

Cruise Passengers Willingness to Pay for Sustainable Cruises: An Empirical Research Using the Theory of Planned Behavior



Lena Mantel & Prof. Dr. Alexis Papathanassis

5th International Cruise Conference
Bremerhaven – 25th of January 2014



Cruise Research Society

Research Question & Relevance

Willingness to Pay the Extra Euro!

What are determinants of German cruise passengers' willingness to pay for cruises?

Are there differences regarding determinants of German cruise passengers' willingness to pay between a cruise in general and a sustainable one?

Are German cruise passengers willing to pay more for sustainable cruises?

Is there a certain percentage of ordinary cruise prices that passengers are willing to pay extra on sustainability?

The background of the slide is a grayscale photograph of ocean waves. The waves are breaking, creating white foam and spray. The image is slightly blurred, giving it a sense of motion. A dark blue horizontal band runs across the middle of the slide, containing the title and subtitle text.

RESEARCH METHODOLOGY

Survey Questionnaire & Statistical Analysis

Content Analysis of Secondary Data

Focus of Incident Eye Witnesses

Source Data:

- The questionnaire was distributed online in May 2013
- German cruise forums at:
 - www.forengruppe.de, www.kreuzfahrten-treff.de, www.kids-on-cruise.de, [www. Kreuzfahrtschiff.de](http://www.Kreuzfahrtschiff.de).Additionally the survey was distributed to:
- cruise passengers by several cruise directors from different cruise companies
- and by www.thats-travel.com and through social networks (snowball system).

Data Collection:

- 234 questionnaires were returned.
- 91 questionnaires incomplete
- 1 rejected (filled in by a respondent who stated he had never been on a cruise)

Questionnaire Design

- Hypothetical cruise offer (West. Med)
- Varying items between samples:
 - Green statement (usage of marine fuel)
 - WTP for CO2 Certificate

Collection Results:

- Average time to fill in a questionnaire = 9 Mins
- Excluded questionnaires filled < 5 Mins
- At the end 112 usable data sets
 - 58 from the control group
 - 54 from the experimental group.

Statistical analysis:

- Descriptives
- T-Test for mean differences
- Regression Analysis
- Crombach's Alpha
- Multi-collinearity

The background of the slide is a grayscale photograph of ocean waves. The waves are breaking, creating white foam and spray. The sky is overcast with soft, diffused light. The overall tone is somber and powerful.

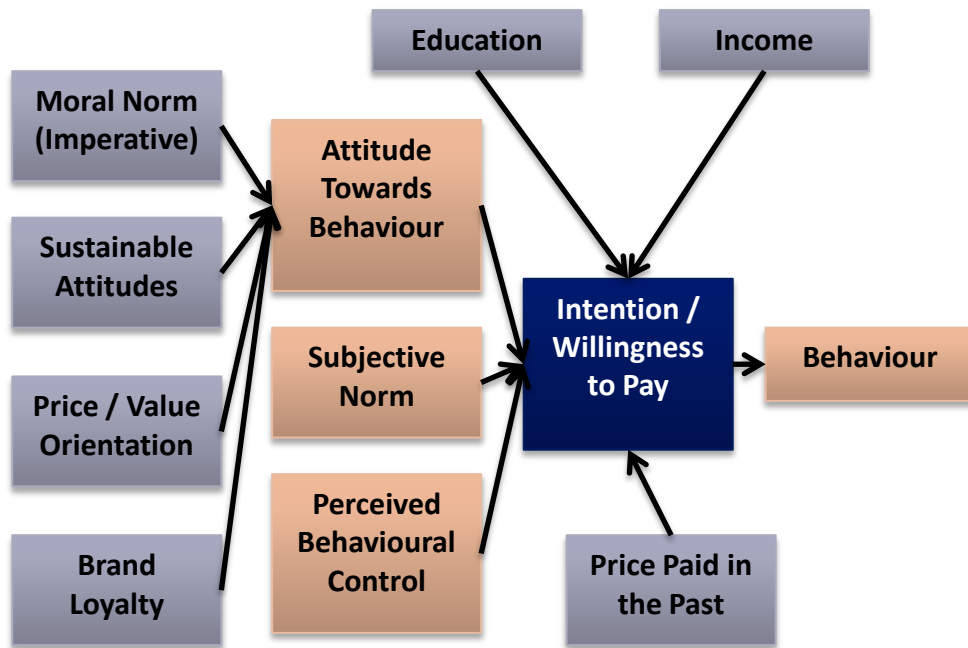
RESEARCH RESULTS & IMPLICATIONS

Hypotheses Model

*Adaptation of the “Theory of Planned Behaviour”**

Control Group

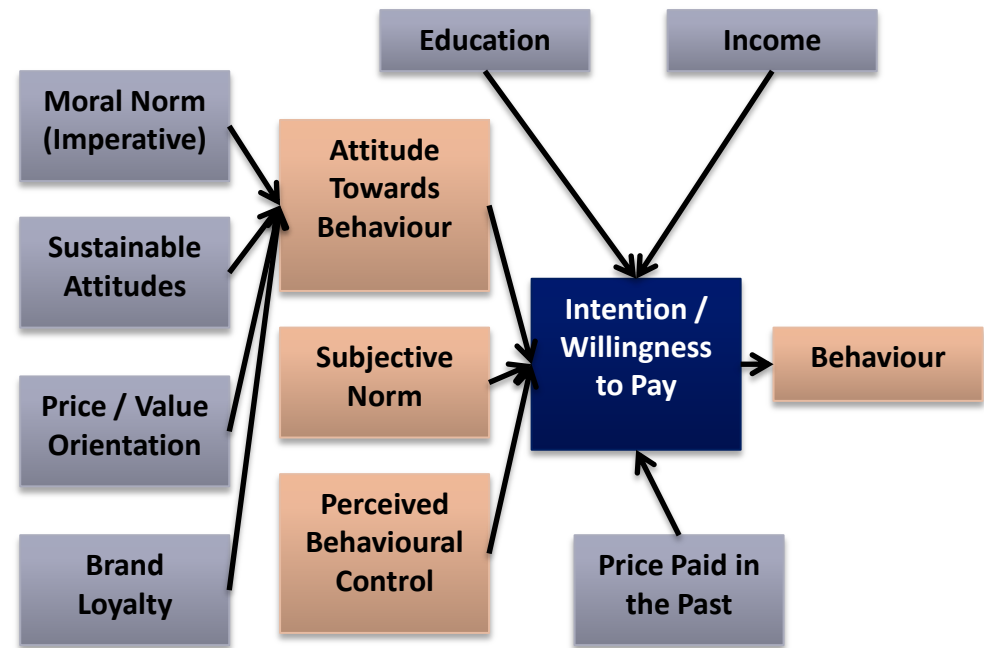
(i.e. no Green Cruise Elements in Hypothetical Cruise)



vs.

Experimental Group

(i.e. with Green Cruise Elements in Hypothetical Cruise)



Independent Variables: *Measurement*

Moral Norm (MN)

- 5 Items in Total (Here some examples):
 - I would enjoy my cruise holiday more, if I knew I was helping to protect the environment.
 - I am concerned about the environmental impact of my cruise holidays.

Attitude Towards Behavior (ATB) - Mindset about the intended behavior

- 2 Items in Total:
 - To book a cruise like the one described before is a good idea.
 - To book a cruise like the one described before would be a pleasure.

Sustainable Attitudes (SA) - Display the value a person assigns to the environment.

- 7 Items in Total (Here some examples):
 - When humans interfere with nature it often produces disastrous consequences.
 - Plants and animals have as much right as humans to exist.

Subjective Norm (SN) - Refers to the social pressure one perceives when making decisions

- 1 Item in Total
 - Most people who are important to me would approve of my booking the cruise described before.

Price/Value Orientation (P/VO)

- 2 Items in Total:
 - I prioritize price over qualitative attributes of my cruise.
 - I prioritize qualitative attributes over price of my cruise.

Perceived Behavioral Control (PBC) - Perceived ease or difficulty to engage in the intended behavior

- 2 Items in Total:
 - I would have the financial means to book the described cruise.
 - I need to be cautious with my spending. Therefore it would be difficult for me to book the described cruise.

Brand Loyalty (BL)

- 4 Items in Total
- Examples:
 - I always book with the same cruise company.
 - I would still do so, if cruise prices were raised.

Past (Consumption) Behavior

- 4 Items in Total (Here some examples):
 - I have been on cruises before.
 - At the booking of previous cruises I have spent approximately a mean of € per week of cruising.

Resulting Hypotheses

H1: WTP for a more sustainable cruise (experimental group) > WTP for a conventional cruise (control group).

t-Test

H2: Cruise pax **moral norms** have a positive impact on WTP.

H3: Cruise pax **sustainable attitudes** have a positive impact on WTP.

H4: Cruise pax **price/value orientation** has a negative impact on WTP.

H5: Cruise pax **brand loyalty** has a positive impact on WTP.

H6: Cruise pax **attitude towards behaviour** has a positive impact on WTP.

H7: Cruise pax **subjective norms** have a positive impact on WTP.

H8: Cruise pax **perceived behavioural** control has a positive impact on WTP.

H9: Cruise pax **education** has a positive impact on WTP

H10: Cruise pax **income** has a positive impact on WTP

H11: Cruise pax **price paid per week of cruising in the past (PPiP)** has a positive impact on WTP.

Ordinary
Least
Squares
Regression
Analysis

The background of the slide is a grayscale photograph of ocean waves. The waves are breaking, creating white foam and spray. The image is slightly blurred, giving it a sense of motion. A dark blue horizontal band is superimposed over the middle of the image, containing the title text.

RESEARCH FINDINGS

Descriptive Statistics

(5 – Totally Agree, 1 Totally - Disagree)

Participants did not perceive strong barriers in purchasing a cruise like the offered one

Brand and price were not very important to the sample groups

Concern for environmental protection was rather high.

Descriptive Statistics						
Control Group						
Factor	Items	Mean	Median	Standard Deviation	Variance	
Attitude Towards Behavior	4	3.85	4.00	1.02	1.05	
Subjective Norm	5	3.86	4.00	1.03	1.07	
Perceived Behavioral Control	6	3.81	4.00	1.03	1.06	
Price/Value Orientation	7	2.35	2.00	0.83	0.69	
Brand Loyalty	8	2.46	2.38	0.97	0.95	
Moral Norm	10	2.99	3.00	0.88	0.78	
Sustainable Attitudes	11	3.82	3.88	0.57	0.32	
Past Behavior-Education	12.1	3.69	4.00	0.86	0.74	
Past Behavior-Income	12.2	3.59	4.00	0.97	0.95	
Past Behavior Price Paid in Past	13.4	1292 €	1000 €	980 €	960187 €	
WTP Conventional Cruise Offer	3.1.1	1295 €	1000 €	614 €	377474 €	
WTP CO2-Certificate	9	2.55	2.00	1.49	2.22	
Experimental Group						
Attitude Towards Behavior	4	3.43	3.50	1.23	1.51	
Subjective Norm	5	3.35	3.50	1.18	1.40	
Perceived Behavioral Control	6	3.66	4.00	1.12	1.25	
Price/Value Orientation	7	2.39	2.00	0.83	0.70	
Brand Loyalty	8	2.37	2.25	0.86	0.74	
Moral Norm	10	2.94	2.90	0.79	0.62	
Sustainable Attitudes	11	3.79	3.88	0.64	0.40	
Past Behavior-Education	12.1	3.54	3.00	0.77	0.59	
Past Behavior-Income	12.2	3.54	3.00	0.95	0.90	
Past Behavior Price Paid in Past	13.4	1236 €	900 €	915 €	836758 €	
WTP Sustainable Cruise Offer	3.2.1	1465 €	1300 €	800 €	641242 €	
WTP CO ₂ -Certificate	9	2.56	2.00	1.30	1.69	

Overall, means are slightly higher in the control group than in the experimental group.

t-Test

H1: WTP for a sustainable cruise > WTP for a conventional cruise

t-Test			
	WTP for cruise offer	Price Paid in Past	WTP – Price Paid in Past
Contr. Group – Mean	1295 €	1292 €	3 €
Contr. Group – St. Dev.	614 €	980 €	883 €
Exp. Group – Mean	1465 €	1236 €	229 €
Exp. Group – St. Dev.	800 €	915 €	765 €
Difference in Means	170 €	-56 €	226 €
95% Confidence Interval	-99 – 439	-411 – 299	-83 – 535
t	1.26	-0.31	1.45
df	99	110	109
p-value	0.21	0.76	0.15

t-Test - Natural Logarithms			
	Natural Logarithm of WTP for cruise offer	Natural Logarithm of Price Paid in Past	Natural Logarithm of WTP – Price Paid in Past
Contr. Group – Mean	7.06	6.95	3.01
Contr. Group – St. Dev.	0.46	0.63	3.02
Exp. Group – Mean	7.17	6.94	4.16
Exp. Group – St. Dev.	0.49	0.58	2.83
Difference in Means	0.10	-0.02	1.15
95% Confid. Interval	0.08 – 0.28	-0.24 – 0.21	0.05 – 2.24
t	1.14	-0.16	2.08
df	107.82	110	110
p-value	0.26	0.88	0.04

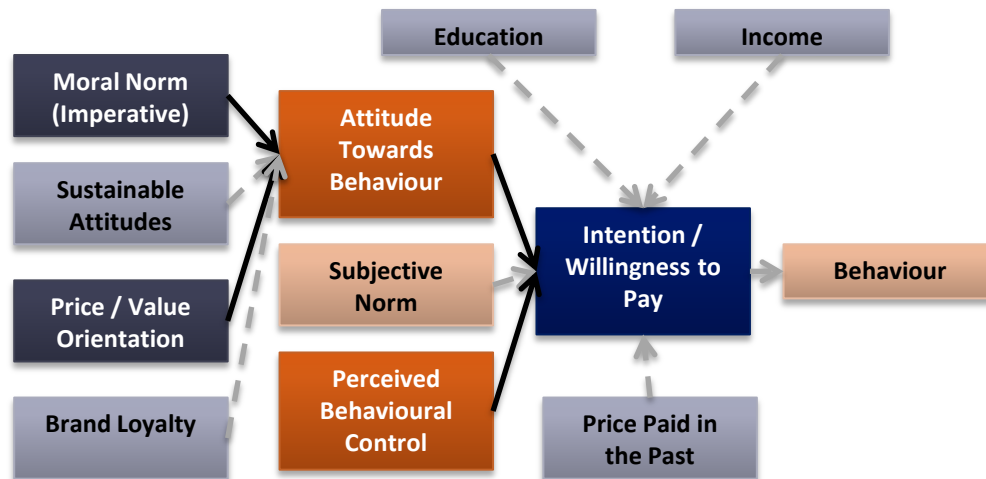
- ▶ t-Test (difference in mean WTP between control group and experimental group):
 - 170 € = 13% of mean Control Group WTP
 - H1 rejected:
 - $t < \text{significance level of } 1.96$
 - $P > 0.05$
- ▶ t-Test (Natural Logarithms) to counter high standard deviation.
 - H1 rejected:
 - $t < \text{significance level of } 1.96$
 - $P > 0.05$ (except for PPIP)

Regression Analysis

H2- H11: Hypothesis Testing

Ordinary Least Squares Estimation						
Combined Group						
Independent Variable		Dependent Variable		Dependent Variable		Result
Factor	Expected Effect	Regression Coefficient	t-Value	Regression Coefficient	t-Value	
MN	+	0.395**	2.642			significant
SA	+	-0.138	-0.659			not significant
P/VO	-	-0.336*	-2.581			significant
BL	+	0.170	1.442			not significant
ATB	+			0.443**	3.016	significant
SN	+			-0.214	-1.355	not significant
PBC	+			-0.277*	-1.993	significant
Education	+			-0.196	-1.279	not significant
Income	+			-0.154	-0.995	not significant
PPiP	+			0.000	1.447	not significant
		R ²	0.14	R ²	0.13	
		R ² _a	0.11	R ² _a	0.08	

*p<0.05, **p<0.01



The model explains 14% ($R^2 = 0.14$) of the variance in **attitude towards Behaviour (WTP)**:

- **Moral Norm** had a significant impact with a t-value of 2.642 > established significance level of -1.96/1.96 and a p-value < 0.01
- **Price Value Orientation** had a significant impact with a t-value of -2.581 > established significance level of -1.96/1.96 and a p-value < 0.05

The model explains 13% ($R^2 = 0.13$) of the variance in **Intention (WTP)**

- **Attitude Towards Behaviour** had a significant impact with a t-value of 3.016 > established significance level of -1.96/1.96 and a p-value < 0.01
- **Perceived Behavioural Control** had a significant impact with a t-value of 1.993 > established significance level of -1.96/1.96 and a p-value < 0.05

A grayscale background image of ocean waves, with a dark blue horizontal band across the middle containing the title text.

SUMMARY & CONCLUSIONS

Summary of Results

“The True Value of Morals”

Hypotheses Testing Results				
Hypothesis	Path	Control Group	Experimental Group	Combined Group
H ₁	WTP _{exp} →WTP _{con}			not supported
H ₂	MN → ATB	not supported	supported	supported
H ₃	SA → ATB	not supported	not supported	not supported
H ₄	P/VO → ATB	supported	not supported	supported
H ₅	BL → ATB	not supported	not supported	not supported
H ₆	ATB → WTP	not supported	not supported	supported
H ₇	SN → WTP	not supported	not supported	not supported
H ₈	PBC → WTP	not supported	not supported	supported
H ₉	EDU → WTP	not supported	not supported	not supported
H ₁₀	INC → WTP	supported	not supported	not supported
H ₁₁	PPiP → WTP	supported	supported	not supported

WTP=WTP, MN=moral norm, ATB=attitude towards behavior, SA=sustainable attitudes, P/VO=price/value orientation, BL=brand loyalty, SN=subjective norm, PBC=perceived behavioral control, EDU=education, INC=income, PPiP=price paid per week in past

Concerned about the Environment...

But also about their Wallets!

- 'Conv' Mean = 2.99 (SD = 0.88)
- 'Green' Mean = 2.94 (SD = 0.79)

Moral Norm / Imperative (MN)

- 5 Items in Total (Here some examples):
- I would enjoy my cruise holiday more, if I knew I was helping to protect the environment.
- I am concerned about the environmental impact of my cruise holidays.

Price/Value Orientation (P/VO)

- 2 Items in Total:
- I prioritize price over qualitative attributes of my cruise.
- I prioritize qualitative attributes over price of my cruise.

- 'Conv' Mean = 2.35 (SD = 0.83)
- 'Green' Mean = 2.39 (SD = 0.86)

- 'Conv' Mean = 3.85 (SD = 1.02)
- 'Green' Mean = 3.43 (SD = 1.23)

Attitude Towards Behavior (ATB) – Mindset about the intended behavior

- 2 Items in Total:
- To book a cruise like the one described before is a good idea.
- To book a cruise like the one described before would be a pleasure.

Perceived Behavioral Control (PBC) – Perceived ease or difficulty to engage in the intended behavior

- 2 Items in Total:
- I would have the financial means to book the described cruise.
- I need to be cautious with my spending. Therefore it would be difficult for me to book the described cruise.

- 'Conv' Mean = 3.81 (SD = 1.03)
- 'Green' Mean = 3.66 (SD = 1.12)

- 'Conv' Mean = € 1295 (SD = € 614)
- 'Green' Mean = € 1465 (SD = € 800)
- Difference of means NOT statistically significant

Willingness To Pay (WTP) – Expressed intention to purchase a cruise

- 2 Items:
- How much would you be personally willing to pay for the offered cruise?
- Open ended Question for both samples / groups
- Would you be willing to purchase a CO2 Certificate at a cost of 50 Euros with your cruise? This would help compensate for your holiday's CO2 footprint, through investment in CO2 reduction- and renewable energy projects.
- (5-scale question)

- 'Conv' Mean (CO2 Certificate) = 2.55 (SD = 1.49)
- 'Green' Mean (CO2 Certificate) = 2.56 (SD = 1.30)

$R^2 = 0.395^{**}$

$R^2 = -0.336^*$

$R^2 = 0.443^{**}$

$R^2 = -0.277^*$

Discussion Point

'Green Cruises' should be a Standard... For Others!

- 'Conv' Mean = 3.82 (SD = 0.57)
- 'Green' Mean = 3.79 (SD = 0.64)

Sustainable Attitudes (SA) -
Display the value a person assigns to the environment.

- 7 Items in Total (Here some examples):
- When humans interfere with nature it often produces disastrous consequences.
- Plants and animals have as much right as humans to exist.

The results are not surprising and seem to confirm the notion that:

Although cruise customers are likely to express concern about the environment in general...

... Whilst, expecting cruise companies to be "Green"...

... They are less likely to be willing to pay extra for their cruise holiday

- ▶ To what extent is a bottom-up, guest-led, approach relevant for the 'Greening' of the cruise sector?
- ▶ Does the importance of the 'Feel Good' Factor, increase the Risk of Cruise 'Green-Washing'?
- ▶ How can we better measure guests' Willingness to Pay for Green Cruises?
 - Where does the difference come between:
 - What guests say they believe and
 - What they are saying they would pay?

The background of the slide is a grayscale photograph of ocean waves. The waves are breaking, creating white foam and spray. The sky is overcast with soft, diffused light. The overall tone is calm yet dynamic.

APPENDICES

Tests and Results

Regression Analysis

Reliability and Validity of the Model

Multi-CollinearityBetweenConstructs								
Factor	MN	SA	P/VO	BL	ATB	SN	PBC	WTP CO ₂
MN	1.000							
SA	0.522	1.000						
P/VO	-0.006	-0.061	1.000					
BL	-0.040	-0.111	-0.167	1.000				
ATB	0.221	0.070	-0.249	0.171	1.000			
SN	0.162	-0.045	-0.164	0.133	0.652	1.000		
PBC	-0.108	-0.141	-0.386	-0,029	0.211	0.250	1.000	
WTP CO ₂	0.651	0.490	-0.058	-0.005	0.193	-0.007	-0.125	1.000

- Multi-collinearity:
- Measures Stability
 - Values close to 1.00 imply exclusion from the model

Reliability		
Factor	SEM	Cronbach's Alpha
Attitude Towards Behavior		formative
Subjective Norm		single-item
Perceived Behavioral Control	0.81	0.86
Price/Value Orientation	0.75	0.80
Brand Loyalty	1.76	0.77
Moral Norm		formative
Sustainable Attitudes	1.94	0.83
Past Behavior-Education		single-item
Past Behavior-Income		single-item
Past Behavior Price Paid in Past		single-item
WTP Cruise Offer Green		single-item
WTP CO ₂ -Certificate		single-item

- Cronbach's Alpha:
- Minimum 0.77 -> indicates good internal consistency (> 0.7 is Recommended)

Regression Analysis

Hypothesis Testing per Group

Ordinary Least Squares Estimation						
Control Group						
Independent Variable	Dependent Variable	Dependent Variable				
Factor	Expected Effect	Regression Coefficient	t-Value	Regression Coefficient	t-Value	Result
MN	+	0.248	1.414			not significant
SA	+	-0.033	-0.118			not significant
P/VO	-	-0.394*	-2.394			significant
BL	+	0.201	1.393			not significant
ATB	+			-126.833	-1.499	not significant
SN	+			125.708	1.397	not significant
PBC	+			90.991	1.163	not significant
Education	+			103.207	1.298	not significant
Income	+			233.259**	2.804	significant
PPiP	+			0.237**	2.949	significant
		R ²	0.16	R ²	0.36	
		R ² _a	0.10	R ² _a	0.28	

*p<0.05, **p<0.01

- The model explains:
 - 16% (R² = 0.16) of the variance in attitude towards WTP and
 - 36% (R² = 0.36) of the variance in WTP in the control group.
 - The adjusted R²(R²_a) indicates a lower percentage of variance that can be explained by the model.
- For attitude towards WTP this rate is 10% (R²_a = 0.10) and for WTP it is 28% (R²_a = 0.28).
 - Only price/value orientation had a significant impact with a t-value of -2.394, exceeding the established significance level of -1.96/1.96 and a p-value lower than 0.05
 - Income and price paid per week of cruising in the past both had a significant impact on WTP, both with a p-value of lower than 0.01 and t-values of 2.804 and 2.949.

Ordinary Least Squares Estimation						
Experimental Group						
Independent Variable	Dependent Variable	Dependent Variable				
Factor	Expected Effect	Regression Coefficient	t-Value	Regression Coefficient	t-Value	Result
MN	+	0.614*	2.365			significant
SA	+	-0.297	-0.928			not significant
P/VO	-	-0.281	-1.318			not significant
BL	+	0.124	0.598			not significant
ATB	+			-50.187	-0.488	not significant
SN	+			72.146	0.633	not significant
PBC	+			114.241	1.179	not significant
Education	+			-2.442	-0.021	not significant
Income	+			30.243	0.262	not significant
PPiP	+			0.539**	5.020	significant
		R ²	0.15	R ²	0.40	
		R ² _a	0.08	R ² _a	0.32	

*p<0.05, **p<0.01

- The model explains:
 - 15% (R² = 0.15) of the variance in attitude towards WTP and
 - 40% (R² = 0.40) of the variance in WTP in the control group.
 - The adjusted R²(R²_a) indicates a lower percentage of variance that can be explained by the model.
- For attitude towards WTP this rate is 8% (R²_a = 0.08) and for WTP it is 32 (R²_a = 0.32).
 - Moral Norm had a significant impact with a t-value of 2.365 exceeding the established significance level of -1.96/1.96 and a p-value lower than 0.05
 - Price paid per week of cruising in the past has a significant impact on WTP, with a p-value of lower than 0.01 and a t-values of 5.020.