



GENERATION Z READY TO EMBRACE THE ELECTRIC VEHICLE REVOLUTION?

PREDICTORS OF ELECTRIC VEHICLE ADOPTION BY YOUTH AND YOUNG
ADULTS IN AUSTRIA

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Who owns an Electric Vehicle (EV) or plans to purchase one as his/her next car?

17% of Austrians plan to purchase an EV as their next car



Every **second** Austrian can imagine to purchase an EV

But who are these potential adopters?



In a nutshell: Research objectives and executive summary

Research Objectives



- Predictors (personal capabilities, attitudinal and contextual factors) of willingness to purchase an EV by youths and young adults
- Differences of willingness to purchase an EV in sub-segments (youths and young adults vs. older adults) of the population

Executive summary

- This study analyses predictors of willingness to purchase (WTP) an EV drawing on a sample of **Austrian citizens (N=452; N=798)**.
- Building on Stern's (2000) Value Belief Norm Theory we examine the **joint effect of different personal capabilities and attitudinal** (including social dominance orientation) **as well as contextual variables** (EV experience) on willingness to purchase an EV.



Current literature and research questions

Current Literature

- In the recent years, a growing body of **literature has studied potential EV adopters** (Axsen et al., 2016; Hardman et al., 2016; Nayum & Klöckner, 2014; Peters & Dütschke, 2014; Priessner et al., 2018; Plötz et al., 2014; Wesche, Plötz, & Dütschke, 2016).
- Prior work has shown that certain **attitudinal and contextual factors as well personal capabilities** (Axsen et al., 2016; Peters & Dütschke, 2014; Tal & Nicolas, 2013; Nayum & Klöckner, 2014; Nayum et al., 2016; Sierzchula et al., 2014) **distinguish** different adopter groups.
- While these studies offer a **good overview with regards to an adult population, youth and younger adults** have been notoriously **understudied**.
- In existing literature **theoretically based approaches** are mostly **absent**. We thus explicitly build on VBN theory to explore its applicability to EV purchase intention.

Research Questions

- 1) What are predictors of WTP an EV?
- 2) How does the younger generation differ in predictors of EV adoption in relation to adults?



Hypotheses on the effect of personal capabilities, attitudinal and contextual factors

<u>Category</u>	<u>Variable</u>
Personal capabilities	Gender
	Age
	Education
Attitudinal factors	Positive attitudes towards EVs
	Negative attitudes towards EVs
	Attitudes towards renewable energy technologies (RET)
	Social dominance orientation (SDO)
Contextual factors	RET social norm
	Social norm energy use
	EV experience





Hypotheses on the effect of personal capabilities, attitudinal and contextual factors

	Scale/dimension	Items		
Attitudinal factors	Positive attitudes towards EVs			
	Intrinsic	Free of emissions Protection of the environment and the climate	H1	
	Extrinsic	Status symbol Charm of modern technologies		
	Negative attitudes towards EVs			
	Technology-related	Range of the electric cars too low Low availability of charging stations (in Austria and abroad)		
	Non-technology-related	A petrol or diesel vehicle is clean enough Electric cars are not safe enough		
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Attitudinal factors	Attitudes towards RET			
	Optimism	Renewable energy technologies enable future economic growth without an increase of climate-damaging CO2 emissions.	H2	
	Skepticism	Renewable energy technologies are a luxury and not everyone can afford it.		
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Contextual factors	Social dominance orientation (SDO)	No one group should dominate in society.	H3	
	<hr style="border-top: 1px dashed #ccc;"/>			
	RET social norm	Many of my neighbors use renewable energy technologies.	H4	
Contextual factors	Social norm energy use	I often talk to my friends about energy because this is an important topic to me.	H5	
	<hr style="border-top: 1px dashed #ccc;"/>			
	EV experience	Have you had any experience with electric vehicles?	H5	



Methods: Online survey and multiple linear regression

	youth & young adults	adults
Sample	▪ Gender (women): 68%	47%
	▪ Age (mean) 23.3	49.0
	▪ Education (university) 22.3%	9.8%
Survey	▪ Online survey in Austria in autumn 2017 (n=452; n=798)	
	▪ The data was collected by an external market research company	
	▪ A subsection of the questionnaire focused on participants' attitudes towards EVs and their willingness to purchase an EV	
Analysis	▪ Multiple linear regression	
	▪ <i>Dependent variable:</i> willingness to purchase an EV	
	▪ <i>Independent variables:</i>	
	▪ personal capabilities: gender, age, education	
	▪ attitudinal factors: positive and negative attitudes towards EV, attitudes towards RET, social dominance orientation	
	▪ contextual factors: RET social norm, social norm energy use, EV experience	



Findings indicate that attitudinal and contextual factors in contrary to personal capabilities play a significant role in explaining willingness to purchase EV

Dependent variable = WTP		β	p	Hypothesis tested
R ²	21% (26% ¹)			
Gender		-0.09 (.03 ¹)	.06 (.35 ¹)	
Age		-0.02 (-.02 ¹)	.70 (.56 ¹)	
Education		.02 (.04 ¹)	.67 (.23 ¹)	
Pos. attitudes intrinsic		.24 (.26 ¹)	.000 (.000 ¹)	✓
Neg. attitudes non-tech-related		-.20 (-.18 ¹)	.001 (.000 ¹)	✓
Social norm RET		-.001 (.17 ¹)	.98 (.000 ¹)	✓
Skepticism		-.12 (-.15 ¹)	.03 (.000 ¹)	✓
Social norm energy use		-.06 (-.10 ¹)	.27 (.01 ¹)	✓
Social dominance orientation		.06 (.08 ¹)	.27 (.02 ¹)	✓
Pos. attitudes extrinsic		.11 (.09 ¹)	0.05 (.05 ¹)	✗
Neg. attitudes tech-related		-.08 (-.08 ¹)	.16 (.09 ¹)	✗
Optimism		.09 (.06 ¹)	.10 (.15 ¹)	✗
EV experience		.05 (.02 ¹)	.31 (.47 ¹)	✗

1 older adult sample

✗ rejected
✓ accepted

Note: † p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001.



The predictors of willingness to purchase differ between youth and young adult vs. older adults

✓ Similarities

- 1 Positive intrinsic attitudes towards EVs
 - More likely to adopt EV, if the individual has positive intrinsic attitudes towards EVs
- 2 Negative attitudes towards EVs and skeptical attitudes towards RET
 - negative non-tech-related attitudes about EV or the more skeptical the individual is about RET, the less likely it is that this person is an potential EV adopter

✗ Older adults (only predictors in adult sample)

- 1 Social norms regarding RET and energy use
 - The more positive individuals are about RET and energy use, the more likely is the adoption of EV
- 2 Social dominance orientation (SDO)
 - Individuals high SDO, are less likely to adopt clean technology vehicles such as EVs



Conclusion and discussion

- ① *In general:*
 - **Potential future adopters are heterogeneous** and to achieve a transition towards electric mobility different stakeholders and research scholars need to have a **granular understanding of preferences and characteristics (focus on attitudinal and contextual factors) of future EV adopters.**
 - **More research with youth and young adults** is needed.

- ② *Results:*
 - **EV support** based on **central aspects and advantages** of the technology, and **EV rejection** focusing on peripheral **non-technology related factors.**

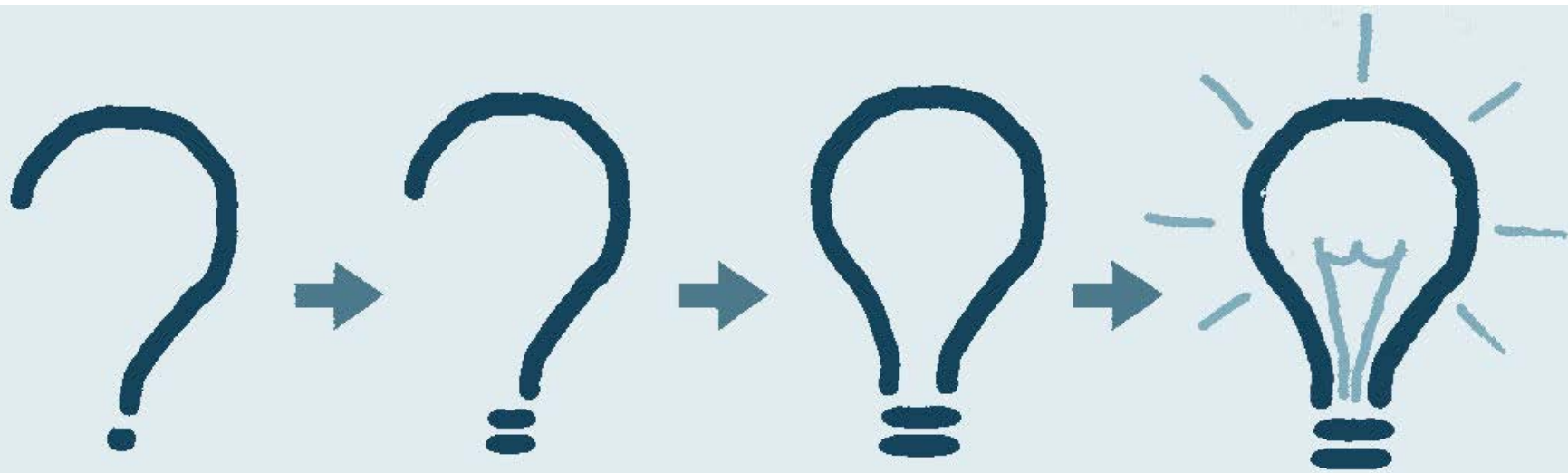
 - **RET skepticism** predicted **willingness to purchase an EV** in both samples. However, **optimist attitude** to renewable energy technology **is not associated with the dependent variable.**

 - **EV experience** was **not associated** with willingness to purchase EV.

- ③ *Sample and variables:*
 - **Fusion of two purchase-related variables** might have introduced **error** into the model
 - **Willingness to purchase vs. actual purchase**
 - Sample is not fully representative for Austrian citizens



Thanks for your attention!
Time for your questions?



Backup



Descriptives: Part 1

Variables	Variable code	Youths/ young adults	N	Adults	N
No. of respondents		452	-	798	-
Willingness-to-purchase	1 = very low 5 = very high	2.97	450	2.75	796
<i>Personal capabilities</i>					
Gender	1 = male 2 = female	32.3% 67.7%	452	53.5% 46.5%	798
Age	Years	23.3	452	49.0	798
Education	1 = compulsory school 2 = vocational training 3 = high school 4 = university	11.5% 25.0% 41.2% 22.3%	452	8.6% 67.5% 14.0% 9.8%	798
<i>Attitudinal factors</i>					
Positive attitudes towards EVs ¹					
Intrinsic	e.g., "Protection of the environment and the climate."	3.97	448	4.00	798
Extrinsic	e.g., "Charm of modern technologies."	3.98	448	3.07	798
Negative attitudes towards EVs ¹					
Technology-related	e.g., "Low availability of charging stations (in Austria and abroad)."	4.00	446	4.18	798
Non-technology-related	e.g., "Electric cars are only a transition technology."	3.09	445	3.38	798

Descriptives: Part 2

Attitudes towards RET²

Optimism	e.g., "It is our responsibility to use renewable energy technologies as this is the only way to prevent long-term harm to the environment."	3.16	449	3.07	798
Skepticism	e.g., "Austria will never get along without fossil fuels (gas, oil, coal)."	2.56	442	2.59	798
Social dominance orientation ²	e.g., "No one group should dominate in society. "	3.23	452	3.28	798
<i>Contextual factors</i> RET social norm	e.g., "I have the feeling, that my family and friends expect from me that I use renewable energy technologies where ever possible."	2.29	445	2.13	798
Social norm energy use ²	e.g., "I often talk to my friends about energy because this is an important topic to me."	2.52	452	2.55	798
EV Experience	1 = I have no experience with EVs. 2 = I have informed myself about EVs. 3 = I already drove an EV or someone drove me with an EV. 4 = I own/owned an EV.	52.3%	417	49.3%	742
		27.6%		32.9%	
		17.7%		16.8%	
		2.4%		1%	

Note: RET = renewable energy technologies; EV = electric vehicle.

¹ 1 = not important at all; 5 = very important.

² 1 = disagree; 4 = agree.

