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Unlocking the Future of Travel – Understanding the Acceptance of Railway Passenger Services in Germany

Katrin FÖRSTER[1], Wolfgang H. SCHULZ[2]

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[1] k.foerster@zeppelin-university.net, Chair of Mobility, Trade and Logistics, Zeppelin University, Friedrichshafen, Germany
[2] wolfgang.schulz@zu.de, Chair of Mobility, Trade and Logistics, Zeppelin University, Friedrichshafen, Germany

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ABSTRACT
Passenger railway transport plays a crucial role in reducing carbon emissions from car use, making its increased adoption essential for meeting climate goals. This study examines the factors influencing the adoption and utilisation of rail transport in Germany, utilising the technology acceptance model (TAM) as a theoretical framework. The adapted model confirms the relevance of TAM in service-oriented contexts, identifying perceived usefulness and perceived ease of use as key drivers of acceptance. A notable finding is the gap between intention and actual behaviour. While many participants expressed a willingness to use rail services, this intention often failed to translate into regular use. This highlights a major challenge in promoting sustainable mobility, as positive attitudes alone are insufficient to shift travel behaviour. The study provides valuable insights for rail service providers seeking to enhance usage and improve public perception. However, limitations must be acknowledged. The sample may not fully reflect the broader population, and a potential selection bias, such as a high proportion of car owners, may affect generalisability. Despite these issues, the study contributes to the literature on TAM in consumer services and underscores the need for further research into the factors influencing the gap between intention and action.

KEYWORDS
technology acceptance model; consumer acceptance; mode choice acceptance; consumer behaviour; quantitative methods; railway passenger services.

1. INTRODUCTION

The need to change passenger mobility behaviour has become a challenge, particularly in Germany, where railway passenger services (RPS) are underutilised [1]. Deutsche Bahn (DB) and the German government aim to expand railway services and reduce reliance on personal vehicles. As part of its environmental strategy, to promote climate-friendly mobility, the government plans higher road taxes for high CO_2 emitters and tax benefits for low-emission vehicles [2]. The Deutschlandtakt project, introduced in August 2021 to increase passenger numbers per the Federal Transport Infrastructure Plan 2030 [3], now faces a 40-year delay, with full utilisation expected by 2070 [4].

Transport mode choices are increasingly shaped by rising motor transport costs and factors like economics, environment, demographics, lifestyle and technology [5, 6]. Railway services, supported by existing infrastructure and government, may become the preferred, climate-friendly option. Additionally, concerns about autonomous trains, including safety, human error and congestion, have been addressed over time [7].

Most transport mode choice studies have focused on commuting [8], often examining hypothetical scenarios, such as reduced parking or lower public transport fares [9, 10]. Furthermore, mode choice research has typically concentrated on situational factors rather than individual preferences.

The technology acceptance model (TAM) is used in this study to explore consumers' intentions to use railway services and focuses on both the external and individual factors shaping acceptance. While the TAM has been applied to smart and shared mobility [5, 11, 12], its application to RPS is new and offers innovation potential. The TAM has also been used in transportation research on green transport [5, 11], which further supports its application to railway services.

This study extends the TAM to railway services, offering a globally relevant, consumer-focused model with practical implications. Unlike prior research focused on tech aspects like ticketing, it addresses broader service perceptions and factors influencing acceptance. By highlighting personal and service-related characteristics, it fills a gap in TAM applications and builds a reliable model for railway service acceptance. While the TAM has been used for consumer goods [13], this study creates a reliable acceptance model for railway services. This study is significant because it focuses on consumer perceptions of railway services, emphasising personal and service-related characteristics.

The main research question of this study is: Is the acceptance model of railway passenger services (AM-RPS) valid? This study examines factors influencing the acceptance and use of RPS. A PLS-SEM analysis using SmartPLS [14] validated the model, offering insights for service providers like DB to refine their Deutschlandtakt plan and boost ridership by 2030 or 2070. Identifying key drivers also bridges theory and practice, guiding effective measures to increase DB usage.

The remainder of this article outlines the theoretical framework and development of hypotheses in Section 2, thereby laying the foundation for the study. The methodology is described in detail in Section 3, followed by data analysis in Section 4. Section 5 examines the results and discusses the study's limitations. Section 6 summarises the key findings.

2. THEORETICAL FRAMEWORK AND HYPOTHESES DEVELOPMENT

RPS are often used as models for examining service definitions. The service industry has expanded with numerous consumer options; however, defining services is challenging because of their diversity and varying perceptions. In addition, German and English definitions may differ, as explored by marketers.

2.1 Services, railway passenger services in Germany and mode choice – car

The definitions of services, RPS in Germany vs England, and consumers' mode of choice must be examined before setting the hypotheses for this study.

Definition of services

In German marketing, Hilke's [15] three-dimensional framework (potential, process, solution) is commonly used but criticised for overlapping with non-pecuniary benefits. In English literature, Grönroos [16] and Zeithaml and Bitner [17] have focused on intangible activities and interactions. Edvardsson et al. [18] have defined services as result-oriented economic activities without transferring ownership.

The current focus is on key service characteristics such as intangibility, heterogeneity, the inseparability of production and consumption, and perishability [19]. Recent studies have highlighted attributes common to all services, such as intangibility, customer involvement in production, variability in input and output, and time sensitivity [20]. These attributes vary based on service type [20].

Edvardsson et al.'s [18] definition of services is the most applicable to our study of RPS, serving as a proxy for services in general. To identify the determinants influencing railway service acceptance, variables from established research were selected.

Railway passenger services in Germany

RPS are defined as "the regular movement of goods or persons from one point to another by some system of conveyance operating on a large scale" [21, p. 89]. Primary services cover the technical and organisational aspects of transporting people or goods, tailored to demand. Pure rail transport focuses on movement, while rail transport services are intangible and non-storable [22].

In Germany, DB is the largest provider of railway services, with DB AG holding 63% of the market share in commuter and regional rail services [23], and 95% of passenger kilometres in 2023 [24], making it a near monopoly. However, railway transport accounted for only 9.4% of the modal split in passenger traffic in Germany in 2023, with private motorised transport dominating at 79.4%. Projections for 2026 show a 0.8% increase in railway transport and a 1.4% decrease in motorised transport [1], indicating a shift in market share.

Despite this, cars remain the preferred transport choice in Germany, highlighting the need to identify the factors influencing car appeal and changing ownership trends.

Mode choice – car

Trains are a more sustainable transport option, but cars are preferred because of their comfort, flexibility and speed [25], especially in areas with limited transport options [26]. Car-sharing and free-floating vehicle services have also grown in popularity [27].

Although the German government and DB aim to make railway services more attractive than cars, innovations in the car sector are actively reducing risks and costs for consumers [28]. Factors such as price, which were once effective in promoting railway transport [10], are now less relevant. However, the rising capital costs of new vehicles and charging infrastructure as governments shift to electric vehicles (EVs) could allow DB and similar groups to exploit the perceived market gap until EV costs decrease. These aspects are considered in the conceptualisation of the AM-RPS.

2.2 Conceptualising the AM-RPS

The TAM, successfully applied in consumer goods research [13], shows potential beyond technology. For this study, we adopted TAM 3 [29], which, despite its simplicity, has strong empirical support [30, 31] and wide acceptance [32, 33].

TAM 3, developed by Venkatesh and Bala [29], expands the original TAM by integrating psychological factors, such as self-efficacy, anxiety and intrinsic motivation, with social influences, including subjective norms and facilitating conditions. Grounded in the Theory of Reasoned Action and the Theory of Planned Behaviour, TAM 3 captures both individual attitudes and external pressures, offering a comprehensive framework for understanding technology adoption.

In contrast, UTAUT, an extension of TAM, has been criticised for its complexity. With multiple core constructs and four moderators (age, gender, experience, voluntariness), it is often seen as difficult to apply consistently. It has been argued [34, 35] that this complexity reduces theoretical clarity and weakens generalisability, especially in dynamic or diverse contexts.

TAM's foundation in established socio-psychological theories and its proven adaptability across organisational and consumer settings make it a more robust and accessible choice [36, 37]. Its simplicity and flexibility allow it to be effectively applied beyond traditional tech-focused research. Given its roots and empirical strength, adapting TAM to model consumer acceptance, such as in rail transport, is both logical and practical. Förster and Förster and Schulz [13, 38] support TAM-based models as especially suitable for non-technological, consumer-oriented contexts.

Its successful application in diverse fields, including consumer goods, renders it suitable for this study.

Railway passenger services were used as a proxy for the acceptance model, with PU and PEOU adapted from mode choice and transport services research, while BI and use behaviour remained unchanged [29].

2.3 Hypotheses development

TAM's successful adaptation to a new category (i.e. consumer goods) suggests only external variables need adjustment [13], so the core elements and their relationships in *Figure 1* were retained.

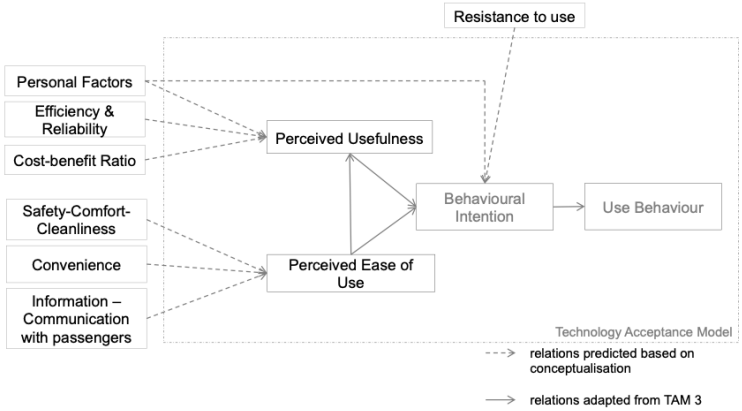

Figure 1 – The conceptualised acceptance model for railway passenger services
Source: Author's illustration

The development of external factors influencing PU and PEOU is rooted in the four categories proposed in the TAM 3. Factors affecting PEOU include anchors and adjustment variables. Anchors offer general information that individuals rely on and lack specific knowledge about, which is subconsciously factored into decision-making. The adjustment variables are based on beliefs formed through direct interactions with a system or product [39].

Factors influencing PU

Including personal factors (PF) is not only relevant to the original framework of the TAM [29, 33, 40] but also increases the model's predictive power [41]. Hence, the personal factors construct positively affects PU and is expected to have a direct effect on BI.

The efficiency and reliability (ER) construct includes waiting times before departure, transfer times, travel times, punctuality, timetabling, service information and train frequency. This construct should also consider delays due to trackwork and signal failures. These factors characterise an efficient transport system [42] and are relevant determinants of PU. Regarding Deutschlandtakt's objectives, it is essential to determine whether high efficiency leads to greater acceptance. Davis [32] explains that there is a direct connection between efficiency and PU.

Lee [43] demonstrates the impact of efficiency on users' expected advantages. However, efficiency often affects the level of trust in the system in question and its degree of acceptance [44]. Therefore, the items presented by Wirtz et al. [45] are relevant after adjusting for rail passenger transportation services, based on topics such as waiting times before departures and transfer times, travel times, punctuality (trust) and frequency.

The items outlined by Gefen et al. [46] regarding punctuality and trust are included, and we further consider the interconnections between efficiency and trust. Trust is related to punctuality when providing services, but also connotes the safety of the network and service equipment, as well as passenger safety on board.

The third variable influencing PU is the cost-benefit ratio (CBR); the price issue is indirectly addressed through this construct. Previous studies have shown that price has a more significant impact when combined with other means that provide benefits [47, 48]. However, to persuade car drivers to switch to public transportation, it is crucial to highlight benefits such as cost and time savings without significant additional expenses compared with other modes. The relevance of the cost-benefit ratio construct, or the cost-benefit paradigm of a system, has been emphasised by Pizzi et al. [44]. Including the cost-benefit ratio allows differentiation between consumer groups due to perceived changes in the balance of costs and benefits [49]. Previous studies have also shown that the impact of price adjustments is determined by other service qualities such as access, frequency and speed [50].

Thus, the higher the cost-benefit ratio for passengers, the higher the acceptance of rail passenger services [45]. The items measure for the construct of the cost-benefit ratio include topics like money savings (price) and time savings (speed), and are derived from Wirtz et al. [45].

After discussing the important variables influencing PU, safety-comfort-cleanliness (SCC), convenience (C) and information–communication with passengers (ICP) are expected to positively affect PEOU because they influence the effort required to use RPS. Radner and Rothschild [51] describe the effort as a limited resource that a person can assign to tasks for which they are responsible. Hence, the less effort a system requires to be used, the more likely it is to be accepted, implying ease of use.

Factors influencing PEOU

Anchors and adjustment variables influence PEOU by providing reference points and shaping individual beliefs. Individuals unconsciously utilise anchors, which offer general information or reveal knowledge gaps, and depend on adjustment variables, which represent beliefs formed through direct interaction with a system or product [39].

The PEOU determinants include safety, comfort, convenience and communication of information with passengers. Thus, Tyrinopoulos and Aifadopoulou [52] have proposed a construct of safety-comfort-cleanliness. Safety has a strong influence on the acceptance of RPS and is one of the most significant concerns affecting public transportation. Consequently, people are less likely to use public transit when their perception of public transit safety is low. However, Tyrinopoulos and Aifadopoulou [52] have referred to safety in a classical sense, addressing issues such as safety conditions at stops and aboard the vehicle, interactions with personnel, boarding processes and potential criminality.

The COVID-19 pandemic has affected the understanding and perception of safety, including the risk of becoming infected while travelling by train. Recent studies have considered this issue as having a significant but highly intangible influence. Preventive measures are unsuitable for public transportation because proximity is unavoidable [53]. Nevertheless, all relevant aspects need to be included to develop the PU/PEOU construct items and measurement scales, using the extant literature [54] for guidance.

The construct of convenience is based on three aspects: compatibility, the ticket system and accessibility. These factors contribute to higher potential acceptance of RPS [50]. Moreover, the usage intentions of many applications are significantly affected by their compatibility with the user's lifestyle [55]. Compatibility is the degree to which RPS fit individual lifestyles and transportation needs and is a critical factor in acceptance in different contexts [55, 56]. Compatibility has also been used in recent TAM studies as a key precursor of PEOU [57]. Thus, its relevance as part of the convenience construct is validated and confirmed, as higher compatibility leads to higher acceptance and, consequently, greater usage of RPS.

The second aspect of the convenience construct pertains to the ticketing system, which should be simple and integrated, allowing passengers to access the entire public transport network (including urban, metropolitan or regional networks) from anywhere with one ticket [58]. The third aspect is accessibility, which refers to the ease of access to RPS for the largest number of people [50]. Regarding accessibility, the linkage between residential areas, urban centres and workplaces is important.

Information related to communication with passengers is the third variable influencing PEOU. It addresses the quality, comprehensiveness and timeliness of information provided to passengers by considering all aspects related to transportation services and means of communication [52]. During a trip, passengers must be informed about route changes, delays or connection alternatives. Such information, when prompt and sufficiently detailed to avoid inconvenience, is expected to improve PEOU. If all three constructs are positively addressed by service providers and perceived by consumers, PEOU will positively affect PU and BI; that is, there is a positive effect on acceptance and actual use behaviour.

The construct of resistance to use is proposed as a direct antecedent of BI, based on personal experience and prejudices. This represents two TAM 3 variables: experience and voluntariness. Resistance to the use (RTU) of a service has a negative effect on BI and, consequently, on actual use, even though the variables affecting PU and PEOU may have positive effects. Resistance is a powerful and unavoidable aspect that can have an immense impact on service performance [59]. User resistance exhibits inhibitor-like behaviour, negatively affecting passenger service usage; however, its absence does not necessarily promote such usage [60]. This is an important factor in the context of rail passenger services, as widespread awareness implies that consumers have perceptions or even prejudices about the service, which can strengthen their resistance to use, allowing for the assumption of prior experience with this service. Hence, if prior usage of the service is unsatisfactory or has failed to provide the expected benefit, users are less likely to opt for it again, at least in the short term.

The proposed model measures how much influence (positive or negative) antecedents have on PU and PEOU, and therefore on BI and actual usage behaviour. The external variables of the TAM 3 were changed for application to RPS, instead of information systems. We focus on factors that are important for consumers in the mode choice context [42, 50, 52, 61] and relevant to the acceptance process in general, such as personal and compatibility factors [50, 52]. Our model combines existing knowledge of the factors influencing the mode choice topic with several personal factors that are elementary to the acceptance process [50]. This process allows the derivation of information that the DB and other service providers can integrate into their strategies; for example, increasing safety measures at stations or increasing the frequency of trains during rush hours instead of capacities. It also identifies personal or socially oriented problems that require a different approach.

2.4 Hypotheses

Focusing on the fundamental components of the TAM provides a suitable basis for this study [13]. As shown in *Figure 1*, the core framework of the TAM is retained, while the definitions of PU and PEOU have been adapted. Furthermore, a new relationship is proposed, leading to the following proposed hypotheses:

— H1. Personal factors (PF) have a positive direct effect on PU.
— H2. Efficiency and reliability (ER) have a positive direct effect on PU.
— H3. The cost-benefit ratio (CBR) has a positive direct effect on PU.
— H4. PEOU has a positive direct effect on PU.
— H5. Safety-comfort-cleanliness (SCC) has a positive direct effect on PEOU.
— H6. Convenience (C) has a positive direct effect on PEOU.

— H7. Information–communication with passengers (ICP) has a positive direct effect on PEOU.
— H8. Personal factors have a positive direct effect on BI
— H9. Resistance to use (RTU) has a negative direct effect on BI.
— H10. PU has a positive direct effect on BI
— H11. PEOU has a positive direct effect on BI
— H12. BI has a positive direct effect on use.

All effects are considered to hold in the AM-RPS.

3. RESEARCH METHODOLOGY

3.1 Process outline

To explore the factors influencing user acceptance of RPS, this study evaluates the measurement model using the conceptualised AM-RPS. Specifically, it applies a literature-based, conceptually grounded acceptance model and compares the findings with the insights gained from assessing the validity of the proposed model. This approach provides preliminary insights into user acceptance and a means to evaluate the model's validity.

3.2 Data collection and method

Data collection was conducted using Unipark, with the data easily exported to Excel and then transferred to Smart PLS for smooth statistical analysis. The German-language questionnaire (see Appendix 1) outlined the study's purpose. Participants were required to be at least 18 years old, as individuals under this age have limited autonomy in transportation choices. To ensure ethical compliance, the study was approved by an Ethics Committee and carried out in line with institutional ethical standards and the general principles of responsible academic research.

The sample structure was designed to represent the German population as accurately as possible; however, it excluded people younger than 18 years, to ensure their ability of choices when it comes to mode-choice.

The data were collected over two weeks using non-probability sampling, which led to a sample size of 324. Missing data were not an issue because responses to each question were required. However, suspicious response patterns such as straight-line issues required us to eliminate several datasets from the sample. This had no impact on the functionality of PLS-SEM, as the sample size does not affect it.

Crucially, an adequate sample size is important to strengthen the analysis. There are several methods for determining the sample size. The recommended minimum sample size for least squares regression, as determined by Cohen's [62] power tables and Hair et al.'s [14] 'ten-time rule,' ranges between 70 and 130 depending on R^2 values. In comparison, G*Power analysis yields a higher minimum sample size.

Taking into account a power of 80%, up to six predictors, and an f2 of 0.1, G*Power analysis estimates a required sample size of more than 143. Our sample, after eliminating several datasets, exceeded the minimum recommendation. Due to the new and adjusted scales used in this study, a larger sample would ensure normal distribution, accuracy, smaller standard error and Type II errors. Therefore, the final sample consisted of 296 datasets as summarised in *Table 1*. Age and gender were well distributed in the sample, thus providing a good representation of the German population. Interestingly, 88% of the respondents had a driving licence, and 79% owned or leased a car. Considering that 92% of adult German citizens hold a driver's license as of 2022 [63], this somewhat skewed distribution cannot be classified as a selection bias. However, this aspect must be considered as it is an initial indicator of the challenge that the DB is facing.

Table 1 – Demographic information of the sample

Variable	Category	N
Age (years)	18–24	23
	25–35	63
	35–44	64
	45–54	52
	55–64	57
	65+	37

Variable	Category	N
Gender	Women	153
	Men	143
Driver's license	Yes	261
	No	35
Car ownership/leasing	Yes	235
	No	61

4. RESULTS AND DISCUSSION

PLS-SEM, executed via SmartPLS, was chosen for its suitability in exploring complex relationships within conceptualised models. PLS-SEM is a statistical technique for analysing complex cause-and-effect models with latent variables. It is well-suited for exploratory research, prediction and small to medium sample sizes, focusing on maximising explained variance (R^2) rather than model fit, making it ideal for theory development rather than theory testing. As the first empirical test of the AM-RPS, PLS-SEM was ideal for assessing validity, following Hair et al.'s [14] procedural guidelines.

4.1 Normality tests

SmartPLS does not require data to be normally distributed [14]. However, serious non-normality may cause issues. To check distribution, skewness, and kurtosis were examined. Skewness values range from −3 to 3; larger absolute values show more asymmetry. The kurtosis index was 8 [14]. For both measures, values above 1 or below −1 indicate non-normality [14]. In this study, all values were within normal limits, so the data did not deviate significantly from normality.

4.2 Structural model

The conceptualised AM-RPS comprises seven exogenous and four endogenous latent variables. The seven exogenous variables were utilised using thirty-one items. The first run of the PLS algorithm revealed that certain items must be reconsidered. Since this was an exploratory approach and some items were newly developed to validate the conceptualised AM-RPS, eliminating some items was not an issue. The four items eliminated were PF4, SCC2, SCC5 and RTU1. PF4 can be considered too theoretical, as it effectively mirrors users' attitudes. SCC2 and SCC4 might be less relevant to users' final acceptance decisions. SCC2 involves interaction with personnel, which would not be necessary as tickets and check-ins are available via a mobile device. SCC4 was based on the assumption that, due to COVID-19, people are more sensitive to situations in which they could become infected, that is, closed, confined spaces with many strangers; as this is not relevant in this construct context, the item element was removed. Finally, the RTU1 construct may not be suitable because it does not necessarily contribute to resistance to use. The statement that DB services are helpful but not essential for daily life reflects a neutral stance, neither firmly rejecting nor fully accepting the services. Apparent resistance requires stronger negative evaluations or concerns, expressing rejection or scepticism toward using DB services.

4.3 Measurement model

Based on Venkatesh and Bala [29], use was measured with a single item. Other constructs were measured with multiple items. The reflective measurement model was evaluated for convergent and discriminant validity. Internal consistency and indicator reliability were also tested. This process showed that the indicators were both reliable and homogeneous.

Table 2 summarises the findings from the evaluation of the reflective measurement models. Convergent validity is generally assessed by analysing indicator loadings and the average variance extracted (AVE). Loadings of 0.5 or higher are considered indicative of a reliable representation of the underlying construct, and all items in this study meet this standard, except for PF5 (0.675) and RTU3 (0.596), ensuring reliable measurements of the latent constructs. For all latent variables, the minimum AVE of 0.5 was exceeded, thereby

establishing convergent validity for the measurement model. All items met this threshold, except for PF5 (0.675) and RTU3 (0.596), ensuring reliable measurements of the latent constructs. For the AVE, all latent variables exceeded the minimum of 0.5, establishing convergent validity for the measurement model. PF5 and RTU3 were not excluded because of the new and exploratory nature of the study, as they were deemed relevant for capturing the key aspects of the conceptual model. These items were included while carefully considering content validity, which ensured that they adequately represented the measured construct and aligned with the objectives of the study. By retaining these items, this study could explore all potential factors influencing the acceptance of RPS while maintaining the integrity and comprehensiveness of the measurement model.

Internal consistency was measured with Cronbach's alpha, which may underestimate reliability due to its sensitivity to item count [14]. Composite reliability gives a more flexible estimate by accounting for variations in indicator contributions [14]. Consequently, roh_A was also included as a suitable measure for internal consistency, with a threshold value of 0.7, to ensure adequate consistency. Internal consistency reliability was observed because both Cronbach's alpha and roh_A values were within the thresholds. The results are visualised in the "Internal consistency reliability" column in *Table 2*.

The heterotrait-monotrait ratio (HTMT) [64] was used to assess discriminant validity. Specifically, high HTMT values indicate that constructs are distinct in their content. To interpret these values, a threshold of 0.85 is used for conceptually unrelated constructs, while a value of 0.90 applies to related constructs. In addition, statistical bootstrapping can be used to further test whether an HTMT value is significantly below 1. In accordance with these criteria, none of the 11 confidence intervals in this study included 1, confirming that all constructs meet the criteria for discriminant validity [64, 65].

Table 2 – Summary of results for reflective measurement models

Latent variable	**Indicators**	**Convergent validity**		**Internal consistency reliability**		**Discriminant validity**	
		Loading(a)	**AVE**	**Cronbach's alpha**	**roh_A**	**Fornell-Larcker**	**Henseler et al. HTMT**
		>0.70	**>0.50**	**0.60-0.90**	**>0.70**	**sqrt AVE>LVC**	**Confidence interval does not include 1**
Personal factors	PF1	0.841	0.640	0.858	0.871	yes	yes
	PF2	0.839					
	PF3	0.797					
	PF5	0.675					
	PF6	0.834					
Efficiency and reliability	ER1	0.818	0.727	0.875	0.878	yes	yes
	ER2	0.901					
	ER3	0.827					
	ER4	0.863					
Cast-benefit ratio	CBR1	0.861	0.671	0.836	0.836	yes	yes
	CBR2	0.855					
	CBR3	0.764					
	CBR4	0.792					
Safety-comfort-cleanliness	SCC1	0.866	0.651	0.731	0.739	yes	yes
	SCC3	0.797					
	SCC5	0.753					

Latent variable	Indicators	Convergent validity		Internal consistency reliability		Discriminant validity	
		Loading(a)	AVE	Cronbach's alpha	roh_A	Fornell-Larcker	Henseler et al. HTMT
		>0.70	>0.50	0.60-0.90	>0.70	sqrt AVE>LVC	Confidence interval does not include 1
Convenience	C1	0.714	0.544	0.789	0.792	yes	yes
	C2	0.775					
	C3	0.686					
	C4	0.783					
	C5	0.725					
Information-communication with the passenger	ICP1	0.865	0.713	0.866	0.873	yes	yes
	ICP2	0.868					
	ICP3	0.866					
	ICP4	0.776					
Resistance to use	RTU2	0.978	0.656	0.586	1.407	yes	yes
	RTU3	0.596					
PU	PU1	0.861	0.706	0.861	0.867	yes	yes
	PU2	0.835					
	PU3	0.781					
	PU4	0.881					
PEOU	PEOU1	0.838	0.676	0.840	0.841	yes	yes
	PEOU2	0.810					
	PEOU3	0.787					
	PEOU4	0.852					
BI	BI1	0.884	0.757	0.840	0.840	yes	yes
	BI2	0.886					
	BI3	0.840					

Note. PU, perceived usefulness; PEOU, perceived ease of use; BI, behavioural intention; AVE, average variance extracted; LVC, latent variable correlation; HTMT, heterotrait-monotrait ratio.

In conclusion, all the items accurately measure their respective constructs and demonstrate strong internal consistency. The distinctiveness of the constructs' content was confirmed for all. Therefore, the reliability and validity of the reflective measurement model were established to ensure its predictive capabilities.

After analysing the construct measurements, collinearity must be ruled out before evaluating the structural model, the model's predictive power, and the relationships between the constructs. Therefore, the inner VIF values must not exceed the threshold value of five [14], and multicollinearity among the predictor constructs must be assessed.

4.4 Hypothesis testing and predictive relevance

The results of parameter estimation using SmartPLS, including R^2 values, standardised path coefficients, and indicator loadings, are presented in *Figure 2*. The predictive relevance of the model is high with Q^2 larger than 0.5 for PU (0.651), PEOU (0.608) and BI (0.567). In addition, to evaluate the predictive accuracy, R^2 was calculated. Hair et al. [14] have proposed R^2 threshold values of 0.75, 0.50 and 0.25 as substantial, moderate and weak, respectively. The R^2 values (within circles) of PU (0.684), PEOU (0.622) and BI (0.642) all show a moderate level of explanation, while the variance in use (0.137) is weak.

The impact of removing one construct on the remaining constructs was assessed using the effect size f^2. Following Cohen [62], values of 0.02, 0.15, and 0.35 indicate small, medium, and large effects, respectively. In this context, the results showed eight constructs with small effects, three with medium effects, and one with a large effect. To gain further insights, statistical significance and path relevance were assessed using BCa bootstrap confidence intervals and standardised weights. As shown in *Figure 2*, all but one path coefficient was significant, with values above 0.2 considered significant and those below 0.1 considered insignificant [14]. Overall, these results demonstrate the model's robust predictive accuracy.

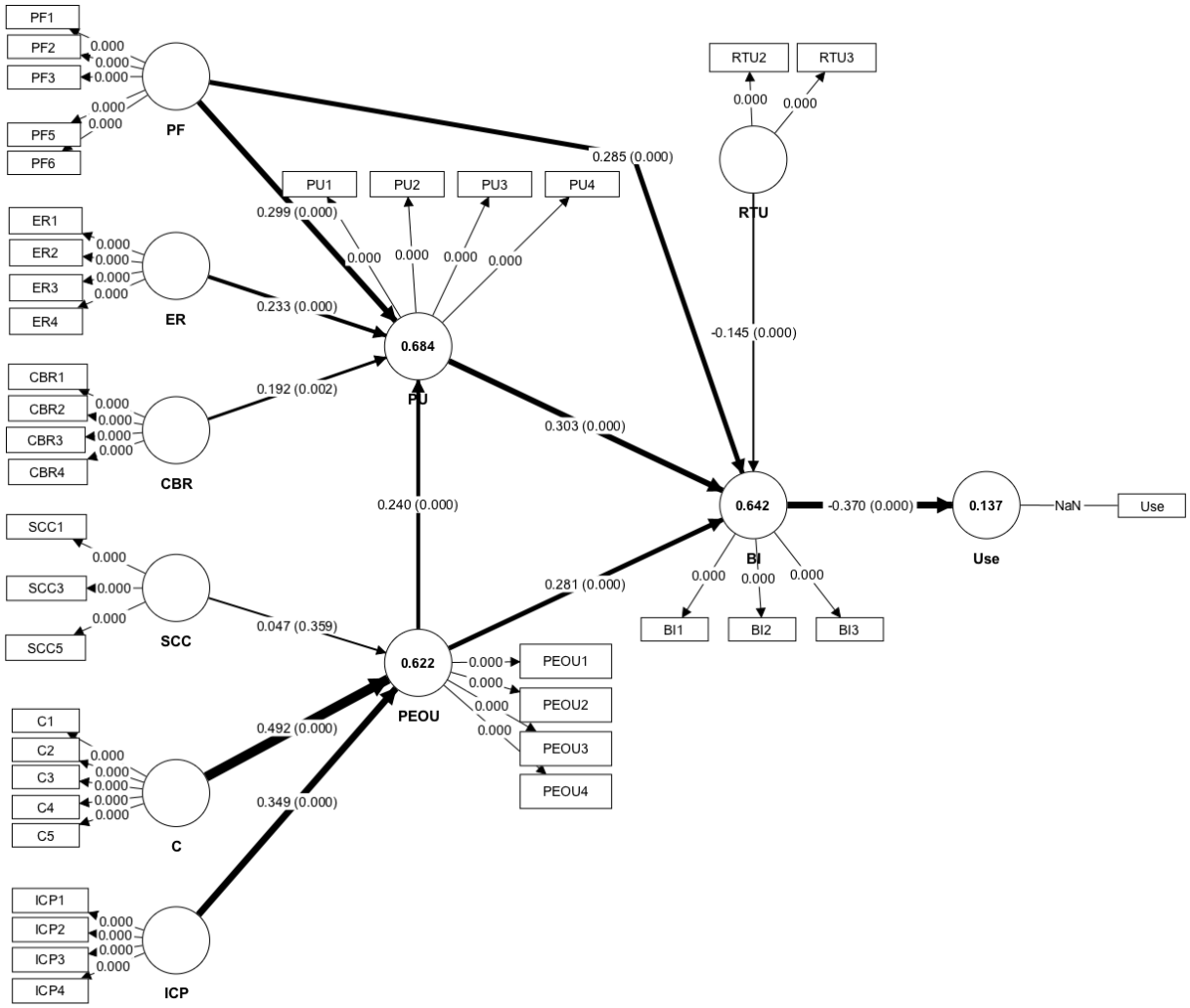

Figure 2 – Results structural model

The structural model assessment results are presented in *Table 3*. The decision column is the most relevant summary of the assessment, as it highlights the predictive accuracy of the conceptualised models and the relationships within them.

All but one variable, SCC → PEOU, had significant impacts. Personal factors, efficiency and reliability, the cost-benefit ratio and PEOU explained 68.4% of the variance in PU, which is considered moderate. Personal factors had the strongest effect on PU (0.299), followed by PEOU, efficiency and reliability, and the cost-benefit ratio. Safety-comfort-cleanliness, convenience and information-communication with the passenger explained 62.2% of the variance in the PEOU. Here, convenience had the highest impact, and safety-comfort-cleanliness had the lowest. Safety-comfort-cleanliness was the only significant indicator in the model. This can be attributed to the fact that the construct focuses more on subconscious and individually perceived aspects. This is supported by an average Likert score of 3, which shows that people are generally indifferent about these aspects in the context of RPS, or would not admit that it is an impactful factor. Furthermore, it highlights how specific characteristics have a greater impact than those of the initial judgement, such as safety-comfort-cleanliness. Safety-comfort-cleanliness may also vary significantly owing to personal perceptions and the difficulty in measuring them. Thus, safety-comfort-cleanliness may be excluded from the model; however,

we suggest analysing it further, to see if a change in position, for example, to a moderator for BI → use could increase its relevance.

The predictor constructs PU, PEOU and personal factors jointly explained 64.2% of the variance in BI, with PU being the strongest predictor thereof. BI explained 13.7% of the variance in use. However, the negative path coefficient indicates that the discrepancy between the statement and behaviour was significant in this scenario. Suggesting that although many participants expressed the intention to use rail passenger transport, they did not translate this into actual behaviour. The discrepancy could be due to habitual car use, perceived inconvenience or structural barriers such as limited accessibility or timetabling issues. Therefore, a positive attitude alone is not enough to encourage behaviour and practical constraints or ingrained habits can override a user's intention. This finding indicates that supportive conditions and targeted measures are necessary to bridge the gap between intention and actual use.

Table 3 – Results of structural model assessment

Hypothesis	Relationship	Path coefficient	95% confidence intervals	p Values	f^2 effect size	Decision	Q^2
H1	PF → PU	0.299	[0.209; 0.393]	0.000	0.160	Supported	0.651
H2	ER → PU	0.233	[0.100; 0.359]	0.000	0.051	Supported	
H3	CBR → PU	0.192	[0.070; 0.317]	0.002	0.036	Supported	
H4	PEOU → PU	0.240	[0.126; 0.349]	0.000	0.085	Supported	
H5	SCC → PEOU	0.047	[-0.050; 0.152]	0.359	0.004	Rejected	0.608
H6	C → PEOU	0.492	[0.377; 0.608]	0.000	0.353	Supported	
H7	ICP → PEOU	0.349	[0.233; 0.460]	0.000	0.180	Supported	
H8	BI → Use	-0.370	[-0.454; -0.280]	0.000	0.158	Supported	0.083
H9	PF → BI	0.285	[0.175; 0.389]	0.000	0.147	Supported	0.567
H10	RTU → BI	-0.145	[-0.221; -0.074]	0.000	0.056	Supported	
H11	PU → BI	0.303	[0.169; 0.439]	0.000	0.098	Supported	
H12	PEOU → BI	0.281	[0.174; 0.386]	0.000	0.107	Supported	

Note. PF, personal factors; PU, perceived usefulness; ER, efficiency and reliability; CBR, cost-benefit ratio; PEOU, perceived ease of use; SCC, safety, comfort, cleanliness; C, convenience; ICP, information–communication with passengers; BI, behavioural intention; RTU, resistance to use.

The predictive relevance of the conceptualised AM-RPS was empirically tested and confirmed, supporting Förster's [13] theory that by maintaining the core structure of the TAM and adjusting only the definitions of the core and exogenous variables, the model remains valid. Thus, the main research question was confirmed by establishing the AM-RPS as a valid model. The same relationships observed in the TAM apply in the service context, demonstrating that the TAM is relevant beyond technological concepts. Although the core structure of the original model was preserved, adjustments to the definitions did not affect its predictive relevance, as described in Section 4. The similarity between PU in the TAM and AM-RPS indicates that social and personal factors are the key drivers of acceptance [10]. Costs outweigh all aspects except for safety-comfort-cleanliness; this highlights how mode choice and the willingness to change are deeply rooted in personal preferences and perceptions. The strong effect of personal factors on PU and convenience on PEOU is further indicative of this. Therefore, essentially, RPS should be changed to better accommodate these user needs and allow for a more personalised experience.

4.5 Theoretical implications

This study makes important theoretical contributions to acceptance research by extending the scope of the TAM to RPS. This shift is significant as the service industry is growing rapidly, and understanding consumer acceptance in this sector is becoming increasingly important.

The results show that the TAM framework remains relevant when applied to services, as it emphasises the most important factors for acceptance, such as PU and PEOU. Only one hypothesis was rejected, emphasising the general validity of the model in the service context. However, rejecting the hypothesis of safety-comfort-

cleanliness requires further research. Future research should investigate whether these factors are irrelevant to RPS acceptance or whether they should be treated as a single variable and not as an antecedent to PEOU. This will provide deeper insights into the nuances of service acceptance and help refine the model's application in this area.

4.6 Practical implications

This study provides key information and a tool for the DB and other RPS providers to understand and enhance the acceptance and usage of their services. User beliefs, needs and preferences vary; for example, those who own a car are less dependent on RPS in their daily lives than those who do not. Therefore, before implementing a strategy to increase acceptance among the general population, service providers should implement different strategies for different user groups. The DB could not only appease different user groups but also enrich its service portfolio and become more specialised in different types of travel. For example, vacationists are likely to focus more on the comfort and accessibility of luggage than work commuters, who would rather reach their destinations as quickly as possible and on time. Furthermore, RPS providers must ensure that the standards they implement are applied throughout their systems, not only in certain areas where usage might be higher.

One area that should be focused on is convenience, as it had the strongest effect on PEOU and the model in general.

Although the personal factors, PU and PEOU antecedent variables had larger impacts on BI, the smaller but negative impact of resistance to use on BI should not be underestimated, highlighting that the efforts of the DB and other RPS providers may be in vain if they do not understand the reasons for user resistance.

Considering that the current state of usage among Germans is low, with 60% of our sample hardly ever using RPS, simply changing aspects of the service will not contribute to greater acceptance or an increase in actual usage. Therefore, once changes to the system are implemented, such as new timing, train lines and on-board offerings (e.g. entertainment options), they need to be communicated and marketed incessantly to ensure that people with cars are alerted and intrigued by the new changes.

In addition to the service-specific implications for providers such as DB, the findings of this study are also highly relevant to transport planners and policy-makers working towards sustainable mobility. In particular, they are directly relevant to the EU's modal shift targets outlined in the Green Deal and the Sustainable and Intelligent Mobility Strategy, which aim to double rail freight and triple high-speed passenger traffic by 2050. To achieve these objectives, it will not be enough simply to extend the infrastructure; it will also be necessary to tackle entrenched behavioural barriers. One of the main obstacles is the tendency for the status quo to favour habitual car use over public transport, even when viable alternatives exist [66]. This behavioural resistance stems from psychological inertia, perceived effort and cognitive overload. Policy instruments that reduce the cost or perceived effort of mode switching, such as trial tickets, simplified booking processes or targeted messages, can mitigate these effects.

Furthermore, the pronounced gap between intentions and behaviours highlighted in this study points to a gap between positive attitudes towards rail travel and actual modal shifts. Behavioural economics tools, including personalised travel plans and timely interventions at life transitions (e.g. moving house, changing jobs), offer ways to bridge this gap. For transport planners and public bodies, this knowledge encourages the adoption of integrated strategies that combine "push" regulatory measures (e.g. low-emission zones, parking restrictions) and "pull" mechanisms (e.g. financial incentives, gimmicks, interventions to disrupt habits). There is growing evidence that these dual-approach strategies are more effective than isolated awareness-raising campaigns in changing behaviour. In summary, promoting rail as the default mobility option will require interaction between infrastructure, the design of supportive policies and behavioural planning. Integrating these elements into transport policy is essential if the EU's modal shift objectives are to be achieved and if a sustainable change in travel behaviour is to be fostered.

4.7 Limitations and future research

This study has several limitations. First, its cross-sectional design limits the assessment of how initial or posterior experiences affect the variables. To counteract this, a future study could conduct a longitudinal field study to examine how experiences and current changes in the service affect the variables and users' intention to use the service. This approach would also allow for a direct validation of the impact of small changes on service use.

Second, the discrepancy between actual and self-reported behaviours is an issue in online surveys. Therefore, free tickets could be provided to test subjects to record their use of railway transport and track actual user behaviour, making it possible to link the data from the questionnaire with the data on tickets and compare self-reported usage behaviour with actual user behaviour. In addition, these tickets can be used to track usage behaviour beyond the free-ticket period. The free ticket has two purposes: (1) as an incentive to use RPS and (2) as a tracking device to measure long-term effects. However, this approach involves some risks depending on the respondent's interpretation of the questionnaire and unforeseen changes in their pattern of behaviour after the survey. Therefore, the questionnaire would need to be rigorously pilot-tested, and enlightened approaches would need to be applied to track ticket data.

Third, this study focused solely on Germany to align with national objectives and support DB's efforts to increase passenger numbers. While this focus is appropriate, future research could benefit from cross-national comparisons to reveal differences in service provision and identify effective practices from other countries that may inform improvements in Germany. Fourth, 79% of the sample owned or were leasing a car; hence, evaluating the data to compare the two groups was considered unnecessary because the difference between them was too large. However, future research could control this aspect during the sampling process to ensure a better distribution thereof in the sample to better understand the impact of car ownership and leasing on the acceptance of RPS. In addition, future research could integrate the moderating variables that impact the relationship between BI and actual use. Here, ridesharing would be a great moderator, as it might impact actual use, despite a high BI. Rideshares offer high flexibility, often in closer proximity to train stations, and thus, might be a more convenient and spontaneous choice.

Future research can extend and specify the model in at least three directions: (1) bus passenger services, (2) car-sharing services and (3) the impact of increasing external pressures on habitual behaviour. The model offers a basis to investigate acceptance, key drivers and emerging determinants, such as fuel shortages or rising demand for CO_2-neutral travel, while the identified six PU and PEOU determinants and one BI antecedent can be adapted and expanded for other transport modes.

Future research should examine how growing external pressures, such as government regulations, rising car costs and social expectations, may weaken habitual behaviours and promote more sustainable lifestyles. Additionally, studies could enhance the model by linking RPS more closely with their technological aspects (e.g. DB apps, autonomous trains). This approach could help identify key drivers of user acceptance and inform strategies to influence travel behaviour.

5. CONCLUSION

This study deepens the understanding of the acceptance of rail passenger transport services in Germany by extending the TAM to include technological features and service-specific attributes. By integrating a service-oriented dimension, the model demonstrates that the TAM's applicability extends beyond conventional contexts and provides a tailor-made framework for rail passenger transport services. Empirical validation with SmartPLS confirms the model's robustness, contributing to the literature, while the results provide actionable insights for service providers and strategies to overcome acceptance barriers. The framework is adaptable across providers and presents a robust model that can be used to investigate the acceptance of RPS and related areas.

Our model and related findings are intended to serve as a starting point for change. As the leading RPS provider in Germany, DB may use this model to identify the key drivers of acceptance of RPS and implement strategies. However, this is only a part of the challenge; the bigger issue is the inevitable disruption that negatively affects passenger numbers and customer satisfaction in the short term [67]. Therefore, the ultimate impact of this strategy is not immediately measurable.

Accordingly, future research should aim to better understand the factors driving RTU, as it has negatively impacted acceptance and use. This is evident from the current low user numbers, highlighting the need to lower the barrier drastically to successfully increase acceptance among car-lovers, as well as actual usage.

DATA AVAILABILITY STATEMENT

The data associated with this study have not been deposited in any publicly available repositories.
Data can be made available by authors upon reasonable request.

ETHICS DECLARATION

All participants (or their proxies and/or legal guardians) provided informed consent to participate in this study.

DECLARATION OF COMPETING INTEREST

The authors declare that they have no competing financial interests or personal relationships that may have influenced the work reported in this study.

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APPENDIX

Appendix I: Consumer Questionnaire (original German version)

Fragebogen

1 Info

Vielen Dank, dass Sie sich die Zeit nehmen, an dieser Umfrage teilzunehmen. Ziel dieses Fragebogens ist es, besser zu verstehen, welche Faktoren die Akzeptanz und Nutzung von Personenverkehr mit der Bahn in Deutschland beeinflussen. Ihre Antworten helfen dabei, fundierte Erkenntnisse für Forschung und Praxis zu gewinnen.

Die Teilnahme ist freiwillig und erfolgt anonym. Alle erhobenen Daten werden vertraulich behandelt und ausschließlich zu wissenschaftlichen Zwecken verwendet. Es gibt keine „richtigen“ oder „falschen“ Antworten – bitte beantworten Sie die Fragen ehrlich und nach bestem Wissen.

Das Ausfüllen des Fragebogens dauert etwa 5 bis 10 Minuten. Bei Fragen oder Unklarheiten können Sie sich jederzeit an die Studienleitung wenden.

Vielen Dank für Ihre Unterstützung!

2 Age

Wie alt sind Sie?

Bitte wählen Sie eine der folgende

- ◯ 18-24 Jahre
- ◯ 25-34 Jahr
- ◯ 35-44 Jahr
- ◯ 45-54 Jahre
- ◯ 55-64 Jahre
- ◯ 65+ Jahre

3 Demographics

Mit welchem Geschlecht identifizieren Sie sich?

Bitte wählen Sie eine der folgenden Antworten aus.

- ◯ Weiblich
- ◯ Männlich
- ◯ Divers/anders
- ◯ Möchte ich nicht angeben

Welche der folgenden Angaben beschreibt Ihr jährliches Haushaltseinkommen am besten?

Bitte wählen Sie eine der Optionen aus.

- ◯ Weniger als €25,000
- ◯ €25,000 - €50,000
- ◯ €50,000 - €100,000
- ◯ €100,000 - €200,000
- ◯ Mehr als €200,000
- ◯ Bevorzuge es nicht zu sagen

Wie viele Personen ab 18 Jahren leben in Ihrem Haushalt?

Bitte wählen Sie eine der folgenden Optionen.

- ◯ 1
- ◯ 2
- ◯ 3
- ◯ Mehr als 3

Wie häufig nutzen Sie die DB services?

Bitte wählen Sie eine der Optionen aus.

- ☐ Täglich
- ☐ Wöchentlich
- ☐ Mehrfach wöchentlich
- ☐ Einmal pro Monat
- ☐ Weniger als einmal pro Monat
- ☐ Nie

Warum nutzen Sie die DB services?

Bitte wählen Sie alle zutreffenden Antworte aus.

- [ ] um zur Arbeit zu pendeln
- [ ] für geschäftliche Reisen
- [ ] für private Reisen
- [ ] zur allgemeinen Fortbewegung
- [ ] Nutze die DB nicht

Haben Sie einen Führerschein?

Bitte wählen Sie unten Ihre Antwort aus.

- ◯ Ja
- ◯ Nein

Besitzen oder leasen Sie ein Auto?

Bitte geben Sie Ihre Antwort unten an.

- ◯ Ja
- ◯ Nein

Wie viele Autos besitzen oder leasen Sie in Ihrem Haushalt?

Bitte wählen Sie Ihre Antwort unten aus.

- ◯ 1
- ◯ 2
- ◯ Mehr als 3
- ◯ Keins

Wo wohnen Sie?

Bitte wählen Sie eine der folgenden Optionen.

- ◯ Innerstädtisches Gebiet
- ◯ Vorstadtgebiet
- ◯ Innenstadt
- ◯ Dorf
- ◯ Ländlich oder auf dem Land

Wie ist Ihr Beschäftigungsstatus?

Bitte wählen Sie eine der folgenden Optionen.

- ◯ Vollzeit
- ◯ Teilzeit
- ◯ Selbständig
- ◯ Arbeitslos
- ◯ Unfähig zu arbeiten
- ◯ Im Ruhestand
- ◯ Student

4 Personal Factors

Menschen, auf die ich höre, könnten mich beeinflussen, die DB zu nutzen.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Meine Familie und meine Freunde halten den Einsatz der DB für eine gute Idee.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Ich bin bereit, Unannehmlichkeiten in Kauf zu nehmen, um umweltfreundlichere Verhaltensweisen zu erreichen.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Ich finde das Konzept des öffentlichen Verkehrs großartig, aber die Umsetzung ist schlecht.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Ich bevorzuge normalerweise umweltfreundliche Verkehrsmittel.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Ich würde die DB- Services gerne öfter nutzen.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

5 Efficiency and Reliability

Aufgrund meiner Erfahrungen mit der DB in der Vergangenheit weiß ich, dass sie zuverlässig ist.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Aufgrund meiner Erfahrungen mit der DB in der Vergangenheit weiß ich, dass sie ein kundenorientierter Dienstleister ist.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Aufgrund meiner Erfahrungen mit der DB in der Vergangenheit weiß ich, dass sie ein effizientes Transportmittel ist.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Aufgrund meiner Erfahrungen mit der DB in der Vergangenheit weiß ich, dass sie mir hilft, Zeit und Geld zu sparen.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

6 Cost-Benefit Ratio

Die Kosten für die Zugfahrkarten sind angemessen.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Das Verhältnis zwischen den Kosten für die Zugfahrkarten und den Vorteilen steht in einem ausgewogenen Verhältnis.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Die Nutzung von DB- Services hat den Vorteil, dass sie Zeit spart.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Ich würde die DB aus Gründen der Kosteneinsparung nutzen.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

7 Safety-Comfort Cleanliness

Die Sicherheitsverhältnisse an den Haltestellen und Endbahnhöfen sind zufriedenstellend.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Die Einstellung des Servicepersonals ist zuvorkommend.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Die Sicherheit während einer Fahrt mit der DB ist für mich kein Thema.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Ich habe Angst, dass ich mich bei der Nutzung der DB anstecken könnte (z. B. Erkältung/Grippe).

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Die Sauberkeit in den Waggons und den sanitären Anlagen ist auf einem hohen Niveau.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

8 Convenience

Entfernung und Zeit zwischen den Umsteigepunkten sind händelbar.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Es ist einfach, Tickets an den Verkaufsstellen zu erwerben.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Online-Tickets sind leicht zugänglich.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Das Fahrkartensystem ist im Allgemeinen leicht zu verstehen und in den verschiedenen Bereichen des öffentlichen Verkehrs (z. B. Stadt-, Großstadt- oder Regionalverkehr) zu verwenden.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Die Verbindung zwischen den Wohngebieten und den städtischen Zentren und Arbeitsplätzen ist zufriedenstellend.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

9 Information-communication with passengers

Abfahrts- und Ankunftszeiten sowie deren Änderungen werden am Bahnhof, in der App oder im Zug korrekt und rechtzeitig mitgeteilt.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Die von den DB- Services bereitgestellten Informationen über Fahrten und damit verbundene Änderungen sind umfassend und klar.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Die Informationen der DB-Dienste können als zeitnah und ausreichend eingestuft werden.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Informationen oder deren Fehlen haben auf den Reisen keine Unannehmlichkeiten verursacht.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

10 Perceived Usefulness

Die Nutzung der DB- Services ist für mich eine kostensparende Überlegung.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Die Nutzung der DB- Services in meinem alltäglichen Leben erhöht meine Produktivität.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Durch die Nutzung der DB- Services verbessert sich meine Nachhaltigkeit.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Ich finde die DB- Services in meinem täglichen Leben sehr nützlich.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

11 Perceived Ease of Use

Meine Interaktion mit den DB- Services ist klar und verständlich.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Die Interaktion mit den DB- Services erfordert keinen großen Aufwand.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Ich finde es einfach, mit der DB dorthin zu kommen, wo ich hin will.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Ich finde die DB- Services einfach zu nutzen.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

12 Resistance to Use

Die Nutzung der DB- Services mag zwar hilfreich sein, ist aber für mein tägliches Leben sicher nicht zwingend erforderlich.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Frühere Erfahrungen haben mich veranlasst, die DB- Services zu meiden.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Negatives Hörensagen hat meine Einstellung zu den DB- Services beeinflusst.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

13 Behavioural Intention

Angenommen, ich hätte Zugang zu den DB- Services, dann würde ich sie nutzen.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Wenn ich Zugang zu den DB- Services hätte, würde ich sie sicher nutzen.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

Ich plane, die DB- Services in den nächsten 3 Monaten zu nutzen.

- ◯ Stimme voll und ganz zu
- ◯ Stimme zu
- ◯ Stimme weder zu noch nicht zu
- ◯ Stimme nicht zu
- ◯ Stimme überhaupt nicht zu

14 Use

Wie oft nehmen Sie die Dienste der DB im Durchschnitt innerhalb von 3 Monaten in Anspruch?

15 Final page

ENDE, Vielen Dank für Ihre Teilnahme!