Excerpt
(Full version of the report: 80 pages)

Charging Persona Study 2022

Data instead of opinions: Charging behaviour of different user segments

UScale GmbH
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Charging Persona Study 2022

Initial situation

Initial situation

With an EV market share of 13.5% for the full year 2021, the market is still in the early adopter segment. The next segment, the early majority, is expected to enter in 2022.

The willingness to buy an e-car depends strongly on the individual charging options and personal preferences.

Objective

For suppliers of e-cars and charging technology, it is important to understand the charging behaviour of the target customers.

To this end, this study develops charging personas based on a survey of over 2,000 EV drivers.

Charging Persona Study 2022

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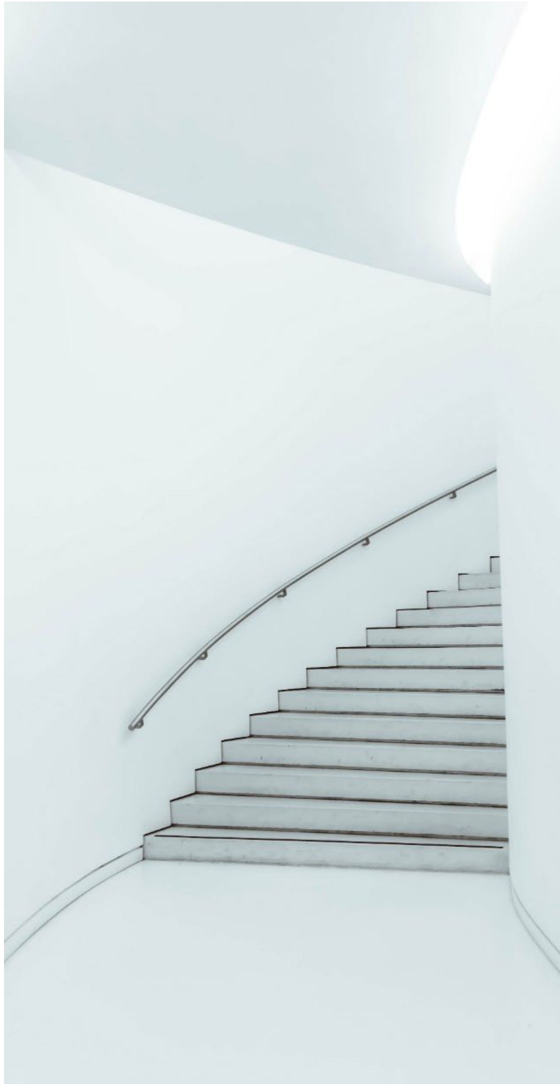


Charging Persona Study 2022

Management summary

1

Four personas with different charging profiles.

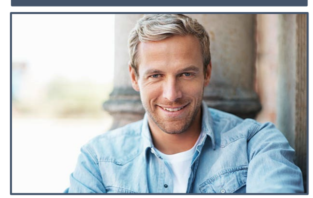
A cluster analysis of over 2,000 EV drivers results in four personas that differ significantly in terms of living situation, vehicle use, charging behaviour and attitude towards charging.

But...
(see next page)

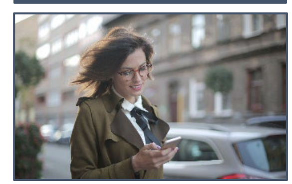
Homebodies 37%

Metropolitans 23%

Dynamics 22%



Professionals 18%



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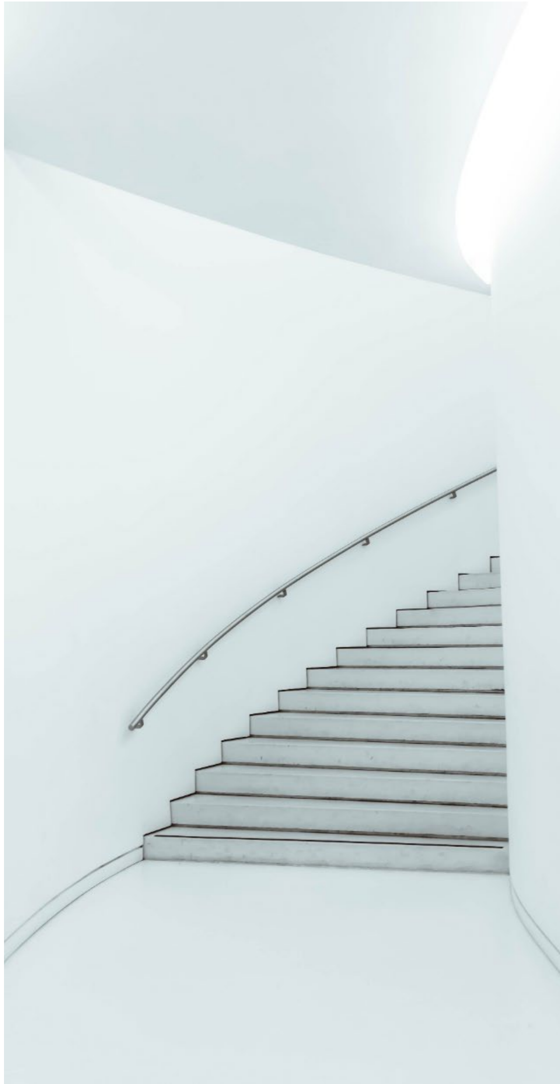


Sample and target group

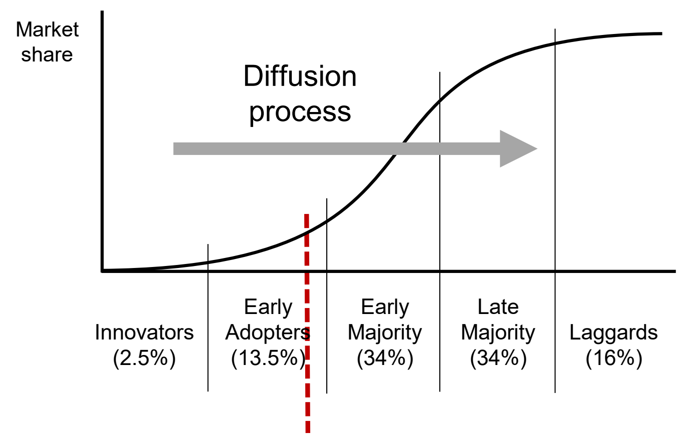
Preliminary remark

How does the sample differ from the target group?

Like any survey, the present survey is subject to bias.

The analysis of the collected data shows a high involvement of the respondents. This is typical for in-depth surveys.

However, the high level of involvement also applies to the surveyed group of early adopters in general. We therefore assume only a low bias, i.e. the sample covers the target group very well.



Total BEV market share of new registrations in 2021

Sample

Target group

Sample:

- Total sample: N = 2,424
  - e-car owners: N = 2,163
  - People interested in e-cars: N = 261
- Sub-sample for analysis of Charging personas: N = 2,123 owners

Survey:

- Survey: online
- Markets: German-speaking countries (DACH)
- Recruitment: Social Media
- Interview duration: 15 - 20 min
- Implementation: September 2021

Sample and target group

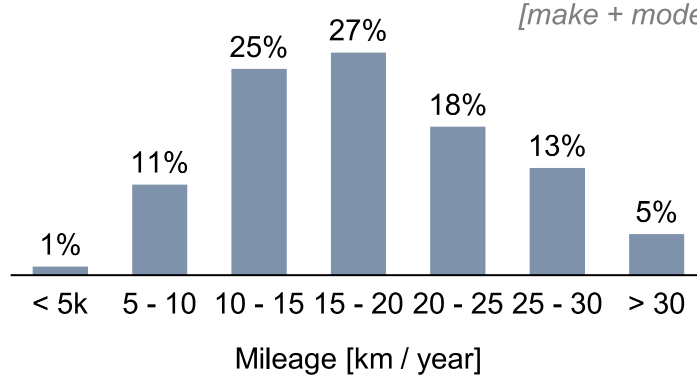
Driving performance

eCars with above-average mileage.

Almost two thirds of e-car drivers cover more than 15,000 km per year. This means that the average annual mileage is higher than that of combustion vehicles (approx. 13,700 km / year*).

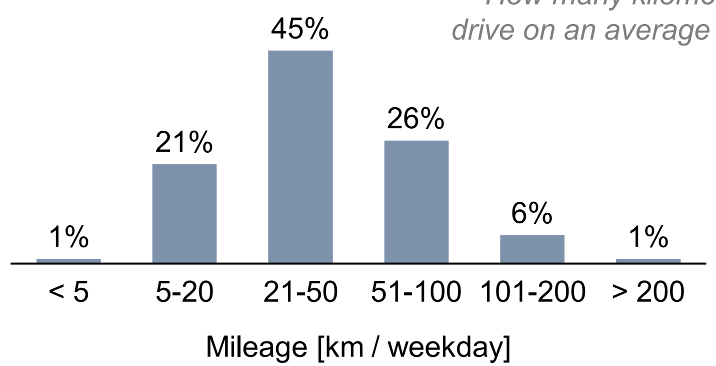
On average, the respondents drive km 40per day.

"Approximately how many kilometres do you drive your [make + model] per year?"



"How many kilometres do you drive on an average weekday?"

Average: km53 / day
Median: 40 km / day



* DAT Report 2021 (mileage has fallen by 6% compared to the previous year due to the Corona).

Sample and target group

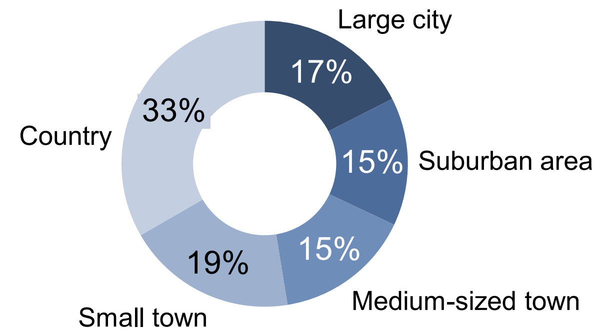
Place of residence and educational attainment

Every third e-car driver lives in the country.
50% academics.

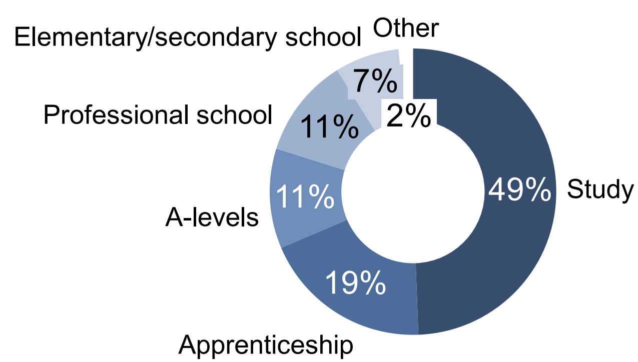
Respondents from rural areas are more strongly represented in the study than e-car drivers from large cities and their surrounding areas.

About half of the respondents have a university degree. This means that the highest level of education of the respondents is clearly above the national average (approx. 21% with a university degree*).

"Where do you live?"



"What is your highest educational qualification?"



* Institute for Employment Research of the Federal Employment Agency, 2017

Sample and target group

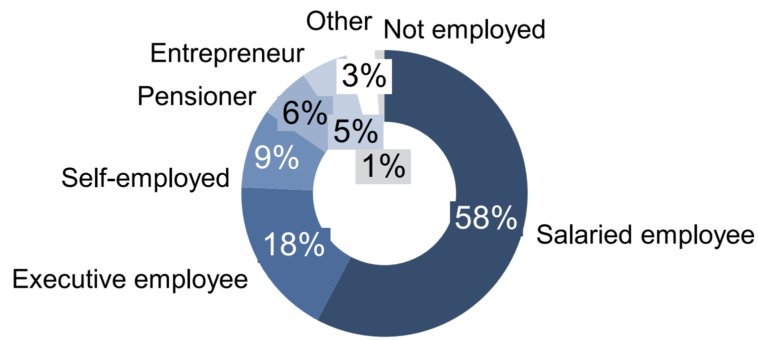
Occupation and net household income

EV drivers have a higher income than drivers of combustion vehicles.

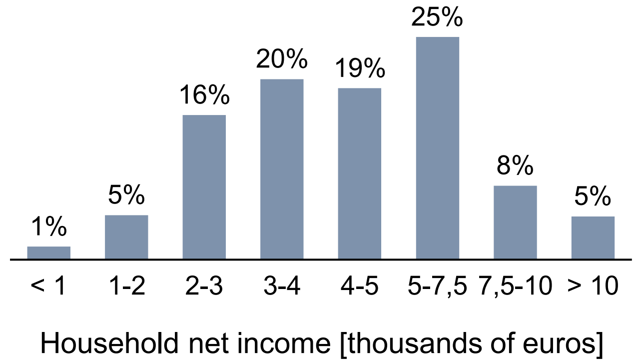
The occupational status of the respondents corresponds roughly to that of the national German population average (10% self-employed among the employed*).

57% of the respondents have a household net income of more than € 4,000. This means that the net income of e-car drivers is above the average in Germany (€ 3,580**).

"What is your professional position?"



"What is your monthly household net income?"



* Federal Agency for Civic Education, 28.11.2020
** Gross and net income per private household in Germany until 2019, Published by J. Rudnicka, 27.05.2021

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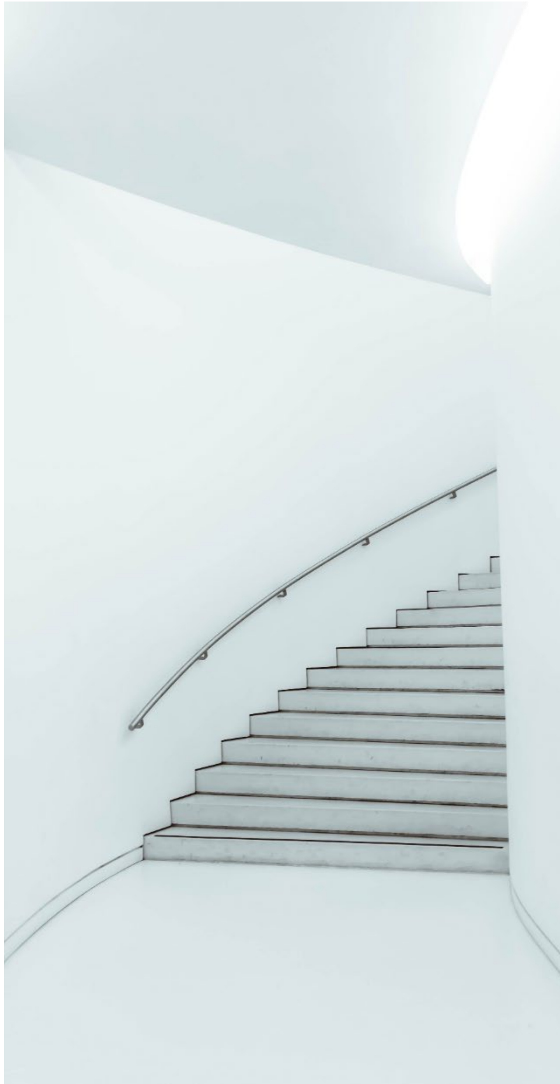

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Charging behaviour, habits, preferences

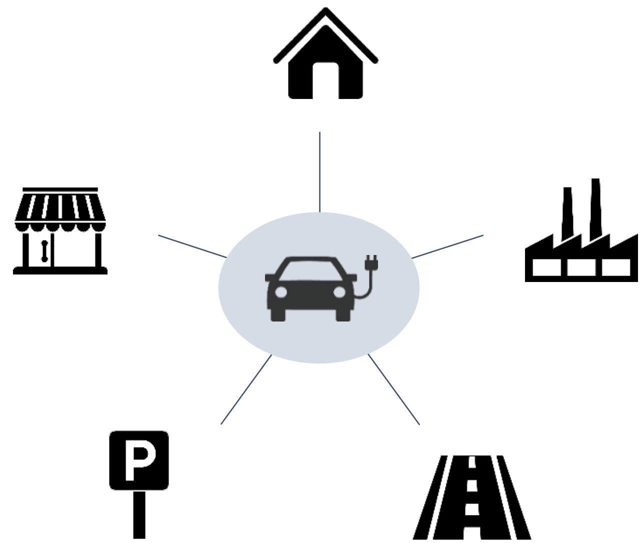
Preliminary remark

Why is knowledge about charging behaviour important?

In the public discussion, it is often assumed that e-car drivers mainly charge at home. The rest is distributed between employers and charging at motorways. These assumptions do not adequately reflect the current charging behaviour.

Questions for providers:

- Where do which e-car drivers charge?
- Why?
- Which charging behaviour is likely to prevail?
- What does this mean for your own offerings?



Charging behaviour, habits, preferences

Charging options

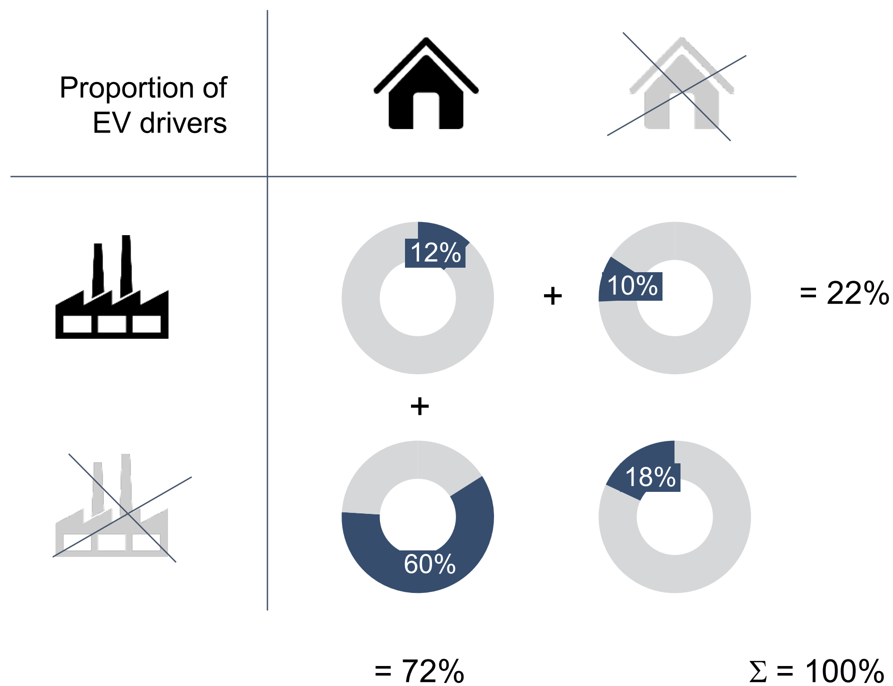
72% with a charging option at home. 18% completely dependent on public infrastructure.

Almost three quarters of respondents have a charging option at home. Among them, 12% have an additional charging option at their employer's premises.

22% have an option to charge at the employer.

18% of e-car drivers are completely dependent on the public charging infrastructure.

Proportion of respondents with charging facilities at home and / or at the employer:



USCALE

Charging behaviour, habits, preferences

Charging locations

"Where do you usually charge your [brand]?"

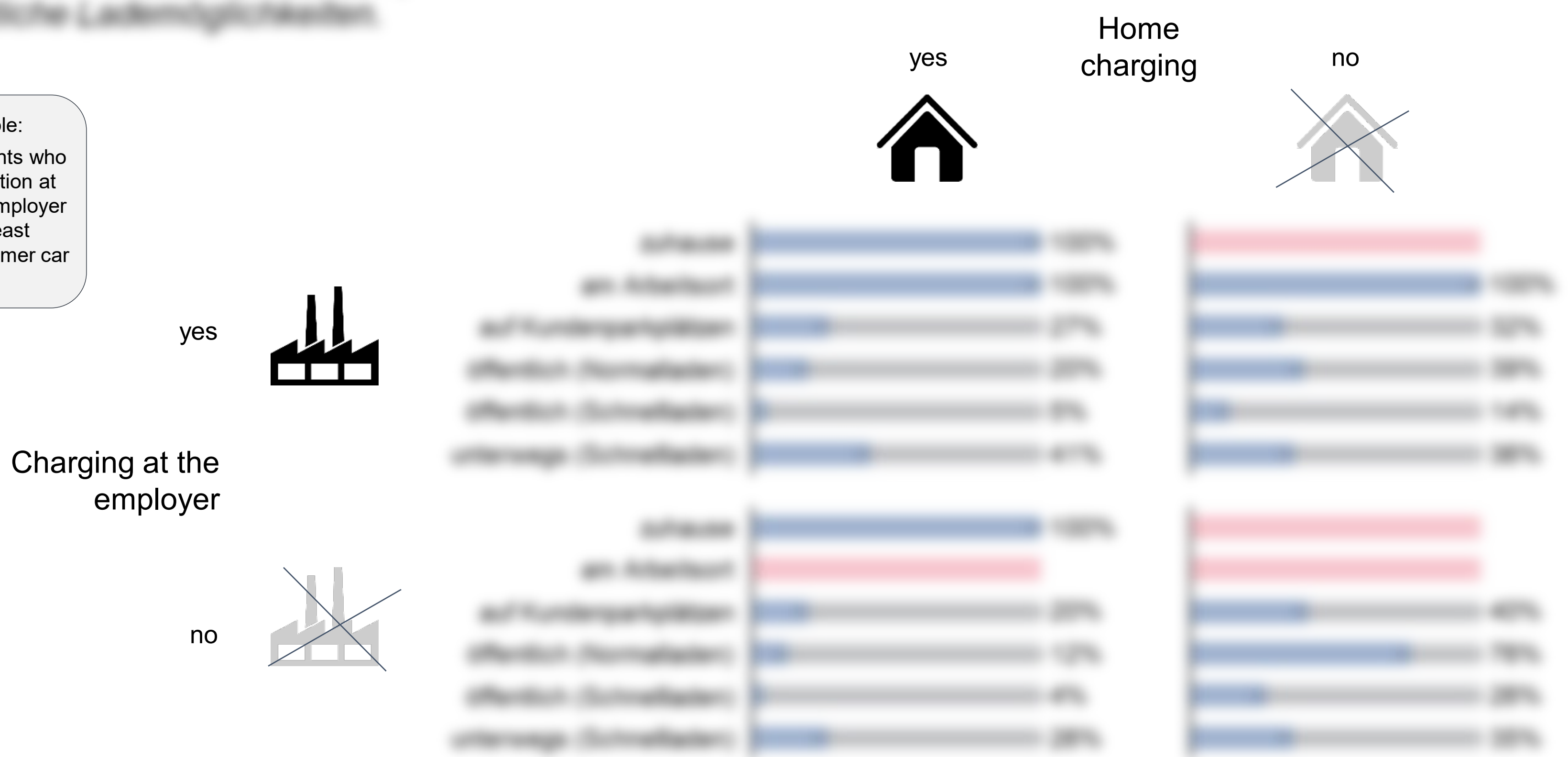
Charging behaviour, habits, preferences

Charging locations

"Where do you usually charge your [brand]?"

Reading example:

27% of all respondents who have a charging option at home ***and*** at their employer also charge at least occasionally in customer car parks.



Charging behaviour, habits, preferences

Energy quantities per charging location

"Approximately what proportion of your annual charging power do you charge where?"

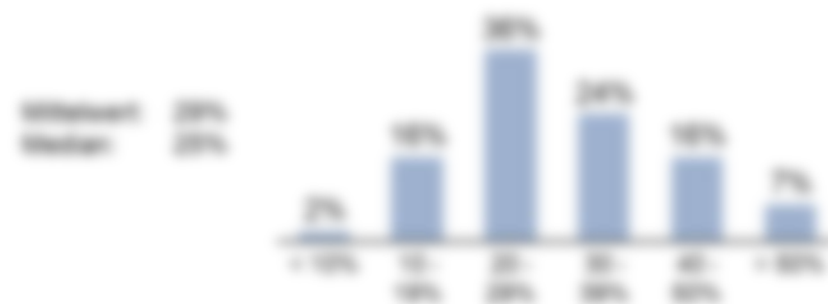
Charging behaviour, habits, preferences

Charging occasions

Pragmatic charging behaviour.

"When do you usually charge your [badge]?"
(Multiple answers possible)

for charging at a certain level:
"At what battery level do you usually charge?"



Charging behaviour, habits, preferences

charging routine

Once or twice a week.

"How often do you usually charge your [brand] per week?"

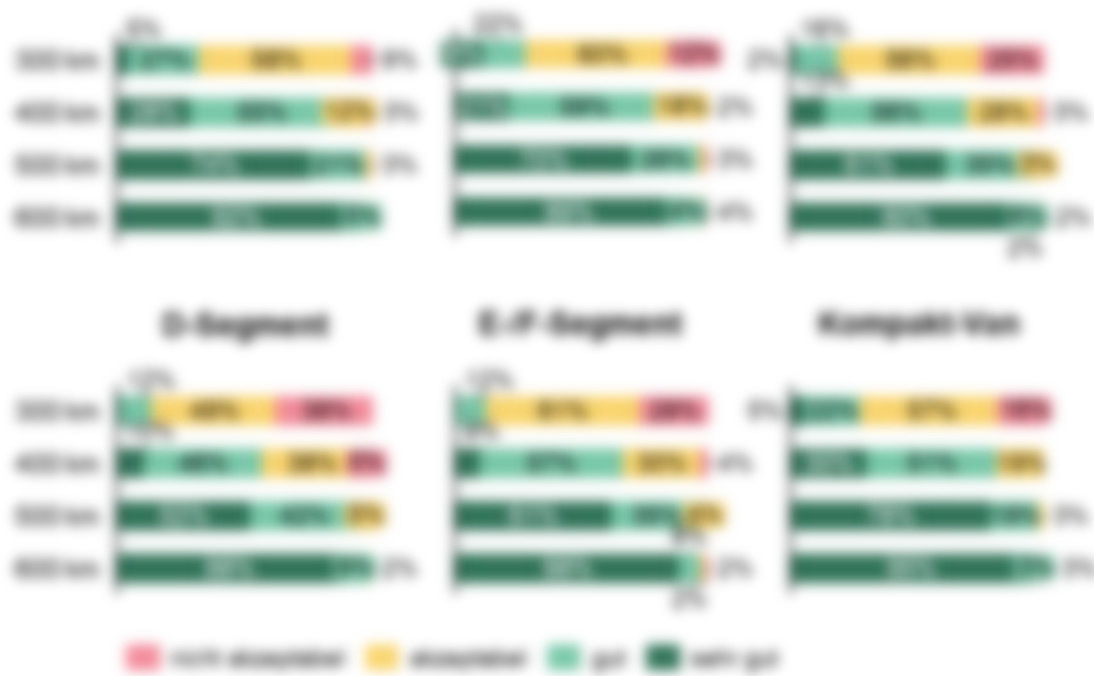
Charging behaviour, habits, preferences

AC charging power (by European segment)

"Independent of the charging power of your e-car:

How do you rate the following <u>AC charging performances</u> for an all-electric vehicle?

The respondent's own car



Charging behaviour, habits, preferences

Charge anxieties

"How would you rate the following statements?"

I am sometimes afraid...

USCALE

Charging behaviour, habits, preferences

Expectation charging experience

"How would you rate the following statements?"

Charging Persona Study 2022

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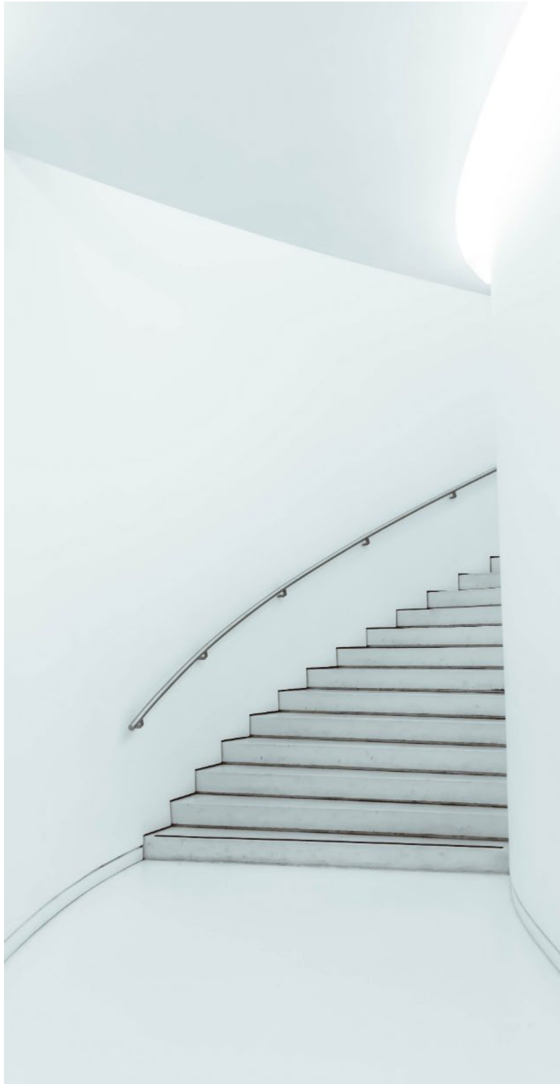


User segmentation

Preliminary remark

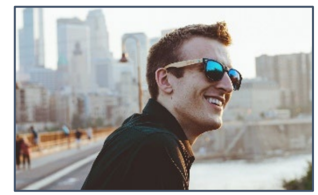
Why should customers be segmented, i.e. grouped together?

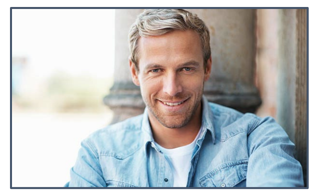
Whether e-drivers are responsive to a charging product or service, for example, depends on the individually accessible charging infrastructure and personal preferences and attitudes.

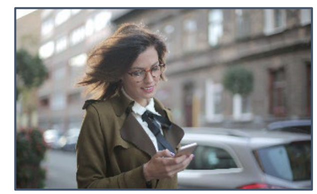
It is important for providers to know target groups as precisely as possible, in order to be able to address them specifically, with the appropriate products and messages.

Questions for vendors:

- What are the different user groups? How did they differ?
- Do the groups need to be addressed with different products?







User segmentation

Methodological procedure Cluster analysis

Three steps to a persona.

Variable analysis

Presentation of the survey results on charging behaviour

Charging locations
- Home / Employer / Public

Charging occasion
- Level / Opportunity
- Habit / Cheap electricity
- Share of long distances

Basis of analysis:
User details

Cluster analysis

Formation of groups of people with similar charging habits and possibilities

- Cluster 1 → Persona 1
- Cluster 2 → Persona 2
- Cluster 3 → Persona 3
- Cluster 4 → Persona 4

Basis of analysis:
Significant differences

Cluster description

Analysis of the differences between the user segments

- Persona 1
- Persona 2
- Persona 3
- Persona 4

→ Feature 1
Feature 2
...
...

Basis of analysis:
Significant differences

User segmentation

Results cluster analysis

Charging behaviour

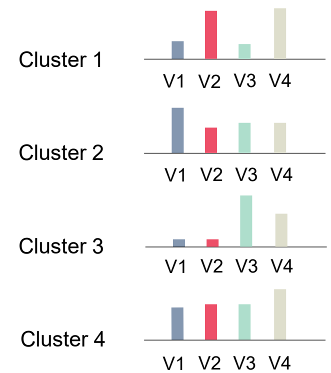
Variable 1
Variable 2
Variable 3 } Charging locations

Variable 4
Variable 5
Variable 6
Variable 7
Variable 8 } Charging occasions

What charging options do e-car drivers have?

What charging behaviour can be identified?

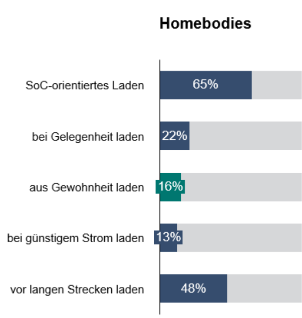
Cluster analysis



Which segments have similar charging profiles? How can these be interpreted?

Which personas can be derived?

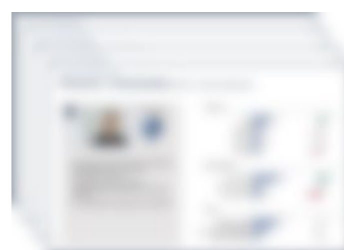
Cluster description



What are the significant differences?

Which characteristics are relevant for differentiating the personas?

Persona profiles



In which characteristics do the personas differ?

How does their usage behaviour differ?

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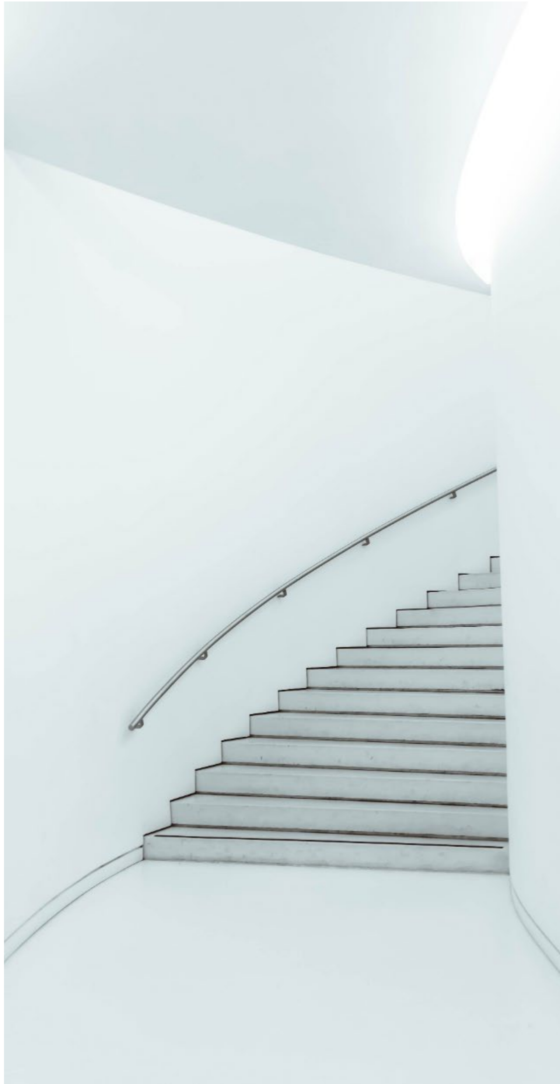
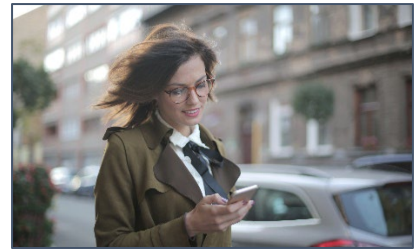


User segmentation

Overview personas

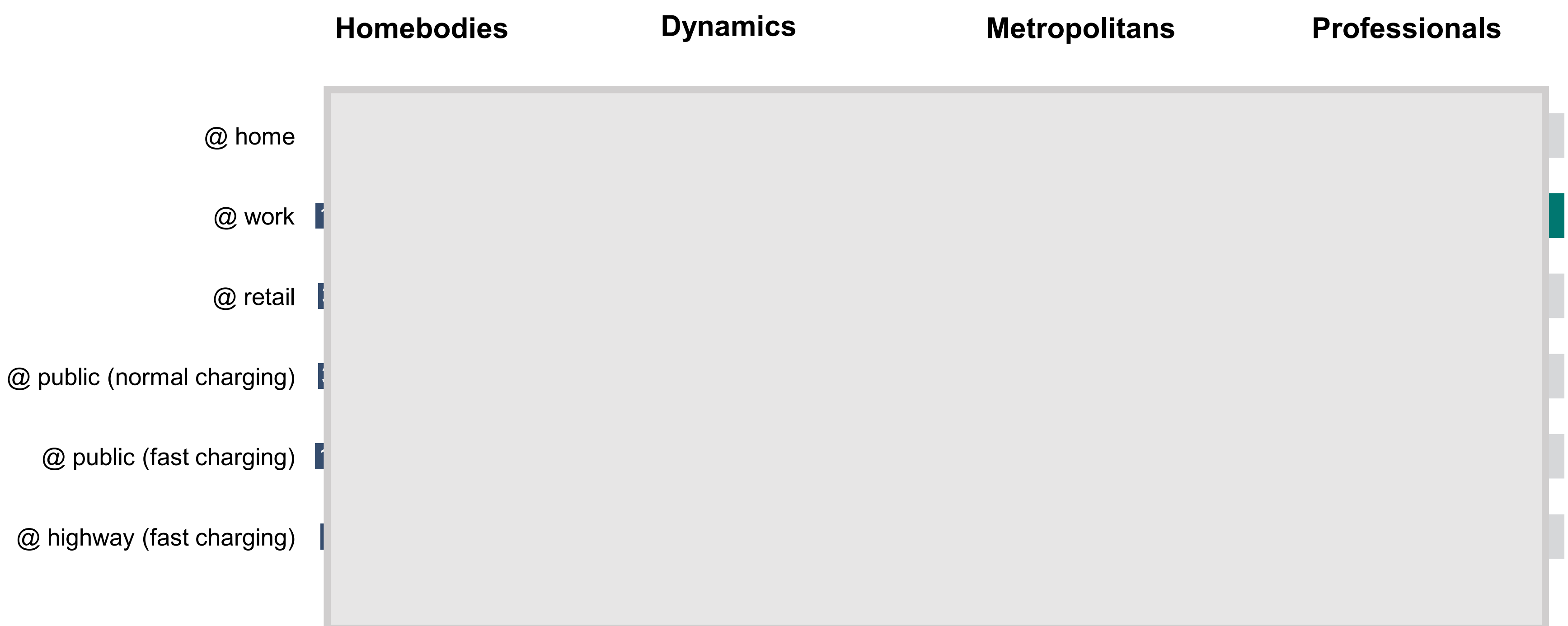
The cluster analysis results in four personas with significant differences.

Homebodies	Dynamics	Metropolitans	Professionals
			
[illegible]	[illegible]	[illegible]	[illegible]
37% of EV drivers	22% of EV drivers	23% of EV drivers	18% of EV drivers

User segmentation

Charging locations

Homebodies laden fast ausschließlich zuhause. Dynamiker zusätzlich häufig unterwegs. Metropolitans im innerstädtischen, öffentlichen Raum. Professionals mit Ladeschwerpunkt beim Arbeitgeber.



User segmentation

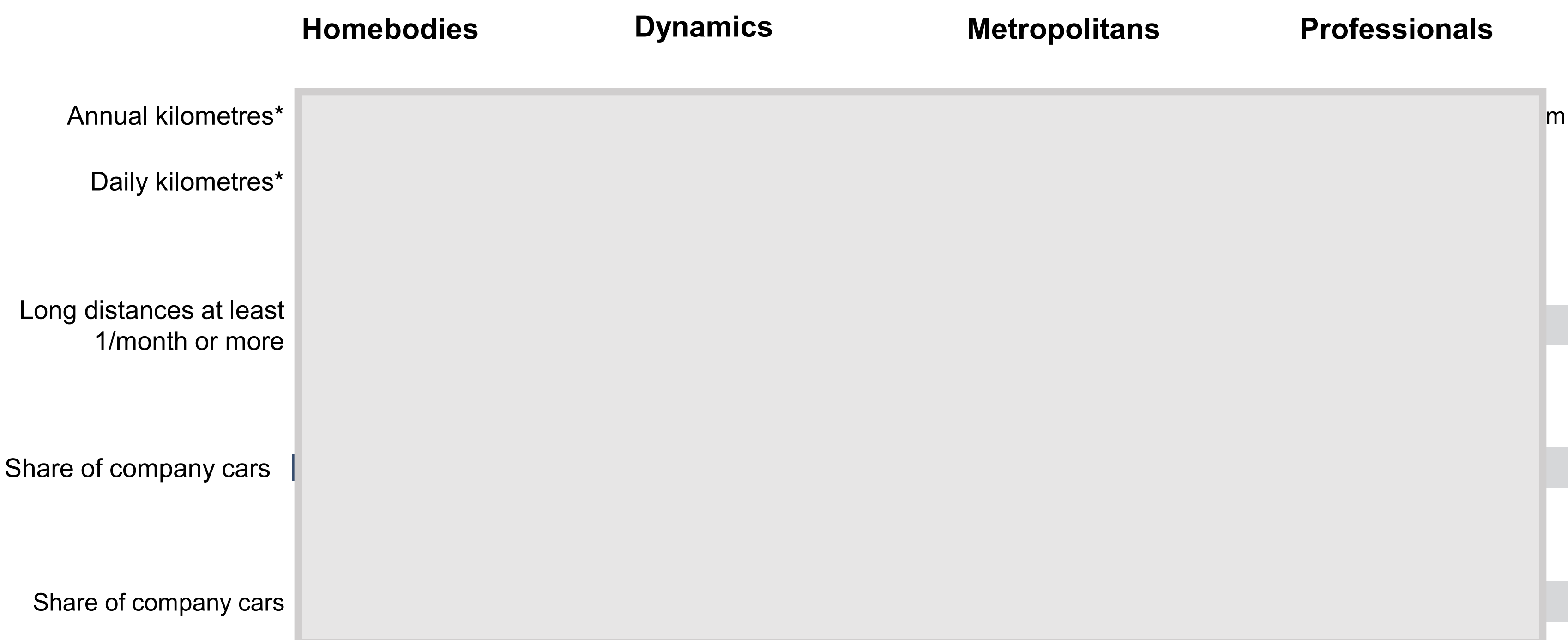
Charging occasions

Während Metropolitans Ladegelegenheiten nutzen (müssen), laden Homebodies stärker aus Gewohnheit. Dynamiker und Professionals laden häufiger auf langen Strecken, Dynamiker zusätzlich kostenorientiert.

User segmentation

Vehicle use

[redacted]



* grouped medians

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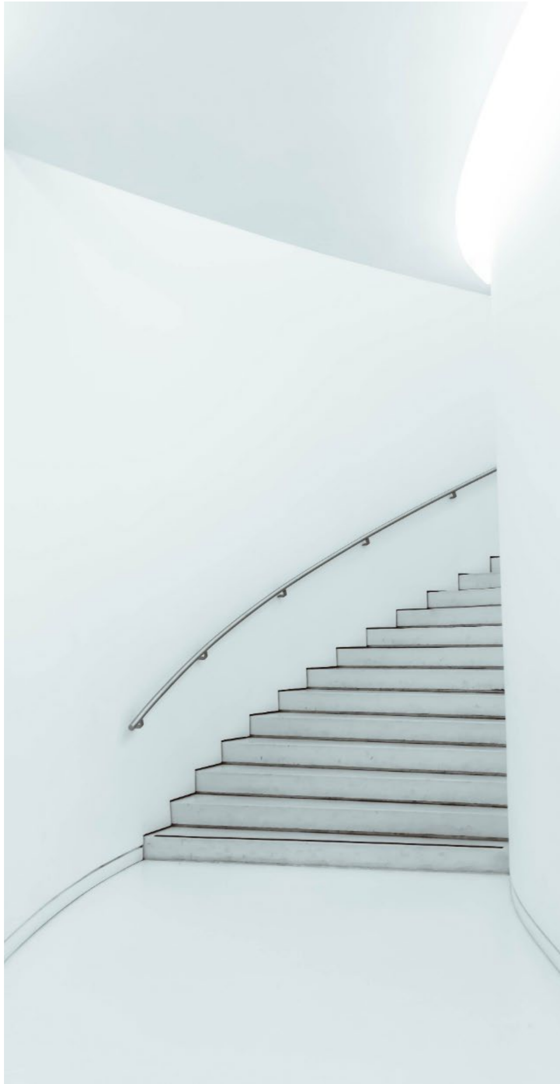
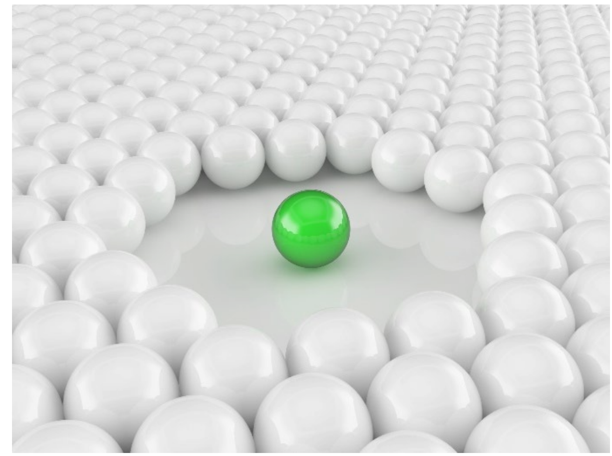


Persona profiles

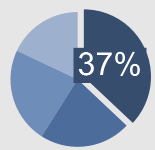
Preliminary remark

All current e-car drivers belong to the group of Innovators and Early Adopters. According to many criteria such as age, income, education, fear of charging, etc., the respondents do not differ significantly (also for this reason).

On the following persona profiles, the personas are only presented with the characteristics for which significant differences are found.



Persona 1: Homebodies (living and working situation)



(N = 791)

Residence

Housing situation

Occupation

Persona profiles

Persona 2: Dynamics (driving and charging behaviour)

Vehicle use

Charging locations

Charging occasions

Charging technology at home

USCALE

SCALE YOUR USER
SCALE YOUR BUSINESS

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About UScale

- UScale advises car manufacturers, energy suppliers and service providers on the customer-oriented design of offers and the development of KPI systems for customer perception.
- UScale's work is based on customer insights studies on all aspects of eMobility and an evaluation procedure for the acceptance of digital services from the customer's point of view.

- UScale is the only provider of a panel specialised in eMobility with more than 5.000 panellists in the German-speaking region.
- UScale makes the customer perspective tangible for managers, engineers and IT'ers.
- UScale has extensive industry knowledge of the eMobility ecosystem.
- UScale combines extensive experience with the challenges of corporates with the agility of a start-up.