Running the green race:

Willingness-to-pay evidence from the Two Oceans Marathon 2011

Om die groen wedloop te hardloop:

Getuienis van deelnemers se bereidheid om te betaal vanaf die Twee Oseane Maraton 2011

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Short title of the paper: **Running the green race**

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Abstract

Environmentally and socially responsible leisure activity has become a key issue in tourism development. Service providers are keen to promote their sustainability credentials and people are starting to pay for carbon offsets and "green" certified facilities. However, compared to doing business as usual, greener operations often imply large capital investments and higher operating costs. There are numerous studies on the importance of sustainable tourism, on tourists who indicate that sustainability is important to them and on the positive impacts that it may have on development. This paper aims to make a contribution to the literature on whether people are willing to pay for greener products and services, by extending the scope to a sports event. It reports the results of a survey conducted at the Two Oceans Marathon in Cape Town, South Africa in 2011. This was the first time that such a survey was conducted at a marathon in South Africa. The focus is on the characteristics of the runners who are willing to pay more for a sustainable event and the results show that there are differences between the willingness to pay of different groupings of runners. Participants who were older and those who were self-employed were more likely to be greener. Education levels do not seem to matter, but feeling responsible for climate change does.

Keywords: Environmentally friendly, events, festivals, Two Oceans Marathon, Willingness to pay, climate change mitigation, South Africa

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1. Introduction

Climate change is happening and there exists a unique link between the environment and our leisure activities. Tourism involves travel, which is an important source of green house gas emissions. Although climate change is a significant concern and there is increasing consensus that we all need to act now, it is not always clear that polluters and policy-makers are ready to take the necessary steps to address the challenge. For example, an article in *The Economist* (2011) reported that a proposal to generate 20 per cent of electricity at the Olympic site in London seems to have been abandoned. It is argued that this highlights a broader concern about energy and policy. The development and use of renewable and alternative energy is typically hampered by uncertainty about the future price of energy and the price of carbon as well as the return on long-term investments. The Olympics provided such a longer term and investment was assured, but it seems that early promises may not be kept. If the suppliers of leisure activities and organisers of major sports and cultural events regard sustainable projects as too expensive, the other side of the coin is that the travelling public may not be willing to pay for a "greener" and more sustainable tourism experience, which is the topic of investigation in this paper.

There exists a large international academic literature on aspects of the environment, climate change and tourism. An analysis of the links between tourism and climate change can be grouped into four categories (Fisher, 2007), namely i) the impact of tourism on climate change, ii) the impact of climate change on tourism, iii) adaptation to climate change, and iv) mitigation of climate change. In this last category, studies of the mitigation of climate change, specifically of willingness to pay, have focussed on air travellers' willingness to pay for carbon offsets (see Brouwer *et al*., 2008), or tourists' willingness to contribute to funds for the management and conservation of a particular natural resource (see Casey *et al*., 2010).

This paper falls in the last category and takes the question of the environment and climate change to a sports event to ask: Are runners willing to pay for a "greener"

marathon and what are their characteristics? The Two Oceans Marathon is a major event on the running calendar, and in 2011, it attracted 23 000 participants from all over South Africa. Most of the participants fly or drive significant distances to participate and spend a number of days in and around Cape Town as tourists. In order to examine whether the runners are willing to pay to reduce their carbon footprint in the race, a survey was conducted at the marathon. In total, 502 athletes participated in the survey and data were collected about their demographics, spending and the key question: "Would you be willing to pay more for a more environmentally friendly marathon?" Based on their characteristics, an online carbon calculator shows that the carbon footprint of the average participant is approximately 480kg of CO_2, which can be offset with approximately 2.2 trees (www.trees.co.za).

The paper is organised as follows. Section 2 provides a review of willingness-to-pay studies linked to the mitigation of climate change. Section 3 provides some background to the marathon and a description of the data collected in the survey. Section 4 presents two regression models of the predictors of willingness to pay. The final section presents the conclusions and recommendations.

2. Literature review

There exists a substantial literature on the environment, climate change and tourism (see for example Dubois & Ceron, 2006 and Patterson *et al*., 2006 for overviews). The aim of this brief review is two-fold: the first is to explain why it is difficult to determine the price of pollution and the value that people place on a sustainable environment; the second is to review the methods that are typically used to determine their willingness to pay and a number of examples from the literature that have applied these methods.

2.1 The environment as a common pool resource

Many natural resources are private goods that are rival and excludable in consumption and have clear property rights. Global warming and climate change involve aspects of the natural environment, which economists refer to as common good characteristics, or non-market resource characteristics. The earth's atmosphere and the climate that sustains life as we know it, an example: It is commonly owned by everyone and

utilised by all – no-one has to pay to live on earth! As a consequence, the environment suffers the effects of negative externalities, specifically the pollution that occurs during all our production and consumption activities. Within the context of this paper, this would, for example, be the pollution that occurs during a flight from Johannesburg to Cape Town to participate in the Two Oceans Marathon. The private cost of the flight to the airline and the individual athlete is clear and represented by the price of the ticket. The CO_2 pollution that occurs during the flight contributes to global warming and climate change and presents a cost to society. The externality is the difference between the private and social costs. The market fails to account for the social costs since no-one owns their share of a sustainable environment to sell to polluters and as such no market or price exists. The result is the "tragedy of the commons", whereby the common pool resource is depleted. We are all deriving utility from the environment at a rate that is unsustainable.

Are there any solutions? We cannot stop tourism or sports events to reduce the related pollution to zero, but there may be solutions in cooperation or coercion. Everyone could work together and cooperate to reduce our consumption and the consequent pollution to sustainable levels. This may mean participating only in local marathons and running with recycled socks! This is an unlikely global solution as cooperation will be undermined by the dynamics of the so-called "prisoners' dilemma". Everyone will suspect that everyone else will continue consuming and polluting and they will do so themselves. Similarly, a user-pays approach may be possible, but will be limited to voluntary contributions. Since no-one owns the environment, it is not clear to whom payments should be made when you pollute. In the case of voluntary purchases of carbon credits, the payments may go towards forestry programmes that capture carbon. The alternative to cooperation is coercion. Government may sell pollution rights if they are able to set carbon caps, measure pollution levels, link it to the polluters and fine those that do not cooperate. Such cap-and-trade systems, along with carbon credits, are already functioning on a limited scale. Along with the creation of a carbon market, government may also levy carbon taxes on polluters. There are also a number of examples of this, but again it depends on the ability of the government to measure the pollution, link it to the polluters, set the tax rate and enforce it. Both the cap and trade system and carbon taxes also suffer from the above cooperation problem, but at a country level. If all governments believe that all the others will

allow pollution, they will not create carbon markets or set carbon taxes. The limitations of the Kyoto protocol and the COP-17 Summit in Durban in 2011 attest to this.

Practically speaking, the effects of human activity on the environment, also our tourism activities, will have to be mitigated by a combination of voluntary contributions and compulsory taxes. Tourism research into the mitigation of climate change has focused on tourists' willingness to pay for carbon offsets, or tourists' willingness to contribute to a fund for the management and conservation of a particular natural resource. The following sub-section provides an overview of recent contributions.

2.2 Willingness to pay for climate change mitigation

To determine how much people are willing to pay to mitigate the environmental impact of their travel and tourism activities, three different approaches have been used.

One possibility is the so-called travel cost method. This method is often used to estimate the value of a protected recreational site such as a park or a beach and the impact of changes in access costs or environmental quality. The principle is that the value of a conservation service is reflected in how much individuals are willing to pay to get to the tourist destination. Surveys are used to determine individuals' place of residence, the distance to the destination, the frequency of visits and their demographic characteristics. Differences in the number of visits and travel costs are used to determine the willingness to pay for conservation at different sites (King & Mazzotta, 2000). Hakim (2010) provides an example of the use of this method to determine the economic value of parks in Indonesia. Within the South African context, Du Preez *et al*. (2011) apply the travel cost method to estimate a random utility model of the recreational value of beaches in the Nelson Mandela Bay area. This approach is useful when one is interested in a particular area, but it is limited when the concern is with global warming and climate change.

A second approach is the hedonic pricing method. This approach is useful where individuals are already paying an entrance fee and one is interested in identifying the conservation premium associated with a protected recreational site. The approach

holds that every tourism experience, such as visiting a park, has a range of characteristics. Some are easy to identify, to determine the cost and set a price – such as the roads or amenities. Other characteristics of the experience, such as the ability to view game in their natural habitat, are more difficult to quantify, but nevertheless part of the utility that the visitor receives and is willing to pay for. With the hedonic pricing method, one does not need to ask visitors how much they are willing to pay. You can observe their spending and use differences in the characteristics of tourism experiences to estimate a conservation premium (King & Mazzotta, 2000). Livengood (1983) used this approach with hunting leases and the demand for wildlife stocks. The approach is useful when one is interested in a particular environmental aspect, but it is limited when the concern is with global warming and climate change.

The third approach is most appropriate when one is interested in people's willingness to pay for climate change mitigation and is called the contingent valuation method (CVM). In this approach, respondents in a survey are presented with a scenario about, for example, climate change and asked about their willingness to pay for off-sets. The payment is hypothetical and the valuation is contingent on the scenario that is presented. Guidelines for this approach are outlined in the Report to the NOAA Panel on Contingent Valuation (see Arrow *et al*., 1993). CV methods can employ open-ended questions, dichotomous choices, payment cards or bidding games (Anderson, 2004). Open-ended questions specifically ask respondents how much they are willing to pay for common non-market resources. Dichotomous choice methods include a single value of payment that can either be accepted or rejected by respondents. Where payment cards are used, values of hypothetical payments are printed and respondents are asked how close the values are to the maximum amount that they are willing to pay for non-market resources. In bidding games, hypothetical payments for common resources can be stacked in ascending or descending order until the respondent rejects or accepts a value (Anderson, 2004). Studies of the willingness to pay for climate change mitigation rely on the assessment of scenarios and therefore CV methods are used in most cases (Johnson and Nemet, 2010). Examples of such studies include those that take a more general approach to willingness to pay for climate change mitigation, those that consider the carbon footprint of tourism and tourists' willingness to pay for carbon offsets, studies that focus specifically on air

travel passengers and their CO_2 emissions, and studies that examine tourists' willingness to pay for specific environmental goods.

Johnson and Nemet (2010) provide a general review of studies examining willingness to pay for policy on climate, drawing on 27 different surveys conducted between 1998 and 2010. They find a range of willingness to pay estimates across the different studies from $22 to $437 per household annually, with a median of $135. Common explanatory variables include measures of environmental engagement, environmental attitudes or beliefs, education level, the perceived efficacy of intervention strategies, political views, the level of certainty about climate change and policy outcomes, and even the perceptions of others' efforts.

McKercher *et al*. (2010) examine the attitudes of Hong Kong residents towards tourism and the environment, and the willingness of these residents to modify their behaviours in response to climate change. The specific objectives of the research were: (1) to identify specific traveller segments based on frequency and destination of travel as a basis to investigate issues of climate change and travel habits; (2) to identify the level of concerns felt by Hong Kong residents towards climate change; and (3) to identify whether concern about climate change has caused Hong Kong residents to make voluntary changes to their travel habits. A phone survey was conducted and followed by cluster analysis to identify types of tourists based on their travel propensity, intensity and their style of accommodation. Their results identified four groups: the regular international tourists, active tourists, regional China tourists and those who are the least travel active. The regular international travellers were most aware of their environmental impact, but also least likely to change their behaviour – only 23 per cent indicated that they would travel less by plane to reduce their carbon footprint. Approximately 59 per cent indicated that they would prefer to make a voluntary payment rather than pay a mandatory tax.

When the focus is specifically on air travellers' willingness to pay to offset their CO_2 emissions, there are a number of contributions to the literature. Brouwer *et al.* (2007) surveyed passengers at Amsterdam's Schiphol airport and found that the mean willingness to pay was €23 per flight. This willingness to pay is significantly influenced by disposable income, frequency of flying and whether they are taking

continental flights (where alternative transport is available). There was also a positive and significant relationship with travellers' perceptions of their responsibility for climate change and the effectiveness of the proposed carbon travel tax. Further work by and Frew and Winter (2008) examined airlines' websites to see how customers are facilitated to buy carbon offsets from their flights. Gossling *et al*. (2007) reviewed industry discourses on tourism and air travel, and Eisenkopf and Knorr (2008) provided a critical assessment of voluntary carbon offsets looking at the voluntary carbon market, the calculation of carbon footprints, and the quality of offset projects.

A final example of tourists' willingness to pay for specific environmental goods comes from Casey *et al*. (2010), who examined tourists' willingness to pay additional fees to protect the coral reefs that they were visiting in Mexico. This payment would be towards a fund to enhance coral reef protection at the Riviera Maya. They surveyed 400 tourists and estimated a probit model of willingness to pay or not. They found willingness to pay values that range from $42 to $58 and a number of possible predictors of willingness to pay. They found that respondents who support direct-use fees are willing to pay slightly more to the coral protection trust.

In summary, it can be said that there is an ever-growing literature that explores the links between the environment, climate change and tourism. There are further contributions that examine the impact of tourism on climate change (see Dwyer *et al*., 2010), the impact of climate change on tourism (see Pham *et al*., 2010), adaptation to climate change (see Claver-Cortez *et al*., 2007) and other that identify environmentally-friendly tourists (see Dolnicar *et al*., 2010). To the best of our knowledge, no one has taken the questions of the environment, climate change and willingness to pay for mitigation to an event. The following section describes the data collected at the 2011 Two Oceans Marathon and athletes' responses to the question: "Would you be willing to pay more for a more environmentally friendly marathon?"

3. Description of the data

The Old Mutual Two Oceans Marathon is an annual marathon race held in Cape Town in the Western Cape Province on the Saturday of Easter Weekend. The first race was held in 1970 and 26 runners participated. Since then, the race has become an

institution in the race calendar and a favourite of Capetonians, other South Africans and international athletes. The race comprises an ultra-marathon (56 km) and half-marathon (21.1 km). The 41st race took place on 23 April 2011. A record number of 23 000 runners lined up for the marathon in 2011, with 14 000 runners competing in the half-marathon and 9 000 in the ultra-marathon.

To examine the characteristics of the athletes and their willingness to pay for a more sustainable marathon, a survey was conducted on 22 April 2011, by means of a structured questionnaire. The questionnaire was developed based on the work of Casey *et al.* (2010). The questionnaire comprised demographic, behavioural and expenditure questions. The runners surveyed were selected on a next-to-pass basis. A total of 502 completed questionnaires (N=502) were used for the purpose of this paper.

The first step in the analysis is to describe the data. Approximately 63 per cent of the respondents in the survey were male, and 35 per cent were female. The ages of the respondents varied between 18 and 69 years, but the average age was 38 years with a standard deviation of 12 years. The majority of these athletes were English speaking (57%). Approximately 26 per cent said that they were Afrikaans speaking and the other 14 percent indicated that they spoke another home language. In terms of education, a quarter of the respondents had a grade 12 high school qualification, approximately 32 per cent also had a diploma or degree and 23 per cent held a post-graduate qualification. There were 12 per cent of the athletes who had a professional qualification. The occupations match these high levels of education. There were only four professional athletes in the sample. The majority of the respondents (27%) indicated that they held professional positions, almost 15 per cent were in management and 13 per cent were self-employed. Students, technical and administrative occupations were also significant parts of the occupation demographics. Of the 502 respondents, most (41%) were from the Western Cape Province and 28 per cent were from Gauteng. The third largest group were from KwaZulu-Natal (6.4%), followed by runners from outside South Africa (5.6%). Approximately 35 per cent of the runners indicated that they were local residents and were like “day trippers” to the race. The rest mainly stayed over with family of friends (18.5%), in a guesthouse or B&B (15.5%) or at hotels (12.7%).

To examine the issue of the environment, climate change and the runners' willingness to pay for climate change mitigation, the questionnaire posed the following scenario: Suppose that an additional fee was introduced and added to the race entrance fee to reduce climate change. This fee would contribute to a fund managed by an independent organisation who plants trees to compensate for your contribution to climate change. Taking this into consideration, the respondents were asked to answer the following questions:

1. Would you be willing to pay such a fee in principal to compensate for your contribution to the emission of CO_2 and therefore climate change? (yes/no)
2. If you are not willing to pay, please indicate why (and they were given five possible reasons and an "other" option), and
3. What are the most important reason(s) why you would be willing to pay (and they were given eight possible reasons and an "other" option).

Of the 502 respondents, 11 per cent skipped the willingness to pay question. Another 27 percent indicated that they were not willing to pay such an additional fee and 62 per cent said that they would. Respondents who were willing to pay in principle were subsequently asked whether they were willing to pay a specific amount of money. They were reminded to keep their budget constraint in mind and consider the payment relative to the race entrance fee. A start bid of R30 was made and depending on their reply (yes or no), they were asked for their willingness to pay for a second follow-up bid to which they could again answer either yes or no. If respondents answered 'no' ('yes') to the start bid, the follow-up bid was a lower (higher) amount. This is referred to as a double-bounded (DB) dichotomous choice contingent valuation question and follows the approach of Brouwer *et al*. (2007). This procedure yields an interval willingness-to-pay value for each individual respondent. One should note that the bid amounts were small – R10, R30 and R50. The cost of offsetting only the CO_2 pollution of a domestic return flight is approximately R90 (www.trees.co.za). Approximately 22 per cent of runners indicated that they were willing to pay the R10, 12 per cent were willing to pay R30 and 19 per cent were willing to pay R50. The runners were also asked to name the maximum amount that they were willing to pay over and above the race registration fee. Almost 40 per cent did not answer the question and, for the remaining 60 per cent, the mean amount was R83.

The focus of this paper is not to calculate an aggregate Rand amount for willingness to pay, but rather to shed light on which athletes would be willing to pay more. Such Rand value estimates (often in the hypothetical millions) depend strongly on the contingency described, bid amounts and characteristics of the sample provide little insight to organisers of events. Instead, the focus is on the characteristics of those who are willing to pay in order to identify and engage such runners. Table 1 presents cross tabulations of the willingness to pay groupings and the gender and age group variables.

Table 1 shows that there is a clear gender difference in the willingness to pay for climate change mitigation. Among the men, 58 per cent indicated that they were willing to pay, whereas 31 per cent were not and 11 per cent skipped the question. In comparison, 69 per cent of women said that they were willing to pay, while 20 per cent said that they were not, and 10 per cent skipped the question. Among the different age groups, the runners in the age groups 18 to 30 years, 31 to 40 years and 41 to 50 years (between 62 per cent and 66 per cent) were willing to pay to mitigate their climate change impacts. An interesting difference is the group aged 51 to 60 years, where only 53 per cent indicated that they were willing to pay. Among the respondents aged 61 years and older, 71 per cent were willing to pay.

Table 1: Cross-tabulation of WTP and gender and age groups

			Willing to pay to mitigate climate change			
			Skipped	No	Yes	Total
Gender	Skipped	Count	2	0	5	7
		% within gender	29%	0%	71%	100%
		% WTP	4%	0%	2%	1%
	Male	Count	35	99	185	319
		% within gender	11%	31%	58%	100%
		% WTP	64%	73%	59%	64%
	Female	Count	18	36	122	176
		% within gender	10%	20%	69%	100%
		% WTP	33%	27%	39%	35%
Age groups	18-30 years	Count	12	31	69	112
		% within age groups	11%	28%	62%	100%
		% WTP	24%	23%	23%	23%
	31-40 years	Count	17	46	105	168
		% within age groups	10%	27%	63%	100%
		% WTP	35%	35%	34%	34%
	41-50 years	Count	12	35	91	138
		% within age groups	9%	25%	66%	100%
		% WTP	24%	26%	30%	28%
	51-60 years	Count	6	17	26	49
		% within age groups	12%	35%	53%	100%
		% WTP	12%	13%	8%	10%
	61 years and older	Count	2	4	15	21
		% within age groups	10%	19%	71%	100%
		% WTP	4%	3%	5%	4%

Table 2 shows a cross-tabulation of the willingness to pay for climate change mitigation with marital status and home language. There is little variation in willingness to pay between the differences in marital status. A slightly greater percentage of runners who were single or divorced were willing to pay, compared to those who were married.

Table 2: Cross-tabulation of WTP and marital status and age groups

			Willing to pay to mitigate climate change			
			Skipped	No	Yes	Total
Marital status	Skipped	Count	27	2	4	33
		% within marital status	82%	6%	12%	100%
		% WTP	49%	1%	1%	7%
	Married	Count	21	82	179	282
		% within marital status	7%	29%	63%	100%
		% WTP	38%	61%	57%	56%
	Not married	Count	6	40	97	143
		% within marital status	4%	28%	68%	100%
		% WTP	11%	30%	31%	28%
	Divorced	Count	1	7	18	26
		% within marital status	4%	27%	69%	100%
		% WTP	2%	5%	6%	5%
	Widow/er	Count	0	0	3	3
		% within marital status	0%	0%	100%	100%
		% WTP	0%	0%	1%	1%
	Living together	Count	0	4	11	15
		% within marital status	0%	27%	73%	100%
		% WTP	0%	3%	4%	3%
Home language	Skipped	Count	1	1	1	3
		% within language	33%	33%	33%	100%
		% WTP	2%	1%	0%	1%
	Afrikaans	Count	12	37	86	135
		% within language	9%	27%	64%	100%
		% WTP	22%	27%	28%	27%
	English	Count	32	81	177	290
		% within language	11%	28%	61%	100%
		% WTP	58%	60%	57%	58%
	Other	Count	10	16	48	74
		% within language	14%	22%	65%	100%
		% WTP	18%	12%	15%	15%

Among the different language groups, a greater percentage of Afrikaans speakers (64%) than English speakers (61%) were willing to pay. Of the runners who indicated that they speak another home language, a group that also includes foreign runners, 65 per cent indicated that they would be willing to pay.

Table 3 presents a cross-tabulation of willingness to pay and education levels. The review by Johnson and Nemet (2010) shows that education levels have been found as

a significant determinant of willingness to pay for mitigation change. The marathon sample also indicates interesting differences. Table 3 shows that 50 per cent of the runners who indicated that they have no schooling also indicated that they were willing to pay for climate change mitigation. Of those with a matric / grade 12-level qualification, 59 per cent were willing to pay. More of the athletes who had a degree or diploma (69%) or post-graduate qualification (66%) were willing to pay. Interestingly, only 55 per cent of those with professional qualifications were willing to pay to mitigate their impact on the environment.

Table 3: Cross-tabulation of WTP and level of education

			Willing to pay to mitigate climate change			
			Skipped	No	Yes	Total
Level of education	Skipped	Count	8	4	5	17
		% within education	47%	24%	29%	100%
		% WTP	15%	3%	2%	3%
	No schooling	Count	4	1	5	10
		% within education	40%	10%	50%	100%
		% WTP	7%	1%	2%	2%
	Matric	Count	13	37	71	121
		% within education	11%	31%	59%	100%
		% WTP	24%	27%	23%	24%
	Diploma, degree	Count	9	42	112	163
		% within education	6%	26%	69%	100%
		% WTP	16%	31%	36%	32%
	Post-graduate	Count	11	30	78	119
		% within education	9%	25%	66%	100%
		% WTP	20%	22%	25%	24%
	Professional	Count	9	20	36	65
		% within education	14%	31%	55%	100%
		% WTP	16%	15%	12%	13%
	Other	Count	1	1	5	7
		% within education	14%	14%	71%	100%
		% WTP	2%	1%	2%	1%

In Table 4, the willingness to pay and occupational groups are cross-tabulated. The percentage of runners who were willing to pay to mitigate their impact on the environment were 62 per cent for professionals, 60 per cent for managers, 61 per cent for those in sales, 62 per cent for those in administration 63 per cent for educators and 64 per cent for students. Interesting differences that show up are with the percentages of civil servants (54%) and pensioners (45%) who are willing to pay compared to the aforementioned groups. On the other side of the distribution, 72 per cent of the self-

employed runners were willing to contribute. Three out of the four professional athletes were willing to pay.

Table 4: Cross-tabulation of WTP and occupation

			Willing to pay to mitigate climate change			
			Skipped	No	Yes	Total
Occupation	Skipped	Count	4	1	4	9
		% within occupation	44%	11%	44%	100%
		% WTP	7%	1%	1%	2%
	Professional	Count	11	44	83	138
		% within occupation	8%	32%	60%	100%
		% WTP	20%	33%	27%	27%
	Management	Count	8	20	46	74
		% within occupation	11%	27%	62%	100%
		% WTP	15%	15%	15%	15%
	Self-employed	Count	7	11	47	65
		% within occupation	11%	17%	72%	100%
		% WTP	13%	8%	15%	13%
	Technical	Count	3	9	26	38
		% within occupation	8%	24%	68%	100%
		% WTP	5%	7%	8%	8%
	Sales	Count	5	4	14	23
		% within occupation	22%	17%	61%	100%
		% WTP	9%	3%	4%	5%
	Administrative	Count	3	10	21	34
		% within occupation	9%	29%	62%	100%
		% WTP	5%	7%	7%	7%
	Civil service	Count	1	5	7	13
		% within occupation	8%	38%	54%	100%
		% WTP	2%	4%	2%	3%
	Education	Count	3	4	12	19
		% within occupation	16%	21%	63%	100%
		% WTP	5%	3%	4%	4%
	Professional athlete	Count	1	0	3	4
		% within occupation	25%	0%	75%	100%
		% WTP	2%	0%	1%	1%
	Pensioner	Count	3	3	5	11
		% within occupation	27%	27%	45%	100%
		% WTP	5%	2%	2%	2%
	Student	Count	2	11	23	36
		% within occupation	6%	31%	64%	100%
		% WTP	4%	8%	7%	7%
	Unemployed	Count	3	4	6	13
		% within occupation	23%	31%	46%	100%
		% WTP	5%	3%	2%	3%
	Other	Count	1	9	15	25
		% within occupation	4%	36%	60%	100%
		% WTP	2%	7%	5%	5%

The final cross-tabulation in Table 5 shows willingness to pay and the runners' province of residence. The province of residence is a proxy for the athletes' carbon footprint for the marathon. Those who live outside of Cape Town have to travel further and that increases their private and also social costs. Whether these participants take cognisance of their location and associated travel behaviour in their willingness to pay is not clear. It seems that those who travelled further may be more cost sensitive and less likely to make a contribution to mitigation of their emissions.

Table 5: Cross-tabulation of WTP and province of residence

			Willing to pay to mitigate climate change			
			Skipped	No	Yes	Total
Province of residence	Skipped	Count	3	0	3	6
		% within province	50%	0%	50%	100%
		% WTP	5%	0%	1%	1%
	Western Cape	Count	21	61	126	208
		% within province	10%	29%	61%	100%
		% WTP	38%	45%	40%	41%
	Gauteng	Count	10	41	93	144
		% within province	7%	28%	65%	100%
		% WTP	18%	30%	30%	29%
	Eastern Cape	Count	2	3	16	21
		% within province	10%	14%	76%	100%
		% WTP	4%	2%	5%	4%
	Free State	Count	2	8	11	21
		% within province	10%	38%	52%	100%
		% WTP	4%	6%	4%	4%
	KwaZulu-Natal	Count	4	6	22	32
		% within province	13%	19%	69%	100%
		% WTP	7%	4%	7%	6%
	Mpumalanga	Count	5	1	6	12
		% within province	42%	8%	50%	100%
		% WTP	9%	1%	2%	2%
	Northern Cape	Count	0	1	3	4
		% within province	0%	25%	75%	100%
		% WTP	0%	1%	1%	1%
	North West	Count	2	2	8	12
		% within province	17%	17%	67%	100%
		% WTP	4%	1%	3%	2%
	Limpopo	Count	2	5	7	14
		% within province	14%	36%	50%	100%
		% WTP	4%	4%	2%	3%
	Outside SA	Count	4	7	17	28
		% within province	14%	25%	61%	100%
		% WTP	7%	5%	5%	6%

The provinces with the greatest proportions of runners who were willing to pay include the Eastern Cape (76%) and Northern Cape (75%). A middle group of provinces with participants who were willing to pay include Gauteng (65%), KwaZulu-Natal (69%) and the North West Province (67%). Of the participants from the Western Cape, who are closest to Cape Town, 61 per cent were willing to pay for climate change mitigation. The provinces with the lower proportions of runners who were willing to pay were the Free State (52%), Mpumalanga (50%) and Limpopo (50%). Of the runners from outside South Africa, 61 per cent were willing to pay.

The questionnaire also asked the participants who were willing to pay, why they would be willing to pay the additional fee. The reasons cited most were that they felt responsible for climate change and that they care about the environment in general. Protecting fauna and flora and giving money for good causes featured as secondary reasons. Similarly, the runners who were not willing to pay were asked why that was the case. The main reason given for not being willing to pay was that people believed that the mitigation programme will have no real impact. This was followed by reasons such as having too little income and not believing in climate change.

Finally, it is also possible to examine the runners' total spending during the Two Oceans Marathon per willingness to pay category and the differences were small. The average of total spending of those who are willing to pay was R4 148, and for those who were not willing to pay, it was R4 447. The spending of those who were not willing to pay also showed greater variation.

Building on this description, the following section presents the empirical analysis of the predictors of which tourists are willing to pay more for a sustainable event.

4. Empirical analysis

The empirical analysis involved the estimation of regression models of the predictors of willingness to pay. Both ordered probit regressions and multinomial regressions were estimated. Willingness to pay was modelled as a function of characteristics of Two Oceans Marathon participants. These explanatory variables include: gender (males=0), marital status (married=0), language (Afrikaans=0), education (no

schooling=0), occupation (professionals=0), province that the runner is from (outside SA=0), number of nights spent in Cape Town, the type of accommodation used (local resident=0), age, total spending during the marathon weekend and a number of reasons why they were willing or not willing to pay.

Table 6 shows the results from the ordered probit regression. The willingness-to-pay dependent variable is seen as a rank of categories: those who are not willing to pay, those who are willing to pay R10, R30 and R50. Independent variables with positive coefficients are associated with increased willingness to pay. Standard errors are in brackets. Compared to males, females were willing to pay more.

Table 6: Regression results

	Ordered probit	**Multinomial logistic (R10)**	**Multinomial logistic (R30)**	**Multinomial logistic (R50)**
Gender: female	0.229	0.312	0.21	0.48
	-0.144	-0.389	-0.465	-0.43
Marital status:				
Not married	0.387	1.034	0.94	0.655
	(0.167)**	(0.438)**	(0.565)*	-0.529
Divorced	0.271	0.477	1.38	0.686
	(-0.265)	(-0.818)	(-0.865)	(-0.820)
Widow/er	-1.343	-1.225	-2.142	-5.169
	(-1.108)	(-2.612)	(-1.426)	(-12187.1)
Living together	-0.147	-0.379	-0.482	-0.347
	(-0.390)	(-1.093)	(-1.279)	(-1.171)
Home language:				
English	-0.08	0.029	-0.012	-0.327
	(-0.147)	(-0.416)	(-0.494)	(-0.463)
Other	0.190	0.607	-0.399	0.644
	(-0.228)	(-0.610)	(-0.820)	(-0.694)
Education:				
Matric	-0.356	-3.093	16.752	14.309
	(-0.524)	(1.364)**	(-2751.0)	(-6316.7)
Diploma/degree	-0.078	-3.079	16.953	15.157
	(-0.519)	(1.346)**	(-2751.0)	(-6316.7)
Post-graduate	-0.082	-3.466	16.972	15.315
	(-0.529)	(1.385)**	(-2751.0)	(-6316.7)
Professional	-0.098	-2.808	17.22	15.562
	(-0.548)	(1.405)**	(-2751.0)	(-6316.7)
Other	0.425	-0.826	19.164	-0.14
	(-0.741)	(-1.912)	(-2751.0)	(-7930.2)

Compared to married respondents, those who are not married were willing to pay more and this effect was significant at the 5 per cent level. None of the education groupings yielded significant coefficients, but it is interesting to note that, compared to those with no education, the other categories were not willing to pay more (save for the "other" group). Compared to professionals, those who are self-employed (5% level of significance) and those in administrative positions (5% level of significance) and students (10% level of significance) were willing to pay more. The results show negative (but insignificant) relationships between willingness to pay and respondents from the Western Cape, KwaZulu-Natal, Mpumalanga and Limpopo. Those from the North West Province were willing to pay more and the coefficient was significant at the 5 per cent level.

Table 6: Regression results (continued)

	Ordered probit	**Multinomial logistic (R10)**	**Multinomial logistic (R30)**	**Multinomial logistic (R50)**
Occupation:				
Management	0.405	0.593	0.422	1.372
	(0.204)**	(-0.517)	(-0.699)	(0.602)**
Self-employed	0.889	0.792	0.809	2.59
	(0.232)**	(-0.675)	(-0.847)	(0.719)**
Technical	0.399	0.818	1.745	0.627
	(-0.276)	(-0.782)	(0.952)*	(-1.133)
Sales	0.61	-0.112	1.098	1.57
	(0.352)*	(-0.995)	(-1.061)	(-0.996)
Administrative	0.612	0.097	1.627	2.204
	(0.308)**	(-0.927)	(-1.017)	(0.966)**
Civil service	0.507	0.155	-15.844	2.271
	(-0.440)	(-1.226)	(-4011.2)	(1.260)*
Educator	0.132	0.77	0.862	0.505
	(-0.338	(-0.863)	(-1.059)	(-1.072)
Professional athlete	-0.591	-1.567	-17.821	-18.337
	(-0.659)	(-1.386)	(-9621.6)	(-6291.0)
Pensioner	-0.093	-0.819	1.361	-0.909
	(-0.459)	(-1.417)	(-1.292)	(-1.71)
Student	0.348	0.071	1.428	1.444
	(-0.290)	(0.816)*	(-0.898)	(-0.941)
Unemployed	-1.186	-3.986	-17.851	-15.051
	(0.614)*	(1.773)**	(-3945.6)	(-1069.2)
Other	-0.686	-0.985	-0.696	-33.296
	(0.347)**	(-0.873)	(-1.177)	(-2265.9)

Table 6: Regression results (continued)

	Ordered probit	Multinomial logistic (R10)	Multinomial logistic (R30)	Multinomial logistic (R50)
Province:				
Western Cape	-0.313	0.864	16.302	-1.102
	(-0.360)	(-1.03)	(-2751.0)	(-0.993)
Gauteng	0.079	1.306	17.607	0.109
	(-0.307)	(-0.925)	(-2751.0)	(-0.842)
Eastern Cape	0.171	2.477	19.132	-0.138
	(-0.418)	(1.234)**	(-2751.0)	(-1.406)
Free State	0.042	0.653	17.472	-0.398
	(-0.450)	(-1.328)	(-2751.0)	(-1.266)
KwaZulu-Natal	-0.184	1.294	16.461	-0.418
	(-0.366)	(-1.057)	(-2751.0)	(-1.017)
Mpumalanga	-0.111	0.612	17.433	-1.043
	(-0.505)	(-1.455)	(-2751.0)	(-1.893)
Northern Cape	1.017	2.701	20.161	3.26
	(-0.696)	(-2.295)	(-2751.0)	(-2.581)
North West	1.516	2.477	20.635	17.63
	(0.588)**	(-1.858)	(-2751.0)	(-1069.2)
Limpopo	-0.742	0.554	15.555	-17.27
	(-0.515)	(-1.257)	(-2751.0)	(-2789.7)

The measure of the type of accommodation did not yield any significant coefficients. Age is positively and significantly associated with willingness to pay. Total spending is positive, but not significant and the coefficient is very small. Finally, there are clear positive relationships between the main reasons people indicated they were willing to pay or not willing to pay and their WTP choices.

As an alternative, Table 6 also shows the results of a multinomial logistic regression. This method estimates the determinants of willingness to pay R10, R30 and R50 compared to the base category of those who were not willing to pay to mitigate their footprint. Note that there is a price to pay when splitting the sample like this. Not all the groups contain observations for each of the variables and when there are few observations, the standard errors of the estimated coefficients become extremely large.

Table 6: Regression results (continued)

	Ordered probit	Multinomial logistic (R10)	Multinomial logistic (R30)	Multinomial logistic (R50)
Accommodation:				
Family or friends	-0.221	-0.224	-0.595	-0.654
	(-0.229)	(-0.611)	(-0.759)	(-0.710)
Guesthouse, B&B	-0.360	-0.413	-1.517	-1.336
	(-0.265)	(-0.718)	(-0.949)	(-0.837)
Hotel	-0.424	0.239	-0.226	-1.508
	(-0.260)	(-0.702)	(-0.885)	(0.838)*
Camping	-0.560	0.939	0.683	1.753
	(-0.667)	(-2.266)	(-2.609)	(-2.603)
Rent house	-0.439	-0.921	-0.231	-2.25
	(-0.375)	(-1.062)	(-1.164)	(-1.590)
Other	0.162	1.36	1.638	0.191
	(-0.446)	(-1.184)	(-1.457)	(-1.558)
Age	0.027	0.022	0.031	0.067
	(0.008)**	(-0.020)	(-0.026)	(0.024)**
Total spending	-0.006	-0.006	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Will pay:				
Responsible	0.852	2.707	2.372	2.756
	(0142)**	(0.451)**	(0.530)**	(0.514)**
Protect	0.245	0.398	1.393	1.163
	(-0.224)	(-0.740)	(0.789)*	(-0.787)
Good cause	0.265	1.441	0.571	1.289
	(-0.227)	(0.040)**	(-0.869)	(-0.813)
Will not pay:				
No impact	-1.768	-2.257	-3.566	-31.825
	(0.272)**	(0.706)**	(1.107)**	(-1712.9)
Little income	-1.193	-1.67	-18.606	-2.4
	(0.282)**	(0.683)**	(-2309.9)	(1.146)**
Do not believe	-0.905	-1.225	-2.471	-3.356
	(0.264)**	(0.616)**	(1.165)*	(1.438)**
Constant		-0.19 -1.908	-36.665	
n	423	423	423	423
Pseudo R^2	0.22	0.35	0.35	0.35

Among those who were willing to pay R10, there were a number of significant determinants of WTP. Being married, from the Eastern Cape Province and feeling responsible for climate change were positively and significantly associated with willingness to pay. Compared to those with no schooling, all the other categories showed a negative relationship with willingness to pay and significantly so. In the case of the runners who were willing to pay R30, very few of the determinants were found to be significant. Here, all the education coefficients are positive, but

insignificant. The final column shows the results for the runners who were willing to pay R50. Here, the gender, marital status, home language and education coefficients were all insignificant. Compared to the professionals, the self-employed, administrative staff and civil servants were willing to pay more and the effect is significant. Age was also found to be a significant determinant of willingness to pay for climate change mitigation.

5. Conclusion and recommendations

This paper makes a number of important findings within the South African context. Firstly, people (participants) are willing to pay for a "greener" marathon and by extension for more sustainable events and tourism experiences. Seen within the context of the growing number of sport and other events in South Africa, this is a positive result. Added to that, one should not forget that events are key drivers of the country's tourism strategy. Secondly, the analysis did not find that income is an important correlate of willingness to pay, but discretionary income may be: the willingness to pay of non-married people and self-employed people was significant. One might expect that willingness to pay for climate change mitigation is related to education levels, but this was not borne out by the results. Therefore, another finding is that marathon runners specifically may be different, which might be an indication that different sectors of the tourism and leisure industry behave differently concerning "green issues". The international literature emphasises demographic variables, like age and education, as predictors of willingness to pay, but this is again not borne out of this research. In related work at the Spier wine estate, Fourie (2011) also shows that simple socio-demographic variables do not explain willingness to pay for green initiatives.

The conclusion is that this research presents an opportunity: If people are willing to pay for "greener" and more sustainable tourism experiences, the suppliers of leisure activities and organisers of major sports and cultural events should provide it. It also presents a challenge: segmenting the market and profiling "green" runners, visitors and tourists will require further research.

This leads this paper to make two recommendations for future research. Surveys need to go beyond simple demographics and ask questions about people's knowledge of and concern about the environment, climate change and mitigation. People may be "green", independent of their age, education or income. Beliefs and attitudes as predictors of willingness to pay should be explored further in greater detail. Surveys may also combine methods to shed light on willingness to pay. At tourist destinations where specific elements of the environment need protection, the contingent valuation question can be combined with travel cost analysis. There is an interesting research agenda open in this field.

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