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# UNDERSTANDING HEDONIC MOTIVATION IN THE CONTEXT OF SMART TRANSPORTATION

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**Purpose:** This study aims to investigate the role of hedonic motivation in shaping the intention to use smart transportation (ST) solutions. The research focuses on hedonic motivation as a critical, yet often underexplored, factor influencing the adoption of ST solutions.

**Design/methodology/approach:** The study employs a quantitative research design, utilizing a structured questionnaire distributed via CAWI method. A sample of 539 urban residents in Poland was analyzed, with measurement scales for hedonic motivation and intention to use ST derived from validated frameworks like the UTAUT. Statistical analyses, including Pearson and Spearman's rho correlations, were conducted to explore the relationships between the variables.

**Findings:** The results confirm a statistically significant moderate positive relationship (r = 0.46, p < 0.001) between hedonic motivation and the intention to use smart transportation solutions. Key hedonic factors, such as enjoyment, entertainment, and pleasure, were found to significantly influence user intentions. The findings highlight the consistent role of hedonic motivation across demographic and socio-economic groups.

**Research limitations/implications:** The study is limited to urban residents in Poland and employs self-reported data, which may restrict the generalizability of the findings. Future research should explore cross-cultural comparisons and longitudinal designs to examine sustained adoption behaviors over time.

**Practical implications:** The findings provide actionable insights for ST's policymakers, system designers, and operators. Integrating hedonic elements such as gamification, aesthetically pleasing designs, and personalized features into smart transportation systems can enhance user engagement and adoption rates. These strategies are crucial for developing user-centered solutions that balance functionality with emotional appeal.

**Social implications:** Promoting the adoption of ST solutions through hedonic motivation contributes to sustainable urban mobility, reducing carbon emissions and encouraging environmentally friendly behaviors. By making transportation systems both efficient and enjoyable, these solutions can improve quality of life and support the transition to smarter, greener cities. **Originality/value:** This study offers a novel contribution by focusing exclusively on the role of hedonic motivation in ST adoption, particularly in the underexplored context of Central and Eastern Europe.

**Keywords:** hedonic motivation, smart transportation (ST), technology adoption, UTAUT, gamification, urban mobility

Category of the paper: research paper, empirical study.

# 1. Introduction

Smart transportation (ST) is a critical component of modern urban development, addressing pressing challenges such as traffic congestion, environmental sustainability, and the growing demands of urban populations. As cities worldwide experience rapid growth, with projections indicating that 68% of the global population will reside in urban areas by 2050 (UN, 2018), the need for efficient, sustainable, and user-centric transportation systems has become paramount. Smart transportation systems (STS) leverage advanced technologies such as artificial intelligence, the Internet of Things (IoT), and big data to optimize mobility, reduce carbon emissions, and enhance the overall commuter experience.

In this context, hedonic motivation plays a pivotal role in driving the adoption of smart transportation solutions. Beyond their functional benefits, such as efficiency and convenience, ST systems that offer enjoyment, entertainment, and emotional satisfaction are more likely to engage users and encourage consistent usage. Research has shown that hedonic factors, such as gamification, aesthetic appeal, and interactive design, significantly influence user behavior, making transportation not only practical but also pleasurable. Understanding the role of hedonic motivation is crucial for designing systems that resonate with users' emotional and experiential needs, ultimately ensuring higher adoption rates and long-term satisfaction with smart.

This paper explores the relationship between hedonic motivation and intention to use smart transportation solutions, examining theoretical foundations, key technologies, and implications for policymakers and designers.

The study also seeks to validate the hypothesis that hedonic motivation positively influences the intention to use ST, providing actionable insights for enhancing the design, implementation, and user experience of smart transportation solutions.

This article is structured into six sections. The Introduction provides an overview of the research problem and objectives, highlighting the significance of hedonic motivation in the context of smart transportation. The Theoretical Framework explores the conceptual foundations of hedonic motivation and the technological advancements in smart transportation systems. The Literature Review examines prior studies on user motivation and smart transport-tation, identifying research gaps and setting the stage for the research question and hypothesis.

The Methodology details the research design, data collection process, and measurement scales used for hedonic motivation and intention to use ST solutions. The Findings and Discussion section present the results of the analysis, interpreting them within the context of existing literature and providing implications for stakeholders. Finally, the Conclusion and Limitations summarize the study's contributions, address its constraints, and propose directions for future research.

# 2. Theoretical framework

#### 2.1. Definition and importance of hedonic motivation

Hedonic motivation refers to the intrinsic joy, excitement, and pleasure derived from engaging in activities that provide sensory gratification and emotional fulfillment, rather than solely meeting practical or utilitarian needs (Arnold, Reynolds, 2003).

Unlike utilitarian motivations, which are task-oriented and focused on fulfilling functional goals, hedonic motivations emphasize emotional and experiential aspects of consumption. These motivations are driven by the aesthetic pleasure and enjoyment of the process itself, such as sensory stimulation, fantasy, and amusement (Hirschman, Holbrook, 1982). For example, hedonic motives may lead consumers to seek experiences of fun and escapism, describing shopping as an adventure or mood-enhancing activity (Babin, Darden, Griffin, 1994; Fischer, Arnold, 1990).

Hedonistic values prioritize enjoyment and emotional fulfillment, often shaping users' decision-making processes by appealing to their desire for pleasure. For example, studies show that "hedonic motivation significantly impacts consumers' behavioral intentions when adopting innovative technologies, such as artificial intelligence-based services or gamified platforms" (Siddiqui et al., 2024). These motivations are particularly relevant in contexts where users seek experiences beyond mere functionality, such as in the use of smart transportation systems that integrate gamification, aesthetically pleasing designs, or personalized features.

Research further emphasizes that "hedonic content inspires consumers more effectively than utilitarian content, driving higher levels of engagement and intention to act" (Swaroop et al., 2024). This is evident in contexts where sensory appeal or gamified incentives enhance the user experience, making services like smart transportation not just practical but enjoyable.

Hedonic motivations contrast with utilitarian motivations, which focus on practical benefits such as efficiency, convenience, and necessity. While utilitarian motivations address functional needs, hedonic motivations fulfill emotional and psychological desires. As Kumar and Singh (2024) argue, "hedonic motivation relates to experiential gratification, whereas utilitarian motivation emphasizes task completion and rational benefits."

In the realm of consumer behavior, the two motivations often coexist, but their relative influence varies depending on the context. For instance, in adopting e-pharmacies, utilitarian factors like convenience dominate; however, "hedonic motivations, such as the pleasure of exploring new platforms or the aesthetic design of the interface, play a subtle yet significant role" (Kumar, Singh, 2024). Similarly, in smart transportation, users may initially prioritize efficiency but are more likely to engage deeply with systems offering enjoyable and rewarding experiences.

This differentiation underscores the importance of integrating both motivational aspects into the design and marketing of smart transportation systems. As Jakubowska and Grzywińska-Rąpca (2024) highlight, a balanced approach that merges utilitarian functionality with hedonistic appeal can maximize user satisfaction and adoption rates.

#### 2.2. Smart transportation: a key component of urban innovation

Smart transportation, a core component of urban innovation, integrates advanced technologies to optimize mobility, improve efficiency, and reduce environmental impact. As cities grow rapidly – projected to house 68% of the global population by 2050 (UN, 2018) – urban planners face increasing challenges in managing traffic congestion, environmental sustainability, and commuter demands. The rise of smart cities, powered by technologies like artificial intelligence (AI), the Internet of Things (IoT), and data analytics, has led to transformative changes in urban transportation systems.

Smart transportation systems (STS) aim to modernize mobility through innovations like intelligent traffic management, real-time route optimization, and the integration of electric and autonomous vehicles. These systems use IoT devices to gather data on traffic patterns, road conditions, and commuter behavior, enabling dynamic adjustments to improve flow and efficiency (Monzon, 2015). According to the US Department of Transportation, STS leverages tools like advanced sensors, communication systems, and data-driven algorithms to enhance safety and operational performance. Below are Key Technologies and Their Current Adoption. *2.2.1 Autonomous vehicles (AVs)* 

Autonomous vehicles are at the forefront of smart transportation. These vehicles rely on AI, machine learning, and sensor technologies to navigate roads without human intervention. Their adoption is progressing, with pilot programs active in cities across the globe. For instance, ride-hailing companies such as Waymo and Cruise have deployed AV fleets in limited areas, demonstrating their potential to reduce accidents and traffic congestion (Dwivedi et al., 2024). However, regulatory and technical challenges still impede widespread adoption.

## 2.2.2. Electric vehicles (EVs) and charging infrastructure

EVs are a cornerstone of sustainable transportation, with governments worldwide incentivizing their use. Smart charging stations, powered by IoT technologies, optimize charging times and energy consumption. For example, "smart and user-friendly electric vehicle charging infrastructure" encourages EV adoption while contributing to reduced emissions (Kamal, 2024). 2.2.3. Intelligent traffic management systems

# Real-time traffic monitoring and optimization systems use IoT devices, cameras, and data analytics to manage traffic flow efficiently. These systems aim to reduce congestion and improve safety. In cities like Singapore, traffic control centers employ data-driven algorithms to dynamically adjust traffic signals and reroute vehicles, significantly enhancing urban mobility (Ngossaha et al., 2024).

# 2.2.4. Shared mobility solutions

Shared mobility systems, including bike-sharing, car-sharing, and micro-mobility options like e-scooters, are gaining traction as eco-friendly alternatives to personal vehicles. These systems alleviate traffic congestion and promote active transportation, particularly in densely populated urban areas. Studies show that shared urban bicycles significantly reduce urban emissions while encouraging healthier commuting habits (Ahmed et al., 2024).

## 2.2.5. Mobility-as-a-service (MaaS)

MaaS platforms integrate various modes of transportation, such as buses, trains, ride-sharing, and bike-sharing, into a unified app. This system enhances user experience by providing seamless trip planning, booking, and payment options. Cities like Helsinki and Los Angeles have adopted MaaS solutions to streamline mobility and reduce dependency on personal vehicles (Schwinger et al., 2024).

# 2.2.6. IoT-driven parking systems

Smart parking technologies use sensors to detect and communicate real-time parking availability. These systems not only reduce the time spent searching for parking spots but also lower emissions from idling vehicles. Pilot programs in urban areas have shown promising results in reducing traffic congestion and improving parking efficiency (Xing et al., 2024).

These innovations promote sustainable urban mobility by reducing reliance on traditional automobiles, minimizing emissions, and encouraging the use of public transit and non-motorized transport.

For example, shared urban bicycle systems reduce traffic congestion and pollution while promoting active lifestyles. Similarly, intelligent parking systems use sensors to display realtime information on available spaces, cutting search times and lowering emissions from idling vehicles. Traffic light countdown displays and city travel time signage improve navigation efficiency and reduce travel uncertainty.

Smart transportation not only enhances the commuter experience but also supports broader sustainability goals, such as reducing carbon emissions and energy consumption. By integrating renewable energy sources and promoting electric vehicle adoption, STS contributes to a greener urban environment. As cities worldwide invest in transforming their transit networks, smart transportation emerges as a critical driver of sustainable urban development and improved

quality of life. Smart transportation, along with IoT, AI and blockchain technologies, play a key role in shaping smart cities. As noted by Wolniak et al. (2024), the integration of these technologies with appropriate business models allows for effective management of urban resources and improvement of the quality of life of residents.

Despite the promising potential of smart transportation technologies, their adoption varies globally. Factors such as regulatory hurdles, high implementation costs, and data privacy concerns continue to pose challenges. Additionally, infrastructure disparities in developing regions limit the scalability of these solutions (Hinga et al., 2024). Nonetheless, advancements in AI, IoT, and big data analytics are paving the way for accelerated adoption in the coming decade.

#### 2.3. Connection between hedonic motivation and technology adoption

In the context of smart transportation, hedonic motivation has become increasingly significant as systems evolve beyond mere functionality to offer users engaging and emotionally fulfilling experiences. Modern transportation technologies, such as gamified public transit apps, aesthetically pleasing ride-sharing interfaces, and personalized travel suggestions, are designed to elicit pleasure and excitement, enhancing user engagement. As Sherry (1990, 27) emphasizes, the "seeking of such experiences is often far more significant than the mere acquisition of products". This underscores the importance of integrating hedonic elements into the design of smart transportation systems.

By catering to both utilitarian and hedonic motivations, smart transportation systems enhance user satisfaction and adoption rates. Hedonic motivation drives individuals to value not only the efficiency of their commute but also the enjoyment and emotional appeal of the journey itself. Consequently, it plays a key role in the success of these systems by transforming routine transportation into an engaging and enjoyable experience.

# 2.3.1. Hedonic motivation and technology adoption

Hedonic motivation—the pursuit of pleasure and enjoyment in using technology—is a significant driver of technology adoption. This is particularly evident in theoretical models such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), which provide frameworks for understanding how hedonic motivation influences user behavior and acceptance of innovative technologies.

## 2.3.2. Technology acceptance model (TAM)

The TAM, introduced by Davis (1989), identifies two primary factors influencing technology adoption: perceived usefulness (PU) and perceived ease of use (PEOU). Hedonic motivation intersects with TAM through its impact on PEOU, as users perceive technology to be not only easy to use but also enjoyable. Research demonstrates that hedonic enjoyment significantly enhances the overall appeal of technology, motivating users to engage with it despite potential learning curves (Dwivedi et al., 2024). For instance, gamified learning platforms or immersive virtual reality tools rely heavily on enjoyment to encourage user adoption.

## 2.3.3. Unified theory of acceptance and use of technology (UTAUT)

The UTAUT model, proposed by Venkatesh et al. (2003), builds on TAM by incorporating additional constructs such as performance expectancy, effort expectancy, social influence, and facilitating conditions. UTAUT2 further integrates hedonic motivation as a critical factor influencing behavioral intention to adopt technology. Studies show that hedonic motivation directly and substantially impacts users' decisions, particularly in consumer-oriented technologies like e-wallets or ride-sharing applications (Boomer et al., 2022).

# 2.3.4. Empirical evidence of hedonic motivation in technology adoption

Empirical evidence underscores the significant role of hedonic motivation in technology adoption across various domains, as it enhances user engagement, perceived value, and overall experience. In digital health platforms, research utilizing the UTAUT model highlights how enjoyment boosts adoption by increasing user involvement and perceived benefits (Alojail, 2024).

Similarly, in educational technologies, studies integrating TAM and UTAUT2 demonstrate that hedonic motivation fosters the adoption of AI-powered tools by enriching learning experiences through enjoyment and excitement (AI-Dokhny et al., 2024).

In the realm of shared mobility services, hedonic motivation plays a crucial role in user acceptance by making commuting enjoyable, with gamified elements and intuitive interfaces significantly improving user satisfaction (Ngossaha et al., 2024).

These findings collectively emphasize the universal importance of hedonic motivation in driving the acceptance and integration of innovative technologies. Hedonic motivation is not merely an ancillary factor but a central driver of user engagement and technology adoption, particularly in the realm of smart transportation. By addressing both utilitarian and hedonic needs, modern transportation systems can create more engaging, efficient, and user-centric experiences. This dual focus ensures higher adoption rates and greater satisfaction, paving the way for a smarter, more connected future in urban mobility.

# 3. Literature review, research question and hypothesis

Research on motivation in the context of smart transportation systems has highlighted how user preferences and behaviors are shaped by emotional and functional factors. A significant focus has been placed on hedonic motivations, which emphasize the enjoyment and pleasure derived from engaging with transport technologies. These motivations are contrasted with utilitarian motivations, which focus on efficiency, cost-effectiveness, and practicality (Anschütz, 2024).

Studies have shown that user engagement with smart transportation systems, such as public transit apps and shared mobility platforms, increases when gamified elements and user-friendly

interfaces are integrated. For example, gamification, as seen in shared mobility services, has been demonstrated to enhance user satisfaction by creating enjoyable experiences that encourage repeated use (Hamid, Kuppusamy, 2017). Additionally, systems that offer real-time updates and intuitive designs improve perceived convenience, further influencing adoption rates (Liu et al., 2024).

#### 3.1. Examples of hedonic factors in smart transportation

#### 3.1.1. Enjoyment in interface design

Studies emphasize the role of visually appealing and interactive interfaces in enhancing user satisfaction. Interfaces that incorporate playful design elements or gamified features not only make the experience enjoyable but also encourage continued use. For instance, gamified public transit apps reward users for sustainable travel choices, fostering long-term engagement (Gajdzik et al., 2024).

## 3.1.2. Convenience and gamification

Convenience remains a central motivator in smart transportation. However, when combined with gamification elements, such as points or leaderboards, it enhances the hedonic appeal of transportation technologies. This dual focus has been found to significantly impact user behavior, particularly among younger demographics who value both fun and ease of use (Wut et al., 2021).

While the role of hedonic motivation in technology adoption has been explored, it is often treated as a secondary factor in broader models like TAM or UTAUT, overshadowed by utilitarian considerations such as efficiency and cost. There is a lack of dedicated research focusing exclusively on hedonic motivation and its unique contribution to the intention to use smart transportation. Moreover, most studies are conducted in Western or Asian contexts, leaving Central and Eastern Europe significantly underrepresented. Cultural differences, particularly in hedonic preferences and the perception of pleasure derived from using smart technologies, could influence the results in this region.

Additionally, while gamification, convenience, and aesthetic enjoyment have been broadly discussed, empirical evidence that links hedonic motivation specifically to smart transportation systems, such as Mobility-as-a-Service (MaaS) platforms or shared mobility, is sparse. This lack of focus on hedonic factors presents an opportunity to delve deeper into understanding how enjoyment and emotional appeal drive adoption in underexplored regions like Central and Eastern Europe.

Therefore, the following research question was posed:

1. How does hedonic motivation influence the intention to use smart transportation systems?

Based on the literature review and the proposed research question, the following hypothesis was formulated:

**H1:** Hedonic motivation has a positive influence on the intention to use smart transportation systems.

This research will fill a critical gap by providing insights into the specific role of hedonic motivation in the context of smart transportation adoption, with a focus on Central and Eastern Europe. Poland is an ideal case for studying hedonic motivation in smart transportation due to its rapid urbanization, EU-supported smart city initiatives, and cultural diversity. As a leading economy in Central and Eastern Europe, Poland has significantly invested in intelligent transport systems (ITS) and sustainable urban mobility projects (Masik et al., 2021). EU funding has driven the integration of smart transportation technologies, such as real-time traffic management and shared mobility solutions (Sikora-Fernandez, 2018). Additionally, Poland's mix of traditional values and growing openness to gamified and user-centric designs highlights its cultural relevance in exploring hedonic motivations (Zawieska, Pieriegud, 2018). Despite advancements, the region remains underrepresented in research, making Poland a pivotal focus for understanding how hedonic factors influence smart transportation adoption.

# 4. Methodology

This research employed a Computer-Assisted Web Interviewing (CAWI) method to gather data, leveraging its wide reach and ability to target respondents residing in Polish cities with populations exceeding 200,000. Data collection was conducted between May and June 2024 using the Biostat Opinion Research Panel, which includes 200,000 respondents. A sample of 1460 individuals was randomly selected, ensuring participants met the criteria of living in Polish cities with a population above 200,000.

To ensure the quality and validity of the research instrument, a pilot study was carried out with 25 respondents during the initial phase. Feedback from this pilot allowed for linguistic adjustments to enhance the readability and clarity of the questionnaire, resulting in an improved final version. Before participating, respondents were presented with a declaration of anonymity and confidentiality, outlining the study's objectives and providing an email contact for further inquiries. After formal validation, 541 questionnaires were qualified for further processing. Following additional verification to ensure participants met the criteria of using smart transportation solutions, a final sample of 539 responses was included in the analysis. The research sample consisted of over 56% of women and nearly 44% of men. Every third respondent was between 18 and 30 years old, almost the same number were aged 31 to 40 and over 40. More than half of the respondents are residents of very large cities. A detailed description of the sample is presented in Table 1.

The construct of hedonic motivation in this study was assessed using a validated scale derived from the work of Venkatesh et al. (2012) and Debesa et al. (2023). Respondents evaluated

their hedonic experiences related to smart transportation solutions by rating their agreement with the following statements on a five-point Likert scale ranging from "strongly disagree" to "strongly agree":

- 1. Using ST solutions entertains me.
- 2. Using ST solutions is a form of entertainment for me.
- 3. Using ST solutions gives me pleasure.

# Table 1.

Structure of the research sample

Characteristic	Item	%
Gender	Female	56.3
	Male	43.7
Age (years)	18–30	33.5
	31–40	31.9
	41 and above	34.6
Role in the household	Dependent on other household members	6.8
	One of the breadwinners of the household	69.4
	Sole breadwinner of the household	23.8
Place of residence	City, 201,000–500,000 residents	43.7
	City, over 501,000 residents	56.3
Use of a car at the place of residence	Yes	77.5
	No	22.5

Source: own study.

This scale captures the emotional and experiential dimensions of hedonic motivation, such as enjoyment, entertainment, and pleasure, which are critical factors influencing user engagement and the intention to adopt smart transportation technologies.

The construct of intention to use ST solutions was measured using a validated scale derived from the works of Bestepe and Yildrim (2019) and Das et al. (2024). Respondents rated their agreement with the following statements on a five-point Likert scale ranging from "strongly disagree" to "strongly agree":

- 1. I intend to use ST solutions in the future.
- 2. I will try to use ST solutions in my daily life.
- 3. I plan to use ST solutions in the future.

This scale captures the behavioral intention of respondents to adopt and incorporate smart transportation solutions into their routines, providing insights into their willingness and likelihood of future usage.

In this study, reliability of the measurement scales was assessed using Cronbach's Alpha. A threshold value of 0.7 was established as the minimum acceptable level for internal consistency, ensuring the reliability of the scales used to measure constructs such as hedonic motivation and intention to use smart transportation solutions. Scales with Cronbach's Alpha values below this threshold were not considered acceptable for further analysis.

To examine the relationships between variables, Pearson's correlation coefficient was used for normally distributed data, while Spearman's rho was applied for non-normally distributed data. These methods allowed for robust measurement of both linear and monotonic relationships, ensuring accurate analysis of the associations between constructs in the study.

# 5. Findings and discussion

# 5.1. Findings

The reliability analysis confirmed that the measurement scales used in the study demonstrated high internal consistency. The Cronbach's Alpha value for the hedonic motivation scale (comprising three items) was 0.869, indicating strong reliability. Similarly, the intention to use ST (also comprising three items) achieved a Cronbach's Alpha of 0.944, reflecting excellent reliability.

These results confirm that both scales meet the threshold of 0.7, indicating their suitability for further analysis and providing confidence in the consistency of the responses across the study sample. The results from the correlation analysis indicate statistically significant positive relationships between hedonic motivation and the intention to use smart transportation (ST) solutions across all three measured aspects (Table 2).

	Intention to Use ST		
Hedonic Motivation	I intend to use ST solutions in the future	I will try to use ST solutions in my daily life	I plan to use ST solutions in the future
Using ST solutions entertains me	,355**	,345**	,331**
Significance (Two-tailed)	<,001	<,001	<,001
Using ST solutions is a form of entertainment for me	,571**	,573**	,571**
Significance (Two-tailed)	<,001	<,001	<,001
Using ST solutions gives me pleasure	,384**	,394**	,378**
Significance (Two-tailed)	<,001	<,001	<,001
Ν	539	539	539

# Table 2.

Correlations

\*\*Correlation significant at the 0.01 level (two-tailed).

Source: own study.

All the correlations in the analysis are statistically significant at the 0.01 level, confirming strong relationships between hedonic motivation and the intention to use smart transportation solutions. The strongest correlation was found between the statement "Using ST solutions is a form of entertainment for me" and "I will try to use ST solutions in my daily life" (r = 0.573,

p < 0.001). Conversely, the weakest correlation was observed between the statement "Using ST solutions entertains me" and "I plan to use ST solutions in the future" (r = 0.331, p < 0.001). These results highlight the varying degrees of influence of hedonic motivation factors on different aspects of user intentions.

The Pearson correlation coefficient was chosen because it measures the strength and direction of linear relationships between continuous variables, making it particularly suitable for analyzing relationships in social science research where such associations are commonly assumed (e.g., Abu-Bader, 2021). This method is widely accepted for its ability to provide a straightforward interpretation of the degree to which two variables are linearly related, especially in datasets without significant outliers or skewness.

The Pearson correlation coefficient was calculated for the variables hedonic motivation and intention to use smart transportation (ST), resulting in a value of 0.46, indicating a moderate and statistically significant relationship. This analysis was conducted to verify the proposed hypothesis that hedonic motivation has a positive influence on the intention to use ST solutions.

Hedonic Motivation		Intention to Use ST		
		I intend to use ST solutions in the future	I will try to use ST solutions in my daily life	I plan to use ST solutions in the future
Using ST solutions	Female	,268**	,261**	,247**
entertains me	Male	,451**	,433**	,423**
Significance (Two-tailed)		<,001	<,001	<,001
Using ST solutions is a form	Female	,518**	,503**	,550**
of entertainment for me	Male	,624**	,637**	,651**
Significance (Two-tailed)		<,001	<,001	<,001
Using ST solutions gives	Female	,307**	,322**	,320**
me pleasure	Male	,475**	,472**	,445**
Significance (Two-tailed)		<,001	<,001	<,001

#### Table 3.

\*\*Correlation significant at the 0.01 level (two-tailed).

Correlations by gender of respondents

Source: own study.

Additionally, the Pearson correlation was calculated by dividing the respondents by gender (Table 3). In examining the correlation between hedonic motivation and the intention to use smart transportation (ST), it is evident that the male group generally shows a higher correlation index compared to the female group. Specifically, for the statement "Using ST solutions enter-tains me," the data reveals differing levels of relationship. In females, the relationship between hedonic motivation and the intention to use ST is weak, while in males, it is moderate.

The Pearson correlation was also calculated based on the respondents' roles within their family households (Table 4). The analysis indicates that respondents who rely on other household members indicate the highest of correlation. This is particularly evident for the statement,

"Using smart technology solutions gives me pleasure." The data reveals varying levels of correlation. For sole breadwinners, the relationship between hedonic motivation and the intention to use smart technology is moderate or even weak. For a group of one of the breadwinners, this relationship is moderate, while for respondents who depend on other household members, the correlation is strong.

#### Table 4.

Correlations by gender of respondents

Hedonic Motivation		Intention to Use ST		
		I intend to use ST solutions in the future	I will try to use ST solutions in my daily life	I plan to use ST solutions in the future
Using ST solutions entertains me	Sole breadwinner of the household	,274**	,268**	,209**
	One of the breadwinners of the household	,379**	,369**	,356**
	Dependent on other household members	,435**	,445**	,556**
Significance (Two	o-tailed)	<,001	<,001	<,001
Using ST solutions is a form of enter- tainment for me	Sole breadwinner of the household	,505**	,569**	,593**
	One of the breadwinners of the household	,583**	,579**	,555**
	Dependent on other household members	,668**	,575**	,681**
Significance (Two	o-tailed)	<,001	<,001	<,001
Using ST solutions gives me pleasure	Sole breadwinner of the household	,277**	,307**	,328**
	One of the breadwinners of the household	,408**	,414**	,375**
	Dependent on other household members	,560**	,541**	,590**
Significance (Two-tailed)		<,001	<,001	<,001

\*\* Correlation significant at the 0.01 level (two-tailed).

Source: own study.

Additionally, the Spearman's rho correlation was calculated to validate the robustness of the findings. Spearman's rho, which evaluates monotonic relationships, showed similar trends and relationships, confirming that the results are consistent across different correlation methods and are not overly dependent on the assumptions of linearity.

# 5.2. Discussion and implications

The findings of this study provide robust evidence supporting the role of hedonic motivation in shaping the intention to use smart transportation (ST) solutions. The results align with theoretical frameworks such as the Unified Theory of Acceptance and Use of Technology (UTAUT), which highlights the importance of emotional and experiential factors, including enjoyment, in technology adoption (Venkatesh et al., 2012). Specifically, the strongest correlation was observed between the statement "Using ST solutions is a form of entertainment for me" and "I will try to use ST solutions in my daily life" (r = 0.573, p < 0.001), reinforcing the idea that hedonic experiences significantly influence behavioral intentions.

Interestingly, the weakest correlation was between "Using ST solutions entertains me" and "I plan to use ST solutions in the future" (r = 0.331, p < 0.001). This could suggest that while immediate entertainment impacts daily decisions, long-term planning may depend more on utilitarian factors like cost-effectiveness and reliability rather than purely hedonic ones. These findings highlight the nuanced role of hedonic motivation in short-term versus long-term behavioral intentions.

Furthermore, additional analysis revealed no significant differences in the relationships between hedonic motivation and intention to use ST solutions across demographic (e.g., age) or socio-economic variables (e.g., role in the household). This consistency suggests that the influence of hedonic motivation transcends demographic and socio-economic boundaries, making it a universal factor in promoting ST solutions.

The implications of this study are directed toward policymakers, system designers, and operators of smart transportation solutions, providing actionable insights to enhance user engagement, promote adoption, and ensure the long-term success of these systems.

Policymakers should recognize the importance of hedonic motivation in encouraging the adoption of smart transportation systems. Integrating gamification, rewards, and entertainment-focused features into public transit and mobility platforms can enhance user engagement, making these systems more appealing to diverse user groups. For example, designing city-wide challenges or incentive programs tied to environmentally friendly commuting could drive broader adoption.

Smart transportation systems should prioritize user experience design that incorporates elements of fun, engagement, and aesthetic appeal. For instance, gamified interfaces, personalized travel suggestions, and interactive visualizations can increase user satisfaction and retention. The strong correlation between entertainment and daily usage intentions suggests that frequent users, such as commuters, may particularly benefit from such features.

Operators should focus on real-time feedback mechanisms that enhance the pleasurable aspects of transportation, such as providing accurate arrival times, seamless ticketing systems, or even integrated music or media streaming. These features can make commuting not just a necessity but an enjoyable experience.

The lower correlation observed in long-term intentions points to a potential gap in ensuring the sustained use of ST solutions. Operators and policymakers should address this by aligning hedonic features with utilitarian benefits, such as cost savings and reliability, to secure longterm user commitment.

In summary, the findings emphasize the critical role of hedonic motivation in shaping user behavior toward smart transportation solutions. By leveraging these insights, stakeholders can design systems that are not only efficient and sustainable but also emotionally engaging, ensuring widespread adoption and satisfaction.

# 6. Conclusion, limitations and future research

#### 6.1. Conclusion

The findings of this study confirm the hypothesis that hedonic motivation has a moderate positive influence on the intention to use smart transportation (ST) solutions. Across all analyzed aspects, hedonic factors such as enjoyment, entertainment, and pleasure demonstrated statistically significant correlations with user intentions, with the strongest relationships observed for daily usage. These results reinforce existing theoretical frameworks, such as the Technology Acceptance Model (TAM) and UTAUT, which underscore the importance of emotional and experiential factors in technology adoption.

This study also highlights the universal nature of hedonic motivation, as no significant differences were found across demographic or socio-economic variables. These findings suggest that incorporating hedonic elements, such as gamification and engaging design, can be effective across diverse populations, providing critical insights for the development of user-centered smart transportation solutions.

## 6.2. Limitations

Despite its contributions, this study has several limitations. First, the data were collected using the CAWI method, which, while efficient, may exclude individuals without regular internet access, potentially limiting the generalizability of the findings. Second, the study focused exclusively on urban residents in Poland, which may limit the applicability of the results to rural areas or other cultural contexts. Further research in different geographic and cultural settings is needed to validate the findings.

Additionally, while the study confirms the role of hedonic motivation in shaping intentions, it does not directly measure actual usage behavior. Future studies should incorporate longitudinal designs to explore whether these intentions translate into sustained adoption of smart transportation solutions over time.

#### 6.3. Future research

While this study sheds light on the role of hedonic motivation in influencing the intention to use smart transportation solutions, several areas remain open for further exploration. Future research should investigate how cultural differences shape the relationship between hedonic motivation and the adoption of smart transportation, particularly through cross-cultural comparisons. Such studies could help identify universal versus culturally specific aspects of user engagement, especially in less explored regions.

Additionally, longitudinal research is needed to bridge the gap between intention and actual behavior. Tracking users over time could provide insights into whether hedonic motivation sustains long-term adoption and continued use of smart transportation solutions. Understanding the interplay between hedonic and utilitarian motivations also represents an important avenue for further study, as exploring how emotional and practical factors interact may yield more comprehensive models of user behavior.

The rapid integration of emerging technologies, such as artificial intelligence (AI), virtual reality (VR), and augmented reality (AR), into smart transportation systems also offers exciting opportunities for future research. These technologies have the potential to significantly enhance hedonic experiences, and understanding their impact on user engagement could guide the design of more effective systems. Moreover, examining how hedonic motivation can be aligned with sustainability goals is critical, particularly in encouraging environmentally friendly commuting behaviors through gamification or rewards.

By addressing these directions, future research can build on the current findings to deepen our understanding of user motivations and improve the development and adoption of smart transportation systems worldwide.

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