

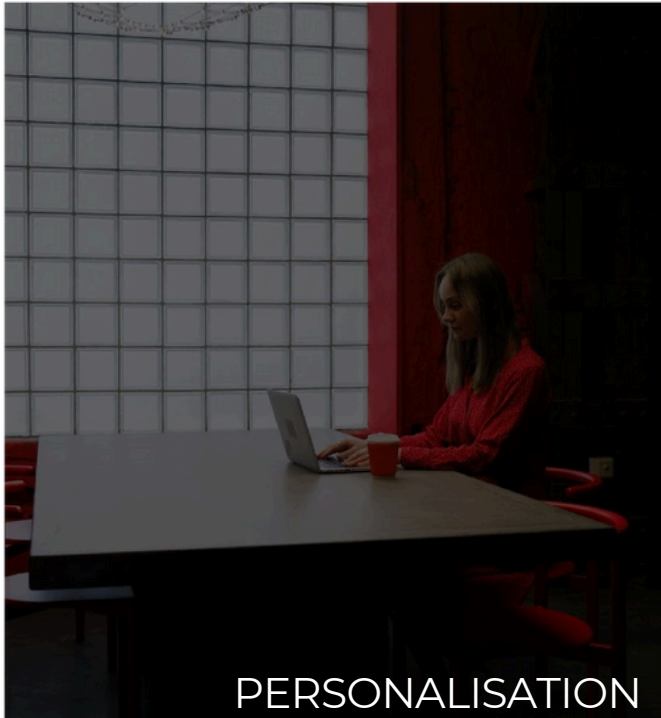
EV DIAGNOSTICS



EV HONOR



GAMIFICATION



PERSONALISATION



TRENDS

OPTIMAL UX & RANGE OPTIMISATION



# TREND #1

## EV HONOR

“ Greatest motivation for buying an EV is it’s environmental impact. ”

### CONCERNS

Lack of charging stations is the top inhibitor to purchase EV’s by 34%, according to EY MCI 2022 Study

### REASONS

Environment continues to be the top motivator for consumers buying an EV

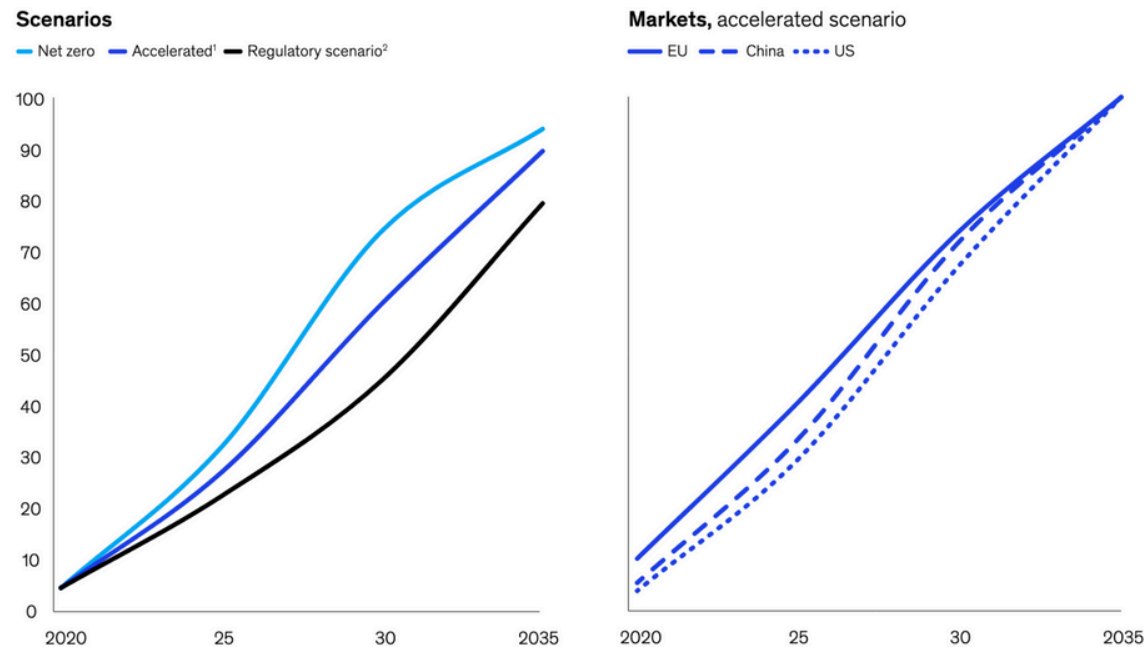
# Market Research-Trends

## EV Honor Study



By 2035, the largest automotive markets (the EU, US, and China) will be fully electric

EV (BEV, FCEV, PHEV) sales in percent of new passenger vehicle sales



## EV HONOR

What: Survey done by McKinsey & Company

How: Survey with McKinsey & Company resources

Results: By 2030, it is estimated that Europe will have an electric vehicle market share of approximately 75%. In alignment with the "Green Deal," the European Union has set a goal for new cars to have zero emissions by 2035.

# Market Research-Trends

## EV Honor Study



### Traditional market drivers

CO<sub>2</sub> Targets

ICE Restrictions

Tech Advancements

EV Incentives

EV Portfolios

OE Investments

### Emerging market drivers

Health Awareness

Out-of-reach CO<sub>2</sub> Targets

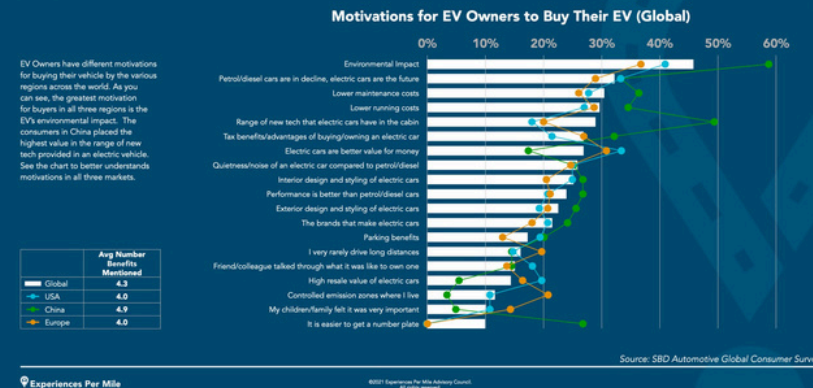
Premium Growth

Public Transport Concerns

**Environment** continues to be the top motivator for consumers buying an EV



### Motivations for Buying an EV Differ Considerably by Region



## EV HONOR

Ernst & Young: EY mobility consumer Index 2022 Study for shifts witnessed in travel patterns and mobility mix in the post-COVID-19 world.

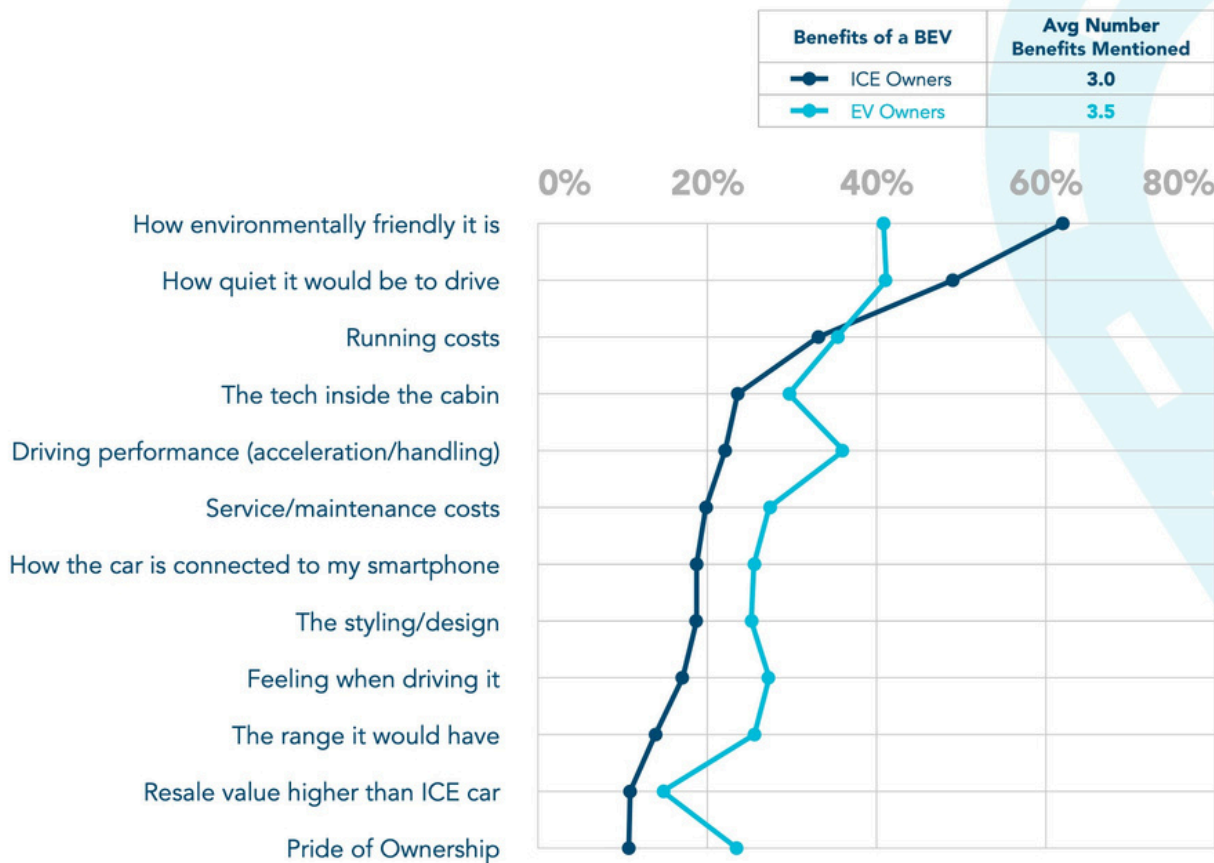
Results: According to the EY Mobility Survey of 2022, 52% of car buyers prefer an electric vehicle (EV) for their next purchase. This represents a three-fold increase in preference for fully electric cars, from 7% in 2020 to 20% in 2022. The top motivator for consumers purchasing EVs is environmental impact, with 38% citing this as the reason.

Additionally, the SBD Automotive Global survey of 2022 found that the greatest motivation for more than 40% of EV buyers on average is the environmental impact of the vehicle. This survey aimed to explore the potential impact of the shift towards vehicle electrification on the consumer experience.



# Market Research-Trends

## EV Honor Study



## EV HONOR

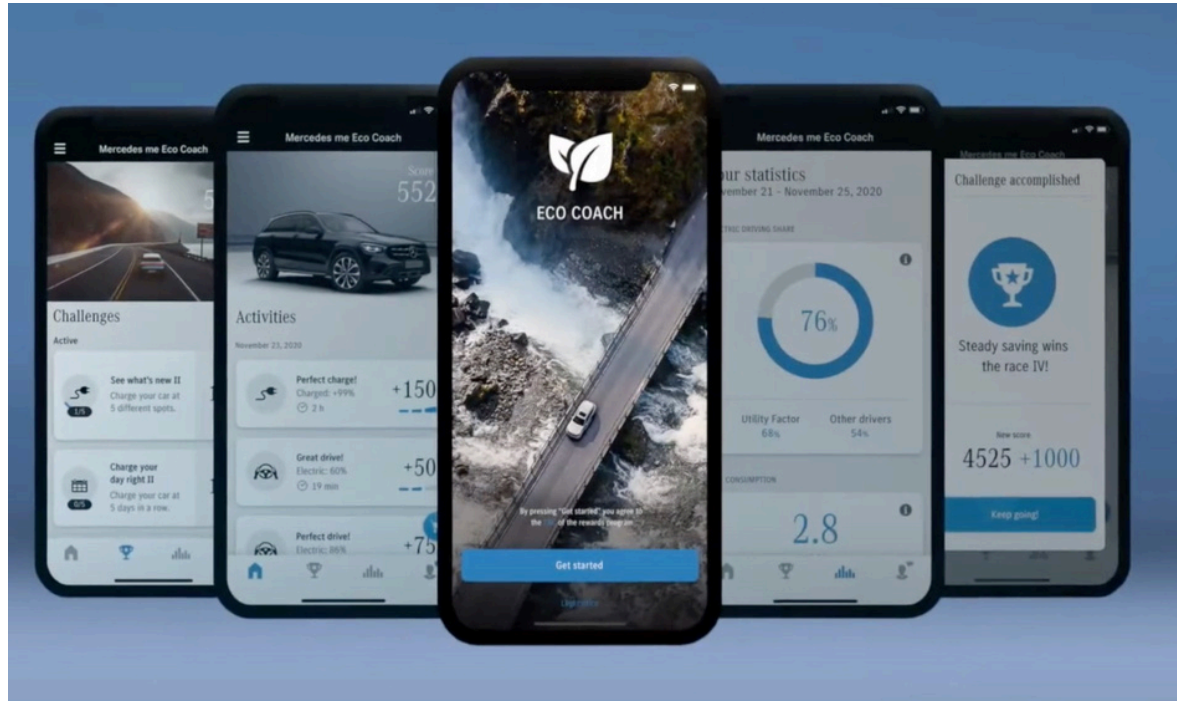
What: Survey to understand ongoing EV trends between new EV customers and EV owners

How: Survey with SBD resources

Results: According to the SBD Automotive Global Survey of 2022, both current EV owners and those planning to purchase an EV see "eco-friendly" and "quiet" as the primary benefits. However, over 30% of existing EV owners also identify in-vehicle technology, performance, and running costs as major benefits.

# Market Research-Trends

## EV Honor Example



## Mercedes Me –Eco Coach Badges

The Mercedes me Eco Coach app has attracted over 50,000 users, who on average, have demonstrated substantial advancements in their driving style and charging practices.

Mercedes-Benz is offering a 50% discount on charging vouchers as part of its integrated rewards program.

Users can earn points within the app by successfully completing various challenges, such as achieving the highest percentage of electric driving or consistently charging for multiple days. They can also participate in monthly community competitions for the chance to win prizes.

By using the app, users have reported a 22% increase in energy savings in their hybrid systems.



# RECOMMENDATIONS

## EV Honor

### 1 ENCOURAGE SAVING ENERGY

Using gamification elements to account for environmental variables while driving an EV such as creating rewarding feedback on driver's lesser energy consumption will save battery life and satisfy the driver's "EV Honor" approach. Gamification elements to reduce speed, smooth braking and smooth acceleration, as well as setting the maximum battery charging level to 80% will highly increase the battery efficiency.

### 2 VISUALS FOR CO2 SAVINGS

Visuals showing how much CO2 drivers would have emitted if they were using a combustion engine vehicle will help confirming user expectations of "EV Honor"

## TREND #2

# EV GAMIFICATION

“ Gamification and persuasive technologies can change behaviours leading to desired outcomes, such as increasing consumer loyalty, raising health awareness, or developing eco-friendly mindsets. ”



### DECREASES

Previous research suggests that user boredom can cause drivers to engage in less eco-friendly driving behaviours, such as speeding, as a way of coping with the monotony of driving.



### INCREASES

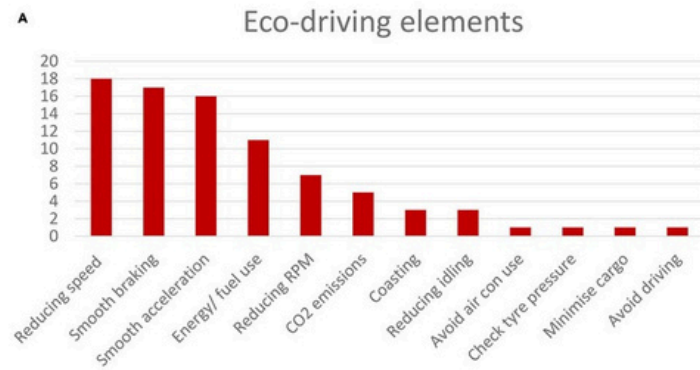
The "EV Honor" approach can be reinforced through the use of gamification elements, such as CO2 consumption visuals, badges or other interactive features, in eco-driving.



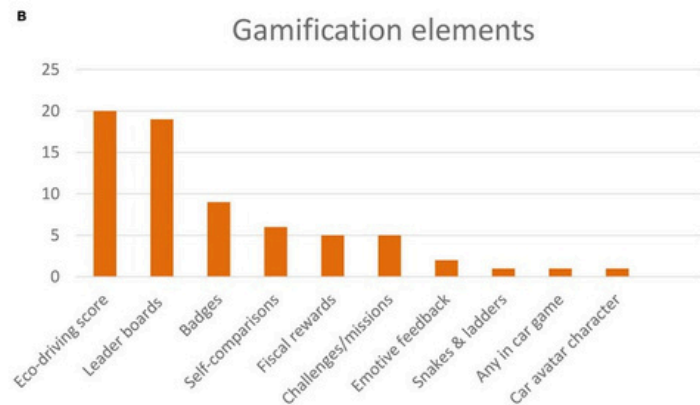
# Market Research-Trends EV Gamification Study



A



B

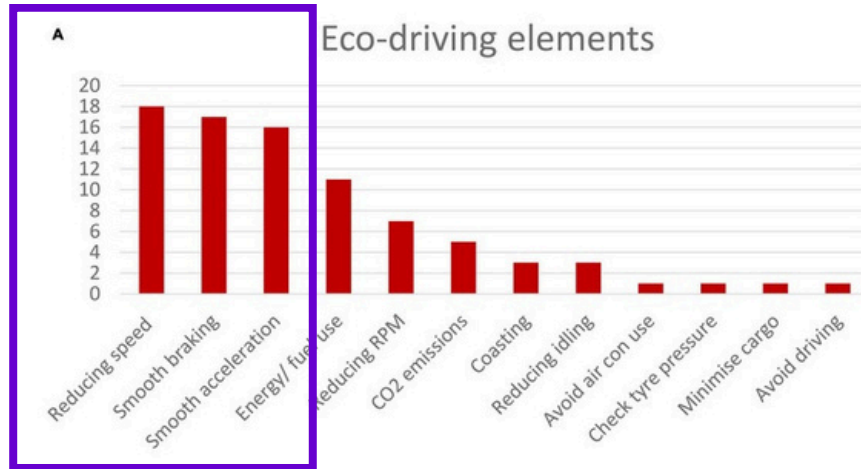


## Study Highlight

Smartphone-based driving aids were the most popular format among users, according to the study.

Custom-designed adjunct systems and video games that promote eco-friendly driving were also utilized. Figure 2A and 2B shows the most effective gamification areas for applying eco-driving elements and gamification elements

## A



## Study A: Coastmaster

What: "Coastmaster" is an in-vehicle game that promotes minimal use of the brake pedal during transitions from higher to lower speed limit areas..

How: The research was conducted using an advanced moving-base driving simulator. Participants were presented with a visual map of ideal speed transitions and were instructed to match their speed to the target speed in real-time. 32 male drivers aged 18-25 participated in the study, driving for 16 minutes with and without the system, with the order of conditions counterbalanced.

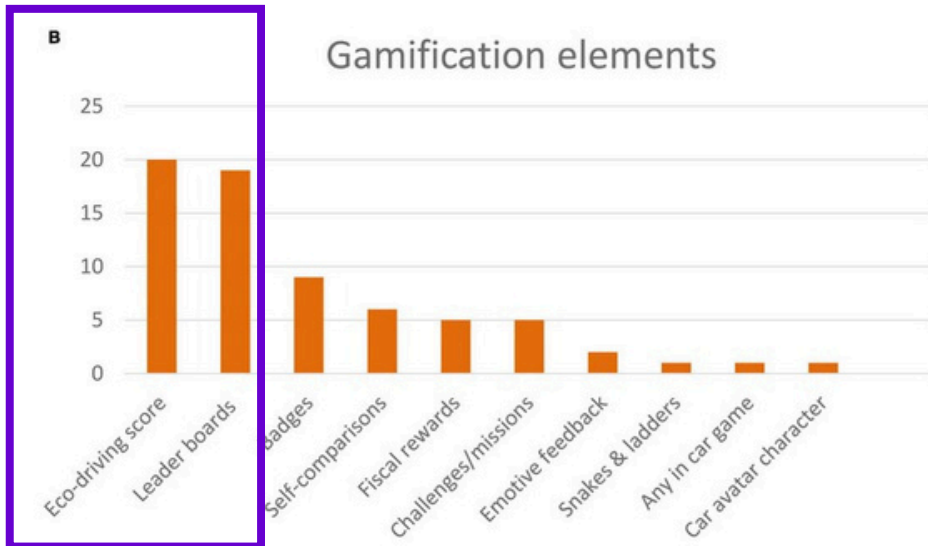
Results: The results, as reported by Steinberger et al. (2017)\* indicated that the use of "Coastmaster" resulted in a significant reduction of speed in 24 male drivers.



# Market Research-Trends EV Gamification Study B



## B



## Study B: Stillwater & Kurany

What: In-vehicle energy use display with a leader-board.

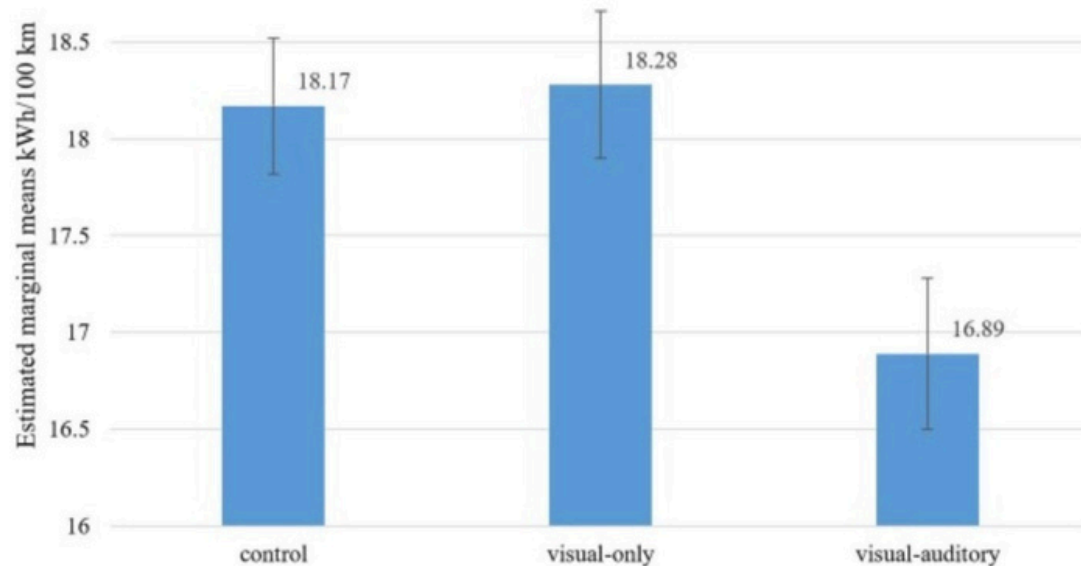
How: A field test was conducted with 46 drivers for a period of 2 weeks each, with results evaluated through interviews at the end of the study.

Results: The study by Stillwater and Kurani(2013)\* found that:

- Real-time feedback aids drivers' experimentation and learning
- Trip-average feedback is necessary for drivers to evaluate their progress towards their goals
- Real-time feedback also aids drivers' experimentation and learning

It was observed that users spontaneously provided feedback that they were challenging themselves to improve their fuel efficiency. However, the leader-board display feature was rated less favourably due to its confusing nature.

# Market Research-Trends EV Gamification Study



## Study: Transportation Part F

January 2023

**What:** Testing the hypothesis that drivers who receive both visual and auditory stimuli through a gamified system during vehicle operation, will consume significantly less energy.

**How:** A field experiment was conducted in four stages: assignment, introduction, driving, and post-test on a fixed route, involving 63 participants divided into 3 groups: a control group without a gamified application, a visual-only group with a gamified application that uses visual stimuli only, and a visual-auditory group with a gamified application that adds auditory cues to visual stimuli.

**Results:** The results showed that the visual-only group expressed a greater intention to use the gamified application, but consumed more energy compared to the visual-auditory group. The addition of auditory elements to the gamification led to: a) easier use, b) greater perceived enjoyment, c) a perception that the gamification with audio was more useful than a gamification without audio.



# Market Research-Trends

## EV Gamification Example



### Mercedes - ECO-Display

The ECO display sums up your driving behavior from start to finish and supports a consumption-optimized driving style.

### Lincoln – Efficiency leaves

Gamification can be encouraging for less emission, as this is mostly the main reason why most europeans buy electric vehicles

# RECOMMENDATIONS

## EV Gamification

### 1 VISUAL-AUDITORY ELEMENTS

Previous studies showed increasing immersive experience of the games and gamified elements such as badges will result in decreasing driver's energy consumption. Immersion will be achieved by adding more auditory elements to in-vehicle features, games and gamified elements.

### 2 COMPETING SCORES

The most popular of the gamification elements is an eco-driving score motivates users to improve via competition against their own current score.

### 3 COMMUNITY APPLICATION

A community where drivers gain loyalty points for using the loyalty app while driving their car will both help reduce boredom resulting in speeding up while creating more loyalty to the brand.

## TREND #3

# EV PERSONALIZATION

“ Automatic user authentication and setting adjustment, making suggestions based on the user’s history of behaviours have been introduced by leading OEMs. ”

### RISKS

According to an SBD survey, more than 30% of the 635 surveyed consumers expressed concerns about how their data is handled.

### FACTS

By 2025, 7.84 million cars will be equipped digital keys, with an average growth of 38%.

### POSITIVES

driving-related personalised information and personalised car-exterior context have an impact on driver’s perceived safety and enjoyment