist destination, which is resulting in an increase in tourist arrival numbers.
- *During the event.* The major influx in tourist numbers for a short period of time.
- *After the event.* The levels of tourist arrivals are expected to continue to increase after the 2010 Soccer World Cup, as the event is expected to increase the profile of South Africa as a tourist destination.

Possible Solutions for the Contributions of the 2010 Soccer World Cup to Climate Change

Participants identified four key solution areas to address the possible contributions of the 2010 Soccer World Cup to climate change, namely transportation; energy consumption; stadiums; and environmental management strategies and guidelines, as discussed below.

Transportation

The statement below (made by PAR2) summarises the perceptions of the majority of the participants.

Transportation is the biggest component on which should be focused.

Participants made observations regarding road and air transportation separately and these included:

- *Road transportation.* More than half of the participants identified the importance of limiting the use of private cars during the event. It was revealed that participants viewed the development of a safe, low-impact, public transportation system as crucial in achieving this goal. Furthermore, participants felt that more should be done to minimise the emissions and energy consumption from this sector. Initiatives suggested by the participants included: capacity control measures; ensuring road worthiness of all the vehicles to curb excess emissions; controlling the quantity and quality of the fuels used; and centralising venues so that spectators can make use of collective or public transportation.
- *Air transportation.* The majority of the participants felt that more should be done within the air transport industry to try to minimise the contributions from this sector. Initiatives suggested by the participants included: the introduction of an emissions levy; and minimising the impacts by loading and capacity control measures, such as the use of the new Airbus rather than Boeings, as it is more fuel efficient and can carry more passengers per flight.

Energy consumption

Host Cities should start to invest in renewable sources of energy now already.

The above statement (made by PAR19) is a keen observation towards the reduction of energy consumption during the event and was concurred with by nearly a third of the participants. Participants felt that there is a need to really implement practically the policies and actions plans that are being created by the Municipality of Tshwane, especially in terms of the energy saving technologies and initiatives recommended.

Stadiums

Eight participants revealed that they believed the stadiums to be a crucial component in curbing the negative environmental contributions of the 2010 Soccer World Cup. It was revealed that stadiums should be built and developed with the environment in mind and that several initiatives were suggested, including:

- the implementation of energy saving initiatives and technologies, such as the use of energy saving light bulbs (PAR8);
- the use of alternative sources of energy and electricity within the stadiums (PAR19) and;
- the implementation of other general environmentally friendly practices, such as waste management, recycling programmes; crowd management as well as the use of biodegradable products and packaging (PAR3; PAR15).

Some participants felt certain that the stadiums will incorporate all the necessary environmental practices and initiatives, because the development of the stadiums is the sole responsibility of the Local Organising Committee under the guidance of FIFA so it is expected that certain international standards will be applied to the operations of the stadiums. However, one participant from within the Tshwane Municipality was very hesitant in this regard as can be seen from his statement below.

Now looking at the current situation, to try and meet some of those deadlines and finish the construction of the facilities on time, the LOC have already started to cut back on some of the energy efficient things that they would have put in as those types of technologies take a lot longer to put in.

Environmental management strategies and guidelines

All of the participants felt strongly that environmental management strategies and guidelines for the 2010 Soccer World Cup will be very effective in reducing the negative contributions of the event, as they will assist with the implementation of identified environmental goals and objectives, by providing a more structured and organised framework.

In terms of how such an environmental management strategy and process should be operated, the participants were fairly divided between three opinions:

- Four participants felt that it should be the joint responsibility of the LOC in conjunction with FIFA, the National Government (through the Department of Environmental Affairs and Tourism), the provincial governmental departments, the different Host City Municipalities as well as the various stakeholders involved and that the environmental management strategy should be implemented through well organised and co-ordinated guidelines.
- Five participants felt that it was the individual responsibility of each stakeholder involved with the 2010 Soccer World Cup to develop and implement their own strategy.
- Five participants felt that it was the responsibility of each Host City Municipality to draft, implement and monitor an environmental management process for that Host City.

Critical Success Factors and Challenges Relating to the 2010 Soccer World Cup and Climate Change

Participants identified various critical success factors and challenges relating to the dual relationship between the 2010 Soccer World Cup and the climate change phenomenon. The most important critical success factors and challenges were identified as follows.

Adopt a holistic view

Several participants felt that when considering the environmental impacts of the 2010 Soccer World Cup, South Africa needs to take it a step further than just the event and its facilities. PAR1 stated this need within the following statement:

We need to look at the 'greening' aspect from a holistic point of view. South Africa should not just focus on the sporting or gaming facilities, but should also ensure that the supporting facilities around the stadiums are environmentally conscious.

It was further stated by various participants that for any initiatives to work regarding the 2010 Soccer World Cup and the climate change phenomenon the local communities with in Tshwane must be involved.

Place strategic emphasis on environmental education and training

Educating the masses, because people on the grass route level do not know what they are doing to worsen the problem or what to do to elevate the problem.

The statement by PAR8 translates how important was deemed the environmental education for the local communities, the private tourism industry, as well as the tourist coming into South Africa, by 17 of the participants. By educating the tourism industry, as well as the local communities about the contributions their actions are making to climate change, it will be possible to limit the contributions made by the tourism industry through the creation of a culture of sustainability within Tshwane and South Africa as a whole.

The number of employees that will be either directly or indirectly involved with the 2010 Soccer World Cup in Tshwane was identified by PAR12 as 5050. A number of participants emphasised the importance of providing those staff members with environmental training to ensure that all the operations of the 2010 Soccer World Cup is sustainable. Furthermore, several participants felt that with such a large number of employees expected to be employed outside of the control of the TOC it will be crucial that suppliers and contract companies are chosen that have a sound commitment to the environment, as is illustrated by the statement made by PAR1:

Environmental Management Systems and policies should have been the criteria for the selection of suppliers...

Implement policies, plans and procedures

Implementation and sustainability of the identified strategies, plans and procedures was perceived to be a major challenge within the Tshwane area by nine participants. PAR11 stated the following in this regard:

..., but the problem comes in with sustaining it and that it is not just put into place for window dressing, as was the case with the World Summit.

A challenge was also identified by PAR14 regarding the implementation of the Tshwane Municipality's Environmental Management Plan.

The Department of Environmental Management can only inform each department, but each Department is responsible to buy in and then to go and see the Department of Environmental Management to assist them. The Department of Environmental Management can only check if each department submitted their EMP to try and control the process.

Communication and coordination

It was deemed crucial by four participants that the Host Cities and the LOC communicate how the different contributing facts will be monitored and controlled so that the various other stakeholders involved throughout the chain can coordinate their actions accordingly. However, a challenge in this regard was identified when none of the participants had any knowledge of the Tshwane Municipality's Environmental Management Plan, even though PAR14 stated that the Environmental Management Plan has been distributed to all the Departments within the Tshwane Municipality. Furthermore, it is stated within the Plan that all Departments within the Tshwane Municipality should work together and coordinate their efforts with the Department of Environmental Management. However, this is not currently happening as can be seen from the following statement of PAR14:

The problem with local government is that each department has its own performance area and feel that environmental considerations are the sole responsibility of the Department of Environmental Management and cooperation between the departments is very limited.

Discussion

This study investigated the possible contribution of mega events to climate change with particular reference to the 2010 Soccer World Cup. This is a ground-breaking research paper, as no other relevant research could be found regarding the impacts of mega events on climate change in South Africa. Furthermore, previous research on the environmental impacts of mega events only considered the impact of the event, without exploring the contributing impacts of the sub-sectors of tourism, which are supporting the event.

Summary of Findings

Consistent with recent research (Becken & Patterson, 2006, p. 323; Dubois & Ceron, 2006, p. 399), this study uncovered the existence of a relationship between the tourism industry and the climate change phenomenon within South Africa. This relationship was brought to light through the investigation of the contributions that the tourism industry, within the Tshwane area, is making towards climate change. The transport industry was found to be the biggest contributing factor, as a result of the choice of transportation modes used. This was in line with the study conducted by Becken *et al.*, (2003, p. 271) and Becken & Patterson (2006, p. 327), in which the highest contributing modes of transportation were found to be air travel, tourist coaches and the use of private or hired cars. However, this study found that the other contributing factors of the other sub-sectors of the tourism industry identified in previous research (Dubois & Ceron, 2006, p. 407; Becken *et al.*, 2003, p. 274, United Nations World Tourism Organisation, 2007) were not considered within the South African context. This was as a result of the revealed level of unawareness among the tourism industry participants regarding the impacts of their operations on climate change.

The in-depth investigation of the dual relationship, as it applies to the case of the 2010 Soccer World Cup, revealed that there was a higher level of consciousness regarding the contributions the various sub-sectors of the tourism industry could make to climate change, when viewed as part of the greater operations connected to a mega event.

When looking towards the possible solutions for the contributions of the 2010 Soccer World Cup to climate change, the study revealed various strategies and initiatives to reduce the CO₂ emissions and energy consumption associated with the event. These initiatives are all in line with the suggestions made by the previous research in this regard. The study did, however, suggest that environmental strategies and guidelines should be developed for the 2010 Soccer World Cup. The study further revealed that there is a need to consider the possible environmental impacts of the 2010 Soccer World Cup from a holistic point of view, which includes the impacts made by all the stakeholders involved. The research suggests that through the application of the concept of sustainability, the dual relationship between the climate change phenomenon and the 2010 Soccer World Cup can be addressed and managed to ensure the success of the event (City of Tshwane Metropolitan Municipality, 2007, p. 4).

Managerial Implications

The results of this study reveal that little understanding and awareness exist between different departments of governmental bodies and their employees. Managers should therefore ensure that all employees in the organisational hierarchy are aware of their responsibilities and commitments towards ensuring that operations are conducted in an environmentally conscious manner. It is also of crucial importance that the managers themselves set an excellent example in conducting operations in an environmentally aware manner. It is also suggested that an umbrella policy be developed that incorporates guidelines for all sectors in South Africa that are having an effect on climate change.

Recommendations for Future Research

The relationship between the tourism industry and climate change, as it could apply to the 2010 Soccer World Cup, was investigated, with the focus on the City of Tshwane, the capital city of South Africa and a host city for the 2010 event. It is recommended that this relationship is investigated within the broader South African context. Furthermore, this study only focused on the CO₂ emissions and energy consumption of the various sub-sectors of the tourism industry. It is recommended that a more in-depth analysis is done in which all the environmental impacts associated with a mega event, and its supporting sectors, are investigated.

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