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a Magyar Tudomány Ünnepe alkalmából
International Scientific Conference
on the Occasion of the Hungarian Science Festival

Sopron, 2025. november 6.
6 November 2025, Sopron

FEJLŐDÉSI PÁLYÁK ÉS ÚJ TÖRÉSVONALAK A FENNTARTHATÓSÁGI ÁTMENET IDŐSZAKÁBAN

DEVELOPMENT TRAJECTORIES AND NEW DIVIDES IN TIMES OF SUSTAINABILITY TRANSITIONS

Szerkesztők / Editors:
RESPERGER Richárd, SZÉLES Zsuzsanna, TÓTH Balázs István

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Co-Creation and Personalisation in Autonomous Mobility: A Qualitative Exploration of User Expectations

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Abstract:
The development of autonomous vehicles is progressing at a rapid pace. This development is accompanied by the ongoing digitalisation of vehicle interiors. To ensure targeted development, user expectations regarding personalisation and co-design are becoming increasingly relevant. Previous research has focused in particular on the aspects of safety, efficiency and technological acceptance. In contrast, little is known about the extent to which users could exploit the potential of autonomous vehicles for personalised services and the extent to which they actively participate in the design of such offerings. This study addresses this gap by qualitatively examining the expectations of potential users with regard to the personalisation and co-design of AVs. Based on concepts such as platform theory and user experience research, interviews were conducted in focus groups with a diverse selection of participants. Following the interviews, the transcripts were analysed using qualitative content analysis. The results of the qualitative content analysis emphasise the relevance of integrating user-oriented principles into the development of AV platforms. This study contributes to the understanding of new value dimensions in autonomous mobility and offers practical implications for mobility providers. Furthermore, it contributes to promoting long-term acceptance among users.

Keywords: autonomous vehicles, user acceptance, qualitative research
JEL Codes: L91, M31, D12

1. Introduction

The advent of fully autonomous driving technology signifies a paradigm shift in the domain of transportation, poised to emerge as a substantial disruptive innovation in the mobility sector. Current projections anticipate its mainstream market entry within the next few decades (Nieuwenhuijsen et al., 2018). In order to provide a proper evaluation of this development, it is necessary that the technology in question is understood in sufficient detail, with particular reference to its functionality. In order to achieve a comprehensive understanding of the subject, reference should be made to the generally accepted classifications of automated driving. These levels, ranging from 0 to 5, delineate the progression of vehicle automation. Levels 0 to 2 are classified as assisted driving and require continuous monitoring of the driving task by a human. Levels 3 to 5 mark the transition to highly and fully automated systems. Evidence suggests that a Level 3 vehicle possesses the capacity for autonomous driving within clearly delineated areas

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of application, with the system engaged in environmental monitoring. Nevertheless, it is imperative that a human remains available to re-establish control if necessary. This places considerable demands on technical redundancy and communication mechanisms. The fourth level is characterised by an extension of this degree of automation, with the vehicle operating in a completely autonomous manner within a defined operating range. Evidence suggests that human intervention is no longer required in the event of system errors, provided that the vehicle is within the defined area. Finally, level 5 describes fully autonomous mobility, in which human intervention is not required at any time and the system operates independently under all traffic and environmental conditions (SAE International, 2019). In this context, the functional scope of levels 4 and 5 is discussed in particular with regard to autonomous vehicles (Fraedrich & Lenz, 2016). This significant advancement in technology, particularly in the domain of highly automated driving systems, is frequently characterised by experts as possessing immense potential with regard to the various disruptive opportunities and transformative possibilities that could fundamentally alter the landscape of transportation and mobility as we currently understand them (Bernhart & Winterhoff, 2016; Nieuwenhuijsen et al., 2018; Winner, 2018).

This occurrence can be ascribed to the capacity of automated vehicles (AVs) to exert extensive societal influences on aspects such as safety, equitable access to opportunities, and public health across an extended duration (Milakis et al., 2017). The successful integration of autonomous vehicles into society and the transport system is contingent upon their acceptance (Othman & Othman, 2021). Notwithstanding the numerous advantages offered by autonomous vehicles and the widespread recognition of the importance of gaining acceptance among potential consumers, the general public believes that autonomous cars inherently pose a higher risk than their human-driven counterparts. Recent research indicates that consumers exhibit significant reluctance and scepticism towards the utilisation of highly automated vehicles. This attitude is indicative of a complex dynamic between technological innovation and social trust (Anable, 2005; Hulse et al., 2018; T. Zhang et al., 2019). Research into the acceptance of autonomous vehicles has historically concentrated on personal beliefs, perceived risks and technological characteristics. However, it is becoming increasingly evident that autonomous driving should be designed not only as a standalone product, but as an integral part of comprehensive digital ecosystems. In this context, the perspective of platform theory becomes relevant, as contemporary platforms represent not only technological frameworks but also complex socio-technical systems in which actors, regulations, data architectures and value generation mechanisms are closely interlinked (Kapoor et al., 2021). This perspective contributes to a broader understanding of autonomous vehicles, as their use, further development and social assimilation will be significantly influenced by platform-oriented intermediaries in the future. Current research emphasises that digital systems are influenced by complex interrelationships between technology, behaviour and culture. Technological synergies such as AI personalisation and immersive engagement are highlighted. At the same time, it addresses issues of cognitive overload and digital addiction, illustrating how factors such as uncertainty avoidance and collectivism influence technology acceptance and risk perception (Yuan et al., 2025).

Despite the increasing importance of value generation through platform-based frameworks, scientific research to date has predominantly viewed autonomous vehicles merely as technological artefacts or singular mobility services. Scientific discourse rarely considers them as integral components – or even potential nexuses – within proprietary platform ecosystems. At this point, it is important to note a significant gap in research: autonomous vehicles are increasingly dependent on data, as they are networked with each other and integrated into digital mobility services. This raises the question of the extent to which they can develop into platforms that facilitate interactions between different actors, enable data exchange and promote new ways of creating value. In this context, the present study focuses on designing the autonomous vehicle as a viable platform and qualitatively analysing the perspectives of potential users with regard to personalisation and co-design. Based on platform theory frameworks and methods from user experience research, focus groups with a large number of participants were organised.

As part of this study, a qualitative content analysis was conducted to evaluate the interview data collected in advance. The results emphasise the relevance of considering user-oriented principles in the early stages of developing autonomous vehicle platforms. This is essential in order to open up new dimensions of autonomous transport and sustainably increase the acceptance of future transport systems.

2. Literature review

Chapter two provides a detailed analysis of existing studies that primarily deal with the acceptance of new technologies, in particular autonomous driving. Research suggests that the dynamics of autonomous vehicles are influenced by a variety of complex technological, psychological and social factors. Previous studies have revealed significant uncertainties regarding the likely impact of autonomous transport on traffic and land use (Gkartzonikas & Gkritza, 2019). At the same time, willingness to use and invest in autonomous vehicles is largely determined by individual characteristics such as familiarity, education, personal attitudes and emotional factors, as demonstrated by the strong explanatory power of such variables in the flight readiness model (Rice et al., 2019). The general acceptance of AVs is largely determined by subjective norms, trust and perceived benefits (Nastjuk et al., 2020; T. Zhang et al., 2019). Direct experiences, such as in field experiments, promote the intention to use AVs, although psychological barriers remain (Xu et al., 2018). In addition, market and communication strategies have a significant influence on trust building, especially in cases where safety and compliance aspects are emphasised (Waung et al., 2021). Furthermore, willingness-to-pay analyses indicate that income, travel purpose and attitudes significantly influence the evaluation of autonomous mobility services (Guan et al., 2024). The following *table 1* presents a systematic summary of the results.

Table 1: Overview of studies in this field

Author (Year)	Key concept	Results
Gkartzonikas & Gkritza (2019)	Literature Review	The studies emphasise considerable uncertainty regarding the impact of autonomous vehicles on travel demand and land use, and highlight differing expectations of such vehicles, particularly with regard to their advantages and risks.
Rice et al. (2019)	Quantitative survey	The study demonstrates that the propensity to fly is significantly influenced by a combination of factors, including familiarity, enjoyment, reduced technical scepticism, minimal fear, high educational attainment and youth. Collectively, these factors account for 73% of the model variance.
Nastjuk et al. (2020)	Mixed methods (exploratory-sequential)	The research indicates that the acceptance of autonomous vehicles is significantly influenced by social factors, personal attributes, and system characteristics. Critical determinants include subjective norms, trust, innovation capacity, and perceived advantages.
Xu et al. (2018)	Field experiment (quantitative, SEM/PLS)	Engagement with autonomous vehicles increases trust, perceived usefulness and ease of use, thereby promoting the intention to use them, although psychological barriers remain significant obstacles to their widespread adoption.
Naiseh et al. (2025)	Bibliometrics Analyse	The research uses hierarchical cluster analysis while acknowledging that bibliometric results rely on

Author (Year)	Key concept	Results
		frequently cited articles, suggesting that more diverse methods such as multidimensional scaling or integrated network strategies should be used in the future.
Kenesei et al. (2022)	Quantitative survey	Trust in autonomous vehicles (AVs) encompasses performance, manufacturer and institutional dimensions, with trust in the service directly promoting usage, trust in the manufacturer indirectly promoting usage through concerns about data privacy, and institutional trust having no influence on perceived risk or user intention.
Waung et al. (2021)	Quantitative survey	Manufacturer and vehicle details influence initial trust in autonomous vehicles. Prioritising safety, compliance and research increases trust and willingness to adopt, whereas emphasising accelerated market entry reduces trust, control and willingness to prepare.
Guan et al. (2024)	Quantitative survey	The study shows that the highest willingness to pay for autonomous vehicle subscriptions is observed primarily among business travellers and affluent population groups, with factors such as travel intentions, income and attitudes significantly influencing the evaluation of different AV alternatives.
T. Zhang et al. (2019)	Quantitative survey	The foundational trust significantly impacts users' attitudes and intentions regarding autonomous vehicles, as it amplifies with perceived utility and diminished safety concerns, thereby underscoring the necessity for confidence-enhancing strategies to foster public endorsement of AVs.
Kulviwat et al. (2009)	Quantitative modelling	Social influence significantly increases adoption intentions through employment, especially for innovations with public applications. Therefore, marketing strategies must be tailored to whether the use is public or private, as attitudes play a crucial role.
Qu et al. (2021)	Mixed-Methods	The study shows that individuals who opted for self-driving vehicles early on exhibit low neuroticism and low extraversion, increased openness and superior prior knowledge, while characteristic fears unexpectedly strengthen confidence in automation, suggesting that specific personality profiles can serve as important targets for marketing and policy strategies.
Zeng et al. (2023)	Quantitative survey	Chinese middle-aged and senior groups view smart cars positively but have safety and control concerns; the extended TAM model explains their acceptance well and provides valuable insights for policymakers and industry.
Syahrivar et al. (2021)	Quantitative survey	The interplay between personal control and cultural dimensions, particularly power distance, significantly influences the perception of autonomous

Author (Year)	Key concept	Results
		vehicles and underscores the need for comprehensive research into the psychological and cultural determinants for effective AV deployment.
Richter et al. (2022)	Literature review / Conceptual study	Autonomous vehicles vary in usefulness in urban environments, proving beneficial in cities with inadequate public transport, while being less useful in well-connected areas. AV pods in particular are largely ineffective, in contrast to the significant benefits offered by AV shuttles.
Pérez-Moure et al. (2023)	Literature Review	Car manufacturers are formulating a wide range of digital mobility approaches, focusing on technological and organisational expertise, with value primarily derived from tailored, interconnected services based on the comprehensive digital mobility ecosystem.
Othman (2021)	Literature Review	Despite safety guarantees, autonomous vehicles are met with scepticism due to ethical dilemmas, liability concerns and negative experiences that hinder acceptance, whereas positive experiences and perceived benefits resulting from the pandemic increase acceptance.
Buckley et al. (2018)	Simulation study (quantitative)	The study demonstrates that attitudes, subjective norms, perceived control, usefulness, user-friendliness and, in particular, trust have a strong influence on the intention to use autonomous vehicles, with simulated driving scenarios providing clear, realistic results.
Jayaraman et al. (2024)	Quantitative survey	People evaluate the privacy and usefulness of healthcare robots in a highly context-dependent manner; the home in particular offers benefits, but also high data protection risks. Design fiction supports the understanding of novel technologies and the development of data protection-sensitive robotics solutions.
Vijayasarathy, (2004)	Quantitative survey	The study shows that factors such as compatibility, ease of use, usefulness, security, normative beliefs and self-efficacy profoundly influence attitudes and intentions towards online shopping, thereby enhancing the extended technology acceptance model (TAM).
Günthner & Proff (2025)	Quantitative survey	Driver assistance systems strengthen trust and acceptance of automated driving, with TAM factors such as trust and innovation significantly influencing this relationship, while age serves as a moderating variable. Furthermore, positive experiences with driver assistance systems promote willingness to opt for autonomous driving, despite regional sampling limitations.
Tang et al., (2025)	Quantitative survey	The intention to introduce autonomous vehicles is primarily driven by perceived enjoyment, while financial incentives and educational initiatives further

Author (Year)	Key concept	Results
		promote this introduction; transport policy has an indirect impact on user-friendliness, while legislative measures have only a minimal short-term impact.
Becker & Axhausen (2017)	Literature Review	Automated vehicles appeal primarily to young, urban and technologically savvy people, as factors such as information availability, repetitive usage contexts and driver assistance technologies shape perceptions. Future studies need to examine specific user requirements and economic diffusion frameworks in greater depth.
Park & Han (2023)	Quantitative survey	Older adults tend to favour autonomous vehicles primarily because of their usefulness, reliability and integration into established routines, with ease of use being of lesser importance. In addition, social influences and prior knowledge have an indirect effect, particularly among Korean baby boomers.
Pan & Zheng (2025b)	Quantitative survey (TAM/UTAUT-based)	Chinese young adults have a positive attitude towards autonomous vehicles. However, perceived risks and reduced driving pleasure undermine trust, whereas social influence, perceived usefulness and user-friendliness increase acceptance, while economic concerns negatively influence their willingness to invest.
Rahman et al. (2019)	Quantitative survey	Older adults rate self-driving vehicles positively as users, but neutrally to negatively as pedestrians. Familiarity, perceived usefulness and trust promote acceptance, while uncertainties remain in the pedestrian context and education remains necessary.
Manchon et al. (2022)	Experiment (driving simulator/driving test study)	Initial confidence has a significant impact on monitoring behaviour, subsequent confidence development and participation in non-driving activities, while highly automated driving generally leads drivers with higher initial confidence to use NDRA more frequently, necessitating the calibration of simulations.
Al-adwan et al. (2023)	Quantitative survey (TAM-based, SEM)	Current research shows that students' motivation to engage with metaverse learning platforms is positively influenced by perceived usefulness, technological innovation and enjoyment, whereas cyber risks have a negative impact on this motivation, with usability only having an indirect influence on enjoyment and usefulness.
Gao & Waechter (2017)	Quantitative survey (SEM-based)	The integrated model shows that initial trust is mainly strengthened by system, information and service quality, while it is reduced by uncertainty. This trust subsequently increases utility and convenience and jointly influences the intention to use the system.
Dirsehan & Can (2020)	Quantitative study	Trust, perceived benefits, user-friendliness and, in particular, sustainability aspects have a significant

Author (Year)	Key concept	Results
		impact on the intention to introduce autonomous vehicles, while cybersecurity strengthens trust, albeit limited by a biased sample.
Ha et al. (2020)	Experiment	Attributional explanations strengthen trust in low-risk situations, but become ineffective as risk increases. The absence of explanations proves most effective in very high-risk situations, suggesting that optimal explanation strategies depend on situational risk factors.
Al-adwan et al. (2022)	Quantitative study (SEM-based)	The study shows that the quality of logistics increases satisfaction, while the quality of political services strengthens trust, which in turn promotes repurchase behaviour, especially in the context of Jordanian and similar developing markets.
Sandvik et al., (2024)	Qualitative study	The study highlights the mechanisms by which suppliers influence the markets for autonomous vehicles through value propositions, technological advances and regulatory challenges, and presents an empirically based process model.
Kim et al. (2024)	Experiment	The present study concludes that sophisticated, multimodal automation interfaces strengthen drivers' trust, acceptance and perceived safety in semi-automated vehicles, with acoustic manoeuvring cues proving particularly effective. Nevertheless, confidence in critical situations remains limited, although there has been an increase in overall willingness to use automation with these interfaces.
Zefreh & Torok (2025)	Literature Review	Research indicates that previous studies pursued different objectives and methods, that personal determinants have a significant influence on transport decisions, and that autonomous technologies have not yet found everyday application despite existing research.
Manfreda & Ljubi (2021)	Quantitative survey	This study examines the factors influencing millennials' acceptance of autonomous vehicles. It is assumed that this acceptance is mainly influenced by perceived personal and social benefits and confidence in technological safety. However, the expected factors, such as perceived safety and mobility efficiency, have not yet been clearly established. The present study also emphasises that the expansion of urban areas and digital infrastructures will significantly integrate autonomous vehicles into intelligent transport systems in the future.
T. Zhang et al. (2020)	Quantitative study (SEM-based)	This study concludes that the willingness to adopt autonomous vehicles is primarily influenced by social factors and fundamental trust. Perceived ease of use and the benefits of the technology acceptance model also have a significant influence on this intention, while different personality traits influence trust in different ways. This necessitates a marketing

Author (Year)	Key concept	Results
		approach that is specifically tailored to key influencing factors and different user demographics.
Rahman et al. (2017)	Experiment & Quantitative Survey	The study demonstrates that the conventional Technology Acceptance Model (TAM) provides the most robust explanation for the intention to utilise driver assistance systems, with the Theory of Planned Behaviour (TPB) ranking second. In contrast, contemporary TAM and UTAUT adaptations exhibit diminished explanatory capacity. Moreover, individuals who utilise Advanced Driver Assistance Systems (ADAS) in a simulation demonstrate a higher level of acceptance of the technology than those who only consume descriptive information.
Bansal et al. (2016)	Quantitative survey	This study shows that enthusiasm and willingness to invest in Level 4 autonomous vehicles have increased significantly, whereas safety concerns mainly relate to technological issues, with a particular focus on tech-savvy, affluent men in urban areas where previous accidents have occurred and who show the greatest willingness to accept and financially commit to the technology.
Rejali et al. (2024)	Quantitative study (SEM-based)	The intention to use fully automated vehicles is primarily influenced by standards, benefits, usability and trust, with decision-making styles and safety risks having a strong impact on trust.
Ljubi (2023)	Quantitative survey	The propensity of millennials to embrace autonomous vehicles is shaped by multifaceted determinants, notably safety perceptions, technological eagerness, and overall dispositions; specifically, enhanced safety perceptions and favourable attitudes correlate with increased adoption willingness, while the difficulty of fostering negative attitudes highlights the imperative for manufacturers and policymakers to emphasize the cultivation of positive attitudes and supportive environments from the outset.
Rahimi et al. (2020)	Quantitative survey (latent class analysis)	The study demonstrates that attitudes significantly influence acceptance and willingness to pay for autonomous vehicles. However, these attitudes vary depending on the user group. Tech-friendly attitudes, desired driving functions, data protection concerns and driving-related preferences each have different effects. This necessitates the development of target group-specific strategies and policy measures.
Pan & Zheng (2025a)	Experiment	The paper shows that a personalised human-machine driving system based on negotiation games can reduce conflicts in shared driving by recognising different driving styles and enable a more intelligent and individualised driving experience through driving style-dependent control strategies.

Author (Year)	Key concept	Results
Abdel-aty & Ding (2024)	Quantitative modelling	The study shows that although autonomous driving systems are safer than human drivers in most scenarios, they are more prone to accidents in complex conditions such as twilight and when turning, which could indicate limited situational awareness and experience on the part of the systems.

Source: Own elaboration

3. Methodology

This study is based on a qualitative research methodology. The research paradigm focused on in this study postulates that human phenomena cannot be adequately captured by purely empirical scientific methods. An extension of these approaches is necessary (Hussy et al., 2013). Qualitative research has the potential to effectively address and meet this specific requirement, primarily due to its inherent emphasis on the subjective experiences and perspectives of the individuals involved in the study (Froschauer & Lueger, 2020). This suggests that individuals involved in qualitative academic research often interact directly with the participants in their studies, which allows for a more nuanced understanding of the phenomena under investigation. As a result, non-verbal cues such as gestures and facial expressions can be seamlessly integrated into the qualitative data collected, enriching the overall findings. Nevertheless, the need for personal interaction places greater demands on researchers, as the processes of data collection and subsequent analysis require a considerable investment of time and resources. As a direct consequence of this increased effort, it is characteristic that the number of participants involved in qualitative research is relatively small. Ultimately, this can raise concerns about the representativeness of the results (Döring & Bortz, 2016; Steffen & Doppler, 2019). In conjunction with qualitative methodology, this research also follows a primary research framework. In contradistinction to secondary analysis, which is predicated on extant data sets, the information pertinent to the research subject is collected and examined directly by the researchers (Olbrich et al., 2012). This particular methodological procedure offers the possibility of drawing meaningful conclusions about the entire population under investigation, enabling researchers to analyse the collected data more comprehensively. The implementation of such systematic approaches enables the identification of underlying patterns and the generation of valuable insights that contribute to the overall understanding of the phenomena under investigation. The integration of these findings consequently not only improves the depth of knowledge in this field, but also promotes the potential for future research initiatives that could build on these established findings (Döring & Bortz, 2016; Magerhans, 2016). Data collection constitutes a pivotal element of qualitative research. In view of the restricted number of participants in the surveys, meticulous preparation is imperative (Decker, 2018). Focus group interviews constituted an integral component of the study. This interview technique entails a focus on a particular topic. The study is conducted in a semi-structured manner using an interview guide. The objective is twofold: firstly, to encourage favourable group dynamics; secondly, to ensure that the focus remains on the core topic (Döring & Bortz, 2016). The interviews were conducted with two groups. The first group consisted of three participants, while the second group consisted of five participants. This approach is in line with standard practice for focus groups. Care was taken to ensure that the gender ratio was homogeneous. The groups were therefore composed of an equal number of male and female participants. A summary of this information is shown in Table 2. The group interviews and the subsequent evaluation were conducted anonymously. The participants were assigned identity codes to ensure that their statements could be attributed to them. When compiling the work, care was taken to ensure that it did not contain any information that would enable the individuals to be identified. To guarantee the anonymity of the interviewees, their names and any other identifying features were anonymised in the transcripts

(Döring & Bortz, 2016; Misoch, 2019). Participation in the event is contingent upon residence in the greater Munich area. This is to ensure that there is adequate access to individual and communal mobility. The decision to utilise these options is at the discretion of the user. The group interview was conducted as an online video conference via the Microsoft Teams platform. The advantage of this approach is that participants can remain in their familiar surroundings. This approach circumvents the creation of an artificial situation (Lamnek & Krell, 2016). Before the actual interview began, participants were informed about the focus and objective of the study. In addition, attention was drawn to the guarantee of data protection and the assurance of anonymity. Within the scope of this scientific study, the transcription methodology was aligned with the utmost care with the guidelines established by Dresing & Pehl (2018). These guidelines are widely recognised and applied in various practical applications in this field. Following the comprehensive transformation of the audiovisual materials into a text-formatted representation, a thorough qualitative analysis is then carried out to derive meaningful insights from the data. As part of this scientific endeavour, qualitative content analysis was systematically performed in accordance with the methodological framework proposed by Mayring & Fenzl (2022), ensuring rigorous examination of the collected information. This approach not only contributes to increasing the validity of the results but also enhances the overall depth and richness of the qualitative research presented.

The sample data described above is clearly presented in tabular form in *Table 2*.

Table 2: Sample details of interview participants

Personal characteristic	Response category	n
Gender	Male	4
	Female	4
Age	20–29	1
	30–39	6
	40 –49	1
Driver's license	Yes	8
	No	0
Experience with driver assistance systems	Yes	7
	No	1

Source: Own elaboration

4. Results

4.1. Use of mobility

The analysis of the focus groups indicates a pronounced predominance of private cars in the context of daily transportation. The primary function of the vehicles is for commuting to and from work, shopping, and family commitments (Participant 1, Participant 3).

In the initial group, one participant offers a concise articulation of their mobility: The car is generally used for private transportation, with public transport being used only in exceptional cases (Participant 5). Several participants emphasise that they use their cars daily and routinely, sometimes in combination with public transport. This combination is used in particular in situations where traffic jams need to be avoided or the route needs to be covered more efficiently (Participant 7). In the other interview, this tendency is even more pronounced.

The participants' estimates of their car usage vary greatly. One participant estimates his car usage at 90 per cent, while another states 95 per cent (Participant 1, Participant 2). Participant 3 summarises the situation succinctly: "I am a mother who works full-time and uses her car 100 per cent of the time".

The utilisation of public transportation is contingent on situational factors within both groups, with its employment being determined by the prevailing circumstances. This tendency is particularly evident at large events (Participant 3). However, it should be noted that the utilisation of public transport is not limited to large events. As previously outlined, it is evident that public transport is utilised when it provides a tangible added value. The added value of this process is typically measured in terms of the time saved. The utilisation of public transportation is favoured when its temporal advantages over automobiles are pronounced (Participant 4, Participant 7). Concurrently, the car remains in frequent use for extended journeys to rural areas (Participant 4).

The aspect of micro-mobility and the availability of sharing services should be regarded as complementary components. The present study found that e-scooters and bike sharing are used on an occasional basis. However, this tendency is more often than not a form of supplementary mobility, used in conjunction with other forms of mobility (Participant 6, Participant 7). In contrast, the other interview makes no mention of systematic car sharing. The second group tends to prioritise the utilisation of their personal vehicle and, in certain circumstances, conventional public transportation.

It is of central importance that both groups emphasise strong time and flexibility pressures. Participant 2 highlights a significant discrepancy between car and public transport (15 minutes vs. 90 minutes travel time) and justifies their preference for the car with the need to be available for their children at short notice at any time. It is evident that other participants employ argumentation patterns that are characterised by references to inadequate public transport connections and rural structures (Participant 3, Participant 5).

4.2. Attitudes towards autonomous vehicles

The attitudes towards autonomous vehicles in both interviews are predominantly ambivalent. The prospect of autonomous driving has been shown to engender clear gains in terms of comfort and efficiency. However, concerns have also been voiced regarding safety, control and technical maturity. The results of the focus group demonstrate a fundamental openness. Participant 5 emphasises that she would consider using an autonomous vehicle, provided that it is her own vehicle and she does not have to share it with other people. For her, the key added value lies in being able to carry out additional activities while travelling. Other participants also describe seeing themselves in autonomous cars for convenience (Participant 6) or in a combination of driving themselves and being driven (Participant 7). Autonomous driving is primarily conceptualised in this context as a comfort technology that liberates cognitive resources and unveils hitherto unexplored possibilities for utilisation within the vehicle. In the second focus group, a significantly more critical voice stands out. Participant 3 repeatedly expresses mistrust of technology and fears that autonomous systems cannot react quickly enough to unexpected human behaviour. Concurrently, Participant 1 (2025) articulates a more systemic concern. In the absence of complete interconnectedness and the persistence of human behaviour that is resistant to prediction, autonomous technology is incapable of adequately anticipating all eventualities. There is a consensus between both groups that the acceptability of autonomous driving is contingent on its perception as being virtually error-free. Participant 2 succinctly expresses the need for autonomous systems to 'function 100 per cent'. This is an essential prerequisite before these systems can be completely reliable and activities such as watching films without observing the driving environment can be made possible. A pervasive sense of tension is evident. Autonomous driving is regarded as a desirable technology for the future, with the potential to enhance

comfort, efficiency and safety. However, there is significant scepticism regarding whether and when the necessary level of maturity will be attained.

4.3. Experience with assistance systems

Both interviews focus on driver assistance systems, which are considered to be the first step towards autonomous driving. The experiences are varied and often serve as a frame of reference for participants to assess the potential and limitations of fully autonomous systems. Participant 2 and Participant 3 have previously utilised cruise control and distance assist on multiple occasions. However, in certain situations, these are perceived as disruptive. In Interview 2, Participant 2 provides a detailed account of the functionality of the motorway assistant system, highlighting its effectiveness in lane change procedures. However, he also acknowledges that the system is not yet entirely free of errors (Participant 2).

Conversely, participant 1 reports a significantly higher number of negative experiences. The subject has described the parking and reversing assistance as the cause of considerable problems, as the vehicle did not perform as expected in practical situations and almost led to collisions (Participant 2). Participant 3 has expressed concerns regarding the abrupt cessation of the distance assistant and the unreliability of the high beam assist functions. These functions, for instance, fail to recognise oncoming traffic in a timely manner (Participant 3).

The interviews suggests that assistance systems have an ambivalent effect. On the one hand, these technologies demonstrate the potential for certain applications; on the other hand, however, there are doubts being expressed about the feasibility of complete autonomy (Participant 2). Malfunctions or driving manoeuvres that are perceived as inhuman are given significant weight on a socio-emotional level and consequently shape the evaluation criteria for future autonomous systems.

4.4. Ownership or sharing

A further pivotal issue pertains to the question of whether autonomous vehicles should be owned or utilised as part of sharing or shuttle models. The analysis of the data from both focus groups indicates a discernible trend towards a preference for ownership, accompanied by noteworthy variations. In Interview 1, the rejection of shared offers is made explicit by several of the participants (Participant 5). Participant 5 justifies his negative stance with concerns regarding cleanliness, flexibility and spatial availability. Participant 6 also emphasises the preference for having one's own vehicle in order to have full flexibility and not have to wait. Participant 6 explicitly prefers a sharing model, provided that certain conditions are met. These include comprehensive availability, flexible parking options and outsourced maintenance. The vehicle is regarded by the individual in question as a service rather than an object of ownership (Participant 6). Participant 4 displays a propensity for conditioned openness. It is evident that the enhanced quality of the vehicle, the augmented level of cleanliness, and the diminished incidence of damage would all contribute to a favourable consideration of car sharing. However, at present, negative experiences with damaged or dirty vehicles predominate (Participant 4). The other participants also show a deepening of the patterns identified previously. Participant 3 reinforces the desire for a personal car that is always available, especially under the pressure of family commitments and in rural areas. Participants 1 and Paprticipant 2 tend to focus primarily on price and availability scenarios. A platform solution would be attractive to these groups of people if waiting times were minimal and vehicles were reliably available. In addition, a significant price advantage over ownership is required (Participant 1, Participant 2). Furthermore, Participant 2 is developing a hybrid model in which a household vehicle remains in ownership, while additional mobility needs are met via platforms. The available evidence suggests that ownership continues to have significant symbolic importance for aspects such as autonomy, control and availability. Acceptance of sharing models is generally instrumental, provided that

they offer a clear functional or economic advantage and avoid additional uncertainties such as waiting times, no-shows or restricted areas.

4.5. Vehicle Interior Functionality

A pivotal concept evident in both discussions is the reassessment of temporal experience during transit in autonomous vehicles. As the act of driving becomes less demanding of complete focus, the duration spent within the vehicle will be perceived as an opportunity for productivity, recuperation or recreational activities. In the interviews, several participants express a desire to use the time available for productive or enjoyable activities (Participant 1). Participant 2 states that she likes to watch films, listen to music or work while driving. It has been asserted by numerous participants that the opportunity to sleep or relax is of particular importance. This may be facilitated by reclining options and comfortable sitting or lying positions (Participant 5, Participant 8). From a technical perspective, participants want tables for laptops, voice control, comprehensive connectivity with smartphones and a finely controllable environment design (Participant 6, Participant 8). Furthermore, networked functions such as intelligent route and break planning as well as traffic statistics are cited, which can be used to anticipate and optimise travel times and traffic jams (Participant 5). Moreover, the spectrum ranges from a highly functional understanding, in which the vehicle is regarded purely as a mobility solution (Participant 3), to ideas of comfort and entertainment that are pronounced. Participant 1 and Participant 2 express a desire for infotainment, such as the Fire TV Stick, watching films, comfortable, swivelling or reclining seats, opportunities to work, play games such as PlayStation or Xbox, and even gaming with other passengers in traffic jams. It is evident that both of these models assume the presence of internet connectivity (Participant 1, Participant 2). The results of the study suggest that upgrading the vehicle interior is an important aspect associated with the perception of autonomous driving. The driver's workplace will be transformed into a multifunctional lounge that can be used as an office, living room, relaxation area or entertainment zone, depending on requirements.

4.6. Data Protection

In both interviews, concerns regarding data protection were found to be relatively weak. Several participants point out that smartphones, apps and social media platforms already generate and process extensive movement and usage data (Participant 4, Participant 5).

Participant 5 express this with resignation. The prevailing view is that everyone already knows where a person is and what they are doing, as surveillance via mobile phone is already possible. Participant 2 emphasises that the functions desired in autonomous vehicles, such as streaming, gaming or networking, are already being used outside the vehicle to generate data, and that this hardly changes the fundamental situation. Participant 1 concludes that although extensive data analysis is theoretically possible, he is relatively indifferent to this in a practical context.

As a result, data protection is given significantly lower priority in both groups than other evaluation criteria such as convenience, price, availability and technical maturity. Consequently, data sovereignty manifests itself less as a tangible barrier to use and more as a rather abstract framework condition.

4.7. Visions of future mobility

In both interviews, the prevailing opinion regarding the future of mobility is that it must be both efficient and congestion-free (Participant 2, Participant 5). Concurrently, she underscores the prospective added value for elderly individuals or those with restricted driving capabilities, who might sustain greater mobility over an extended period, a possibility facilitated by autonomous

vehicles (Participant 5). Participant 4 further reflects on the concept of the car and hypothesises that road infrastructure in its current form could become obsolete as fully autonomous technology advances. Alternatively, autonomous flying could be a solution to traffic problems. Participant 1 and Participant 2 in the interviews add to the functional ideas of a networked system that aims to optimise journey times, speeds and traffic density in real time, thereby contributing to smoother and more predictable traffic conditions.The fundamental prerequisites for the appeal of autonomous vehicles can be summarised as follows:

Technical maturity and safety: It is essential that fully autonomous systems are perceived as reliable and 100% functional (Participant 2, Participant 6). It is imperative that driving behaviour is rendered more human-like and less jerky in nature (Participant 3).

Economic attractiveness: In order to encourage users to modify their existing routines, such as acquiring a second car, it is essential that both purchase/leasing models and platform offerings are competitively priced (Participant 1, Participant 2, Participant 3, Participant 4, Participant 5).

Flexibility and control: A considerable proportion of participants expressed a preference for spontaneous journeys devoid of waiting times, a preference that is conducive to the establishment of ownership models (Participant 3, Participant 5, Participant 8). Conversely, mixed and sharing models are acknowledged, provided there is evidence demonstrating their capacity to offer high availability and reliability (Participant 1, Participant 2, Participant 6).

Comfort and added value: It is only when autonomous vehicles offer significant added value in terms of time utilisation and interior comfort that switching will appear particularly attractive (Participant 1, Participant 2, Participant 4, Participant 6, Participant 8).

5. Conclusion

The findings of this study demonstrate that everyday mobility is strongly dominated by private car use, driven by time pressure, flexibility needs and insufficient public transport connections (Participant 1, Participant 2, Participant 3). This high reliance on private cars helps explain why autonomous driving is primarily evaluated as a potential source of comfort and efficiency rather than a mobility alternative that could replace existing routines (Participant 5, Participant 7). Prior research has identified analogous patterns of ambivalent yet conditional openness, emphasising that acceptance is shaped by perceived usefulness, trust, and expected personal benefits (Nastjuk et al., 2020; Y. Zhang et al., 2019). Participants in this study acknowledged the convenience of autonomous vehicles; however, their scepticism regarding safety, system maturity and human-like behaviour is strongly aligned with broader evidence showing that trust and perceived risk are central determinants of adoption (Buckley et al., 2018; Kenesei et al., 2022).

The interviews further emphasise that direct user experience with automation exerts a significant influence on acceptance, with positive encounters leading to an augmentation in perceived usefulness and ease of use, while negative experiences serve to amplify doubts regarding reliability (Participant 2, Participant 3). This finding aligns with experimental results demonstrating that interaction with automated systems, whether simulated or actual, fosters enhanced acceptance and trust more effectively than abstract descriptions (Rahman et al., 2017; Xu et al., 2018). A salient finding of this study is the pronounced preference for vehicle ownership, attributable to concerns regarding availability, cleanliness and control. This finding is consistent with the evidence that attitudes towards sharing are contingent on perceived convenience, trust and socio-emotional security (Guan et al., 2024; Richter et al., 2022). The aspiration for multifunctional interiors, elevated connectivity, and personalised comfort finds resonance in research underscoring that the acceptance of autonomous vehicles is contingent upon their ability to generate substantial added value beyond transportation (Participant 1, Participant 8; Pérez-Moure et al., 2023).

The present study lends further support to the prevailing body of research by demonstrating that the acceptance of autonomous vehicles is derived from a multifaceted interplay of

trust, perceived usefulness, personal mobility needs and system reliability. It is imperative that these factors are addressed to facilitate widespread societal adoption (Buckley et al., 2018; Nastjuk et al., 2020; T. Zhang et al., 2020).

The current study has significant limitations. As the findings are based on qualitative focus groups, they are context-specific and cannot be generalised statistically, while the limited pool of participants and specific regional and demographic restrictions further limit the applicability of the findings to different population cohorts or mobility scenarios. A key limitation of this study is that the concept of the platform economy was difficult for many participants to grasp, even though they implicitly described its advantages, such as flexible use, lower costs and outsourced responsibility. However, it remains unclear to what extent the preferences expressed actually reflect a conscious evaluation of a platform or are based more on everyday usage experiences. Future research should therefore develop more structured, vivid scenarios to enable a clearer examination of platforms.

Disclosure of conflicts of interest

The authors declare that they have no known competing financial interests or personal relationships that could influence the work described in this article. Furthermore, the authors declare that this article is unrelated to their current professional activities and that the conclusions expressed herein represent solely their personal opinions.

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