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Willingness to pay for sustainability – the interplay between voluntary actions and forced choices

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ABSTRACT

We shed light on sustainability issues in the services industry by examining the interplay between voluntary actions and forced choices using choice-based data from the alpine skiing industry. We find that utility is significantly affected by both CO_2 compensation and the mandatory use of public transportation. Utility estimates are used to calculate marginal willingness to pay for the two sustainability alternatives. CO_2 compensation induces a higher willingness to pay for the service, but compulsory use of public transportation as part of the service package induces significantly lower willingness to pay. We also find that estimated utility varies across both age and time dimensions. Our findings can be used by businesses from a range of industries that are considering the introduction of "green" actions.

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Willingness to pay; sustainability issues; tourism industry; conjoint analysis; voluntary actions

Introduction

Environmental issues such as low carbon emissions, the use of sustainable materials, and nature conservation are receiving increasing attention within all business areas around the world. Activities that protect the environment can be divided into two groups: voluntary actions (free choices between various alternatives) and imposed actions (forced choices resulting from prepacking alternatives). The interplay between voluntary actions and forced choices with regard to sustainability is a fascinating yet largely unexplored area in existing research. In this study, we examine this interplay by using data from a choice-based experiment among Norwegian alpine skiers.

Sustainability issues are particularly relevant within the recreational industry and for typical winter activity destinations (Cavallaro et al., 2017). Within the alpine skiing industry, for example, the risk of shorter ski seasons and a decline in natural snow change the ability of ski resorts to conduct business. Based on a critical review of 119 publications on

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the climate change risk of ski tourism, Steiger et al. (2019) conclude that climate change represents a significant risk to the sustainability and profitability of ski resorts worldwide. Many ski resorts today are producing artificial snow to extend the ski season and ensure good ski conditions on the slopes, but the risk of higher temperatures in the future will reduce this opportunity. Scott et al. (2020) report that as soon as the 2030s, the ski season for Norwegian ski areas will be shortened considerably, and that only half of the current Norwegian ski areas will still have reliable natural snow. In 2050, the number of resorts operating will be reduced to one third, and the situation could be even more severe in central Europe.

Sustainability management addresses economic, environmental, and social aspects simultaneously. If consumers are committed to reducing emissions, one might think they would be willing to pay a higher price if a business were to implement climate-friendly measures. Consumers interested in climate-friendly solutions would then choose to use services from businesses that adopt measures to help solve the problem (see e.g. Scott et al., 2020). From a marketing perspective, sustainability initiatives can be highlighted to improve reputation.

This study supplements the literature on willingness to pay (WTP) for sustainable tourism by examining the case of Norwegian alpine skiers and their WTP for sustainable measures at ski resorts. In our context, the sustainability measures are concentrated on reduced carbon emissions through the use of both CO_2 quotas and public transport. Cetin et al. (2017) report that tourists are more willing to pay an additional tourist tax if it improves their experience, but less willing to pay such a tax if it relates to destination sustainability. Göktaş and Çetin (2023) show similar results and find that the average WTP for a tourist tax is lowest when the tax goes to protecting the environment (among the specified alternatives).

CO_2 emissions are unlikely to have any impact on alpine skiers' experiences in the short term. In the long term, however, alpine skiers should be interested in climate-friendly solutions, such as reduced CO_2 emissions, to prevent changes to the climate that negatively affect snow conditions at ski destinations, see e.g. Steiger et al. (2019). Demiroglu et al. (2020) examine the climate change effect on Sweden becoming a major ski destination because of the advantage of natural snow in the future, whereas ski destinations further south will be less likely to provide natural snow in their ski areas. Demiroglu et al. (2018) investigate summer skiing on Norwegian glaciers. Their findings suggest high climate change awareness, but limited climate friendliness. Other implications of climate change on Nordic tourism are presented by Michael Hall and Saarinen (2021). They provide a review of the last 20 years of research on the Nordic climate change crisis and tourism and discuss some implications for the future research agenda. They report that Nordic researchers have focused mainly on the implications of climate change on winter tourism, and that Nordic research has not had the same coastal and marine focus. There have also been some studies on climate change and the tourism industry from a manager's perspective. Gössling and Scott (2018) report their findings from interviewing 17 leaders in the global tourism industry regarding their views on emission growth. While all agreed that climate change is a reality, there was no consensus on how to solve these problems. Falk and Vieru (2017) investigate the determinants of ski lift revenues by examining 20 ski areas in Finland. They find a relationship between the amount of snowfall and revenue, where winter seasons with lower snowfall than normal can experience a 23% reduction in ski lift revenues.

Although the literature on how environmental issues such as climate change will affect the future of ski tourism is comprehensive, few studies focus on how consumers' WTP is related to these issues (see e.g. Agag et al., 2020; Arun et al., 2021; Casado-Díaz et al., 2020; Durán-Román et al., 2021; Fennell, 2019; Fennell & Bowyer, 2020; Ma et al., 2020; Schuhmann et al., 2020; Seetaram et al., 2018; Sinclair et al., 2019; Wu & Chen, 2016; Yarimoglu & Gunay, 2020). In extant research on dynamic pricing within the alpine skiing industry, the focus has mainly been on finding the optimal price based on consumers' WTP when elements such as weather, snow conditions, time, congestion, and travel distance are considered (see e.g. Haugom et al., 2021; Haugom & Malasevska, 2019; Malasevska et al., 2017). To the best of our knowledge, only one recent research note on consumers' preferences for green skiing alternatives has been published (Haugom et al., 2021). The authors examine how the demand for season passes is affected by the introduction of compensation for CO_2 emissions and the mandatory use of public transportation to and from the ski area. They find that the demand for a season pass, which compensates for CO_2 emissions, is substantially higher compared with that for a regular season pass. However, a season pass that is only valid in combination with the use of public transportation (ski bus) is much less attractive. The authors also calculate optimal (profit-maximizing) prices for the various season pass alternatives. The optimal prices are found to be 11.5% higher (CO_2 version) and 25% lower (ski bus version) than a regular season pass.

In this study, we extend the work of Haugom et al. (2021) in several ways. First, we focus on modeling alpine skiers' expected utility associated with various sustainable season pass alternatives, and not on an estimation of price-response functions. From these utility estimates, we calculate the marginal WTP for the two sustainability attributes. By contrast, the focus in Haugom et al. (2021) is on using price-response functions to estimate the profit-maximizing prices for various types of season passes (including a regular season pass). They then use these estimates to calculate WTP indirectly. In the present study, we also analyze how the utility estimates vary across subgroups in the data. Here, we focus on age, travel distance to the ski area, and the difference in travel time between buses and cars, and then create a model with interaction effects. The estimated utility functions are again used to calculate marginal WTP for the various alternatives across different values of these variables. Our survey data, consisting of 174 season pass holders, are a choice-based conjoint survey (CBS), similar to Jacobs and Hörisch (2021).

The remainder of this paper is organized as follows: In Section 2, we present the methodology. In Section 3, we present the collected data. In Section 4, we present the results from the analysis, and in Section 5, we provide a discussion and final remarks.

Method

The service provided by a ski destination is not possible to store and sell later. Therefore, the produced service needs to meet demand at the appropriate time. Demand is, of course, also dependent on the right conditions, with snow conditions likely being the most important attribute. As climate change will affect the ability of ski destinations to provide their services/products, we seek to examine alpine skiers' WTP for sustainable measures. To do so we examine two concrete alternatives ski resorts can pursue to make this leisure activity more sustainable. The first alternative is a season pass that compensates for all the CO_2 emissions associated with alpine skiing over the entire season by purchasing CO_2 quotas. The other alternative is a season pass that is only valid in combination with public transportation to and from the ski resort.

Strictly speaking, both alternatives add value when compared to just a regular season pass (CO_2 compensation and transportation). In practice, however, the compulsory transportation may reduce flexibility, and hence utility, for many skiers, and could therefore result in lower WTP for such an alternative.

Several methods exist for measuring customers' WTP, such as "the open-ended question format", "rating-based conjoint analysis", "ranked-based conjoint analysis", "CBS", "Becker, DeGroot, and Marschak's incentive-compatible mechanism", and "incentive-aligned CBS" (Miller et al., 2011; Rao, 2014). The advantage of CBS is that it is very similar to an actual marketplace (Ben-Akiva & Lerman, 1991; Rao, 2014). Furthermore, we assume that an individual acts rationally, which in this context, means that we can assume that the consumer's chosen alternative will yield utility that exceeds the utility from all other alternatives considered (Rao, 2014). In this study, we estimate a utility function with a conditional logistic model. Hence, we want to derive the utility from a model of the choice an individual makes between the different attributes presented in the choice sets in the questionnaire. Let the utility function be:

$$U_i = V(\boldsymbol{\beta}, \boldsymbol{X}) + \epsilon_i \tag{1}$$

where V is a function of the attribute levels $\boldsymbol{X}$ and the estimated coefficients of each attribute level $\boldsymbol{\beta}$, $\boldsymbol{X}$ is a vector of attribute levels for each alternative for each respondent i, and ϵ is the error term, which accounts for components that are unobserved. Equation (1) measures the individual utility for each respondent, which makes it possible to investigate how different attributes (alternatives) and individual preferences affect utility. Following McFadden (1973), the probability that an individual i will choose alternative j among a set of J alternatives can be defined as follows:

$$Pr_i(j) = \frac{e^{V_{ij}}}{\sum_{k=1}^{J} e^{V_{ik}}} \tag{2}$$

This is the function of the choice probability for a discrete choice and a function of systematic utility (see Paczkowski, 2018). This means that equation (2) shows the probability that individual i will choose alternative j. A consumer can also choose none of the alternatives (e.g. not to purchase any of the alternatives in the choice set).[1] Since the utility represents the demand for one good or attribute, it also represents the WTP for this attribute for the given price in the questionary, meaning that $WTP = \Delta P$, where ΔP represents the change in price for the good or attribute, see Paczkowski (2018, p. 128).

The utility level can be calculated from the estimated model in equation (1), and from this, we can calculate the utility level for each individual. This makes it possible to measure different utility levels for alternative characteristics of the consumer, modeled by the interaction effects. As can be seen in the estimated model presented in equation (3), we focus on age, travel distance to the ski area, and the difference in travel time between buses and cars.[2]

$$U_i = \boldsymbol{\beta},\ \boldsymbol{X_i} + \epsilon_i = ASC + \beta_1\text{ClimateNeutralSkiing} + \beta_2\text{CompulsoryTransp} + \beta_3 PRICE + \beta_4\text{ClimateNeutralSkiing}*\text{Age} + \beta_5\text{CompulsoryTransp}*\text{Age} + \beta_6\text{ClimateNeutralSkiing}*\text{Time} + \beta_7\text{ClimateNeutralSkiing}*\text{Time}^2 + \beta_8\text{CompulsoryTransp}*\text{TimeDiff} + \beta_9\text{CompulsoryTransp}*\text{TimeDiff}^2 + \epsilon_i \quad (3)$$

ASC is the alternative-specific constant capturing the average effect on utility of all factors not included in the model relative to the "none of these" option (the observed component of utility for the option is normalized to 0). *ClimateNeutralSkiing* represents the inclusion of CO_2 compensation in the season pass. *CompulsoryTransp* represents that the season pass holder must take a bus to and from the ski destination. *PRICE* represents the monetary variable, here measured in Norwegian kroner (NOK).[3] *Age* is the age of the respondent, *Time* is the time it takes for the respondent to drive a car from home to the ski destination, *TimeDiff* is the difference in time between driving a car and riding a bus to the nearest ski destination, and ϵ is the standard random error term.

Following Holmes et al. (2017), from a nonlinear utility function as in equation (3) we can derive the marginal WTP for the attributes as follows:[4]

$$MWTP = -\frac{\partial U_i/\partial X_i}{\partial U_i/\partial PRICE} \quad (4)$$

Data

The data used in this study are from a large survey in 2020 on Norwegian alpine skiers' preferences when visiting a ski resort.[5] The development of the questionnaire consisted of two steps. The first version of the questionnaire was developed based on conversations with local ski resort managers and discussions in the research group. This version was then tested on colleagues and third-year business students (n = 20). We incorporated feedback from the pretesting before starting the data collection. The survey was then carried out on a representative sample of adults (age ≥ 18 years) in the eastern part of Norway (Asker, Bærum, Lillehammer, and Oslo), which has a relatively high density of skiers. We also included smaller municipalities in Norway with one or more skiers in the local area. The collection of the data was performed by Norstat which is a Norwegian professional data gathering company. They contacted the respondents by email and invited them to respond on the survey online. The subsample we used consisted of skiers that held a season pass at the time of the survey; that is, the respondents chose the alternative "I currently have a season pass for a ski area" to the question about preferred lift tickets. The respondents who stated that they were season pass holders were presented with additional questions/scenarios regarding sustainability.

The respondents were presented with the following case scenario:

> A ski resort in your area is considering various measures to make alpine skiing/snowboarding more sustainable. One such measure is to offer season passes that involve the compulsory use of public transportation to/from the ski resort. The ski pass will then only work if you go to/from the resort in a so-called ski bus. The ski bus will have fixed departure and

> arrival times matching the opening hours of the ski resort. Ski bus transportation will be included in the season pass.
>
> The other measure the ski resort is considering is to offer season passes that compensate for all the CO_2 emissions associated with alpine skiing over the entire season. This is made possible by purchasing CO_2 quotas that correspond to the average CO_2 emissions associated with alpine skiing/snowboarding over an entire season. With this season pass, alpine skiing/snowboarding therefore becomes **climate-neutral**.
>
> The ski resort is also considering **combinations** of these measures, but first wants to examine the preferences of potential future season pass buyers.

To ensure correct answers, we then asked the respondents if they fully understood the described scenario. Respondents who answered "yes" were moved to the part of the survey where they had to make choices between various alternatives. The questions the respondents answered were designed as a CBS experiment. The respondents were presented with choice sets where the two sustainability attributes (climate-neutral skiing (yes/no) and compulsory use of public transportation (yes/no)) were presented with various values in combination with a given price in NOK (2000, 3000, 4000, 5000, 6000, and 7000).[6] In total, 12 such choice sets were created using the shifting method. The shifting method is a way of creating the minimum required choice sets dependent on the numbers of attributes and levels (for more details, see Rao, 2014).[7] Each respondent answered all 12 choice sets in the same order. In each choice set, the respondent could also choose a "no choice" alternative. Figure 1 illustrates one such choice set that the respondents had to consider.

In total, 174 respondents answered all 12 choice sets in the same order, and thus, the rule-of-thumb minimum sample size as recommended in Orme (2010) was well exceeded.[8] Table 1 presents the sample characteristics. Among the respondents, 67% were males and 33% were females. The average age of the respondents was 43 years. These numbers correspond with other studies from Norway (see e.g. Malasevska & Haugom, 2018) and official statistics on the characteristics of Norwegian alpine skiers.[9] Family status was divided into four groups: single, single with children, couple, and

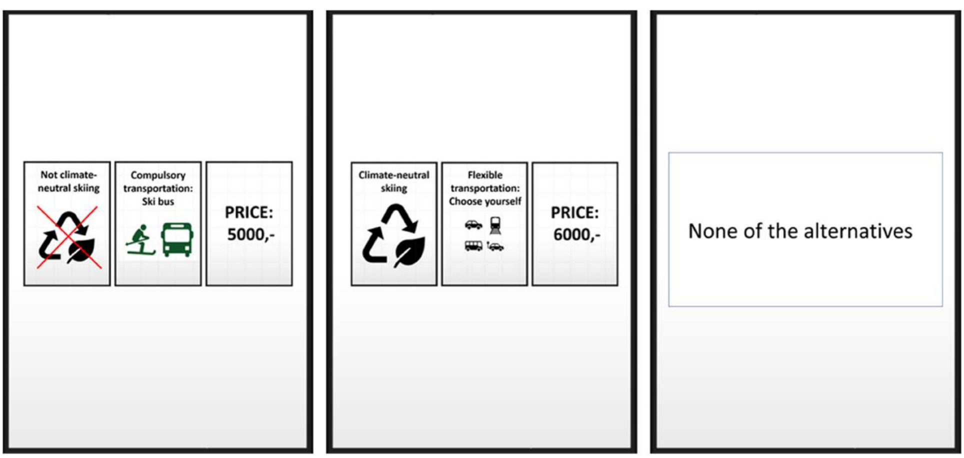

Figure 1. Illustration of one choice set used in the survey.

Table 1. Sample characteristics.

VARIABLE	DESCRIPTION	PERCENTAGES
Gender	Male	67.0
	Female	33.0
Family status	Single	23.4
	Single with children	3.0
	Couple	21.0
	Couple with children	52.6
Net income household (NOK)	< 100,000	3.6
	100,000–300,000	6.6
	300,001–600,000	10.2
	600,001–900,000	13.2
	900,001–1,200,000	17.4
	> 1,200,000	38.9
	Prefer not to answer	10.2
Average Age	43.3 (median = 43.5, SD = 15.8)	
Average Time	21.7 (median = 15.0, SD = 31.1)	
Average TimeDiff	14.4 (median = 05.0, SD = 42.9)	

couple with children. The largest group (> 50%) was couples with children. The respondents were also asked about their net household income. The largest group, at almost 40%, was > 1,200,000 NOK. Around 10% did not answer this question. The average time it takes to drive by car from the respondent's home to the nearest ski area is 21.7 minutes. And the average TimeDiff is 14.4 minutes, where TimeDiff is the measure for how much longer it takes to travel by bus compared to travel by car from the respondent's home to the nearest ski area.

Results

Table 2 presents the results from the maximum likelihood estimation of the conditional logit model specified in equation (4). The effect of price on utility (or demand) is negative as expected. The interpretation is that if the price increases by one unit, then the estimated utility for the average consumer (skier with a season pass) decreases by 0.001.[10] Furthermore, we can see that, on average, the introduction of CO_2 compensation, meaning climate-neutral skiing, has a positive effect on the average skier (respondent). This result means that people have a WTP for climate-friendly measures. However, introducing compulsory transportation by bus has a negative effect. This is also a climate-friendly measure, but is mostly about changing behavior, e.g. going by bus instead of

Table 2. Estimation results.

Attribute	Estimated coefficient (*p*-values in parentheses)
Alternative-specific constant (ASC)	3.120 (0.000)
ClimateNeutralSkiing	1.011 (0.000)
CompulsoryTransp	−0.539 (0.018)
Price (NOK)	−0.001 (0.000)
Interaction variables	
ClimateNeutralSkiing * Age	−0.017 (0.000)
CompulsoryTransp * Age	−0.016 (0.004)
ClimateNeutralSkiing * Time	0.014 (0.007)
ClimateNeutralSkiing * Time^2	−0.001 (0.005)
CompulsoryTransp * TimeDiff.	−0.019 (0.000)
CompulsoryTransp * TimeDiff^2	0.001 (0.000)

car, and not so much about paying for some measures. From the interaction variables, we can see how the age of the skier affects the results. Age has a negative effect on skiers' preferences for both climate-neutral skiing and the introduction of compulsory transportation by bus. This means that younger people are happiest (obtain the highest utility) with green skiing (including CO_2 compensation and compulsory transportation by bus). The older the skiers are, the lower the utility they get from the introduction of climate-friendly measures. This finding is supported by previous studies (see e.g. Kostakis & Sardianou, 2012). These results indicate that compared with older people, younger people have a higher WTP for CO_2 compensation and a less negative WTP for the inclusion of bus transportation. Put differently, the WTP for both sustainability attributes decrease with increases in age. The interaction variable "Time" measures the time it takes to drive by car from the respondent's home to the nearest ski area, and "TimeDiff" measures how much longer it takes to travel by bus than by car from the respondent's home to the nearest ski area. The results show that an increase in the time it takes to travel by car to the nearest ski area increases the size of the positive effect of CO_2 compensation on skiers' utility. Furthermore, we find the opposite effect from compulsory transportation by bus and the difference in travel time between bus and car. When the travel time difference (bus vs. car) increases, the utility of including compulsory transport by bus is reduced. The second-order interaction variables ("$Time^2$" and "$TimeDiff^2$") are included to test for nonlinear effects. Both effects are significant, which means that the utility effects associated with both attributes reach a maximum (Time) or minimum (TimeDiff) point and decrease for higher values of these variables.

Following the MWTP measure presented in equation (4) the results are presented in Table 3 for each attribute and for each of the interaction terms.[11] The results show that an average skier holding a season pass would be willing to pay 108 NOK more for the season pass if the ski resort offered climate-neutral (CO_2-compensated) season passes. However, if a ski resort introduced compulsory transportation by bus, the average skier would be willing to pay 1 298 NOK less for such a season pass. When we measure the effect of climate-neutral skiing and compulsory transportation with age, the MWTP is negative. This provides the same results as presented in Table 2, but here, we obtain results measured in NOK. The mean age in our sample of respondents was 43.33 years. The interpretation of the effect on MWTP of age for climate-neutral skiing is that increasing the age by 1 year from the mean will decrease the MWTP by 17 NOK. The corresponding effect for compulsory transportation by bus is 16 NOK for a 1-year age increase from the mean. Furthermore, the MWTP for climate-neutral skiing will decrease by 29 NOK if the travel time by car from home to the nearest ski area increases by 1 min. Finally, the

Table 3. Marginal willingness to pay for each attribute and the interaction terms.

Attribute	MWTP (mean)
ClimateNeutralSkiing	108
CompulsoryTransp	−1 298
ClimateNeutralSkiing * Age	−17
CompulsoryTransp * Age	−16
ClimateNeutralSkiing * Time	−29
CompulsoryTransp * TimeDiff	10

Note: the sample values *Age*, *Time* and *TimeDiff* is set to average (43.3, 21.7 and 14.4)

MWTP for compulsory transport will increase by 10 NOK if the travel time difference between car and bus to the ski resort increases by 1 min.

Figures 2 and 3 present the effect on the utility of environmental measures when age and travel time to the nearest ski resort are considered, respectively. This is calculated using the coefficients from the estimated utility functions. In this case, we use the mean/median price of a season pass, where the respondents are presented with different choice sets in the questionnaire (4500 NOK). In Figure 2, we present the utility measures when including CO_2 compensation when purchasing a season pass at a ski resort. We see that for short travel times (the time it takes to travel by car), the utility associated with CO_2 compensation increases with increased distance to the nearest ski area. When the travel time is above approximately 50 minutes, however, the utility from CO_2 compensation starts to decline. We also see that regardless of the travel times, the utility of CO_2 compensation decreases with the increasing age of the skier. In Figure 3, we measure the utility of implementing compulsory transportation by bus for different ages and travel time to the nearest ski resort (the time difference between travel by car and travel by bus). Except for very high values on time differences, the utility decreases when the time difference increases. When it comes to the respondent's age, we find the same result. As age increases, the utility of implementing compulsory transportation by bus decreases, regardless of the time difference.

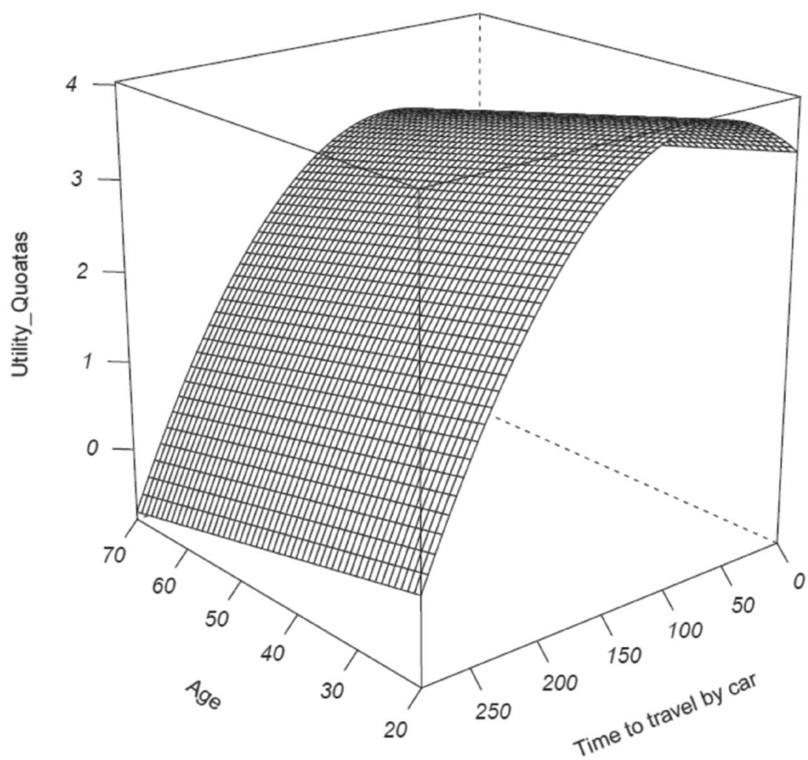

Figure 2. Illustration of the age and travel time effects on the utility of environmental measures.

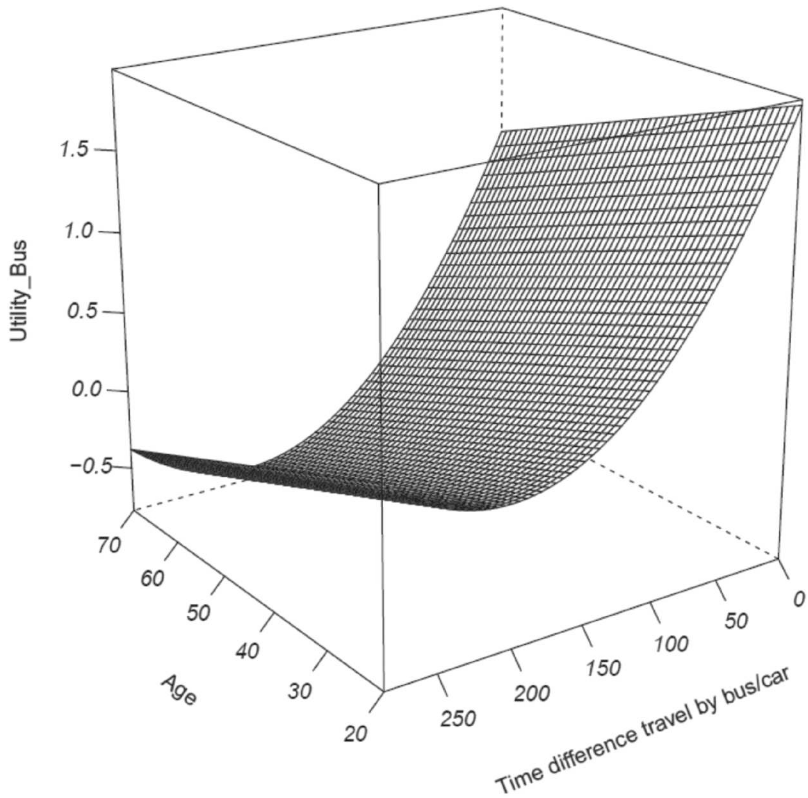

Figure 3. Illustration of the age and time difference effects on the utility of environmental measures.

Discussion and final remarks

While prior studies have documented customers' WTP for sustainable product attributes in the hospitality industry (Birdir et al., 2013; Haugom et al., 2021; Hinnen et al., 2017; Lam-González et al., 2022; Ritchie et al., 2021; Saayman et al., 2016; Schuhmann et al., 2020), the present study is the first to document how utility and MWTP are affected by various sustainability measures in the alpine skiing industry. As climate change will affect the ability of ski destinations to provide their services/products, we wanted to examine alpine skiers' WTP for sustainable measures. To do so we tested two alternatives measures which the ski resort can pursue, the inclusion of CO_2 compensation and season pass only valid in combination with public transport to and from the ski resort. The analyses show that including CO_2 compensation has a positive and significant effect on skiers' expected utility associated with purchasing a season pass. By contrast, offering a season pass that is only valid in combination with use of public transportation to and from the ski area has a negative and significant effect. We use the utility estimates to back out marginal WTP for the two sustainability alternatives. For the CO_2 alternative, the estimated utility increase amounts to a WTP that is 108 NOK above the base price of a season pass. As supplier incremental costs associated with sustainability are typically estimated in the range of 5% (Gerpott & Mahmudova, 2010), this finding can be used by service providers to deliver profitable sustainable consumption experiences. In line with most, but not all (Niedermeier et al., 2021), prior work (Diaz-Rainey & Ashton, 2011; Gerpott & Mahmudova, 2010), we find that the expected utility and marginal WTP for sustainability is even higher among younger consumers. Managers can use this insight when creating marketing campaigns for sustainable ski pass alternatives. However, the negative effect from the compulsory use of public transportation on the estimated utility indicates that personal convenience is more important than sustainability. Customers value sustainability and are willing to make choices that benefit the environment but are more eager to pay for it to retain flexibility rather than to be forced to make a choice that induces personal hardship. Hence, our results suggest that customers value flexibility and free will; therefore, policy makers or governments that step into customers' shoes and make choices for them risk producing options that customers value less.

Looking beyond these immediate implications, our research lays a foundation for future investigations into the impact of diverse marketing strategies on skiers' perceptions and their WTP for sustainable ski pass alternatives. This could include examining the efficacy of messaging that highlights environmental benefits, convenience, cost-effectiveness, or social responsibility. Moreover, conducting international comparisons of ski resort practices and skiers' preferences across various regions or countries may shed light on the cultural, regulatory, and environmental factors influencing WTP for sustainability initiatives. Future research efforts should also involve evaluating the practicality and acceptance of enforcing mandatory sustainability measures versus fostering voluntary initiatives.

Notes

1. To be totally clear, the «no purchase» option does not mean that the respondent will purchase a standard season pass, but rather that the respondent chooses the «no purchase» option over the other alternatives in the current choice set.
2. We also tested using gender, income, and family status, but did not find any significant effects.
3. 1 EUR $\approx$ 11 NOK
4. To see how this is calculated for each attribute, see the Appendix.
5. The data used in this study include only respondents who finished all 12 choice sets. In 32% of the choice sets, the "no–purchase" option was chosen. None of the 174 respondents chose "no-purchase" in all of the choice sets, but all respondents answered "no-purchase" in one or more choice sets.
6. The prices for a season pass vary among different ski areas, but in 2020, the prices in Norway varied between NOK 5000–7000 for a season pass for adults (age $\geq$ 18 years).
7. The method requires that the respondents answer a number of choice sets covering all possible combinations of the attributes, and at the same time, ensure that the respondents answer the minimum number of choice sets dependent on the numbers of attributes and levels.
8. Orme (2010) suggests that the minimum sample size should be $\frac{nta}{c} \geq 500$, where n is the number of respondents, t is the number of tasks (choice sets), a is the number of alternatives per task (not including the "no choice" alternatives), and c is the number of analysis cells (largest number of levels for any attribute). In our case, we have $\frac{174 \times 12 \times 2}{2} = 2088$.
9. See https://www.ssb.no/en/statbank/table/09100/. Furthermore, according to Statistics Norway, 804,000 persons participated in alpine skiing in 2021 in Norway. From this group, we find that *Employed* is 23%, *Out of work* is 8%, *Retired* is 2%, *Unable to work* is 4%, and *Student* is 37% (see https://www.ssb.no/en/statbank/table/13375).

10. We would like to thank one reviewer, who pointed out that the value of the calculated utilities, or the value of the estimated coefficients, are only meaningful to the degree that they can be used to rank alternative scenarios for a specific individual.
11. To see how this is calculated for each attribute, see the Appendix.

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Appendix

Calculating the MWTP for each attribute and the interaction terms from equation (3), and the corresponding estimated coefficients presented in Table 2. Note that the sample values *Age*, *Time* and *TimeDiff* is set to average.

MWTP for ClimateNeutralSkiing:

$$-\frac{\frac{\partial U_i}{\partial ClimatNeutralSkiing}}{\frac{\partial U_i}{\partial PRICE}} = -\frac{\beta_1 + \beta_4 * Age + \beta_6 * Time + \beta_7 * Time^2}{\beta_3} = 108$$

MWTP for CompulsoryTransp:

$$-\frac{\frac{\partial U_i}{\partial \mathrm{CompulsoryTransp}}}{\frac{\partial U_i}{\partial PRICE}} = -\frac{\beta_2 + \beta_5 * Age + \beta_8 * TimeDiff + \beta_9 * TimeDiff^2}{\beta_3} = -1\ 298$$

MWTP for the interaction term *ClimateNeutralSkiing* * *Age*:

$$-\frac{\frac{\partial U_i}{\partial ClimateNeutralSkiing * Age}}{\frac{\partial U_i}{\partial PRICE}} = -\frac{\beta_4}{\beta_3} = -17$$

MWTP for the interaction term *CompulsoryTransp* * *Age*:

$$-\frac{\frac{\partial U_i}{\partial CompulsoryTransp * Age}}{\frac{\partial U_i}{\partial PRICE}} = -\frac{\beta_5}{\beta_3} = -16$$

MWTP for the interaction term *ClimateNeutralSkiing* * *Time*:

$$-\frac{\frac{\partial U_i}{\partial ClimateNeutralSkiing * Time}}{\frac{\partial U_i}{\partial PRICE}} = -\frac{\beta_6 + 2\beta_7 * Time}{\beta_3} = -29$$

MWTP for the interaction term *CompulsoryTransp* * *TimeDiff*:

$$-\frac{\frac{\partial U_i}{\partial CompulsoryTransp * TimeDiff}}{\frac{\partial U_i}{\partial PRICE}} = -\frac{\beta_8 + 2\beta_9 * TimeDiff}{\beta_3} = 10$$