Autonomous Vehicle Acceptance and Construct-Level Fragmentation: Mapping Measurement Architecture in TAM- and UTAUT-Based Studies

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Abstract

Autonomous vehicle acceptance research frequently relies on established technology acceptance models, particularly TAM and UTAUT, yet studies that use the same model labels often operationalize acceptance with different sets of constructs. This paper examines construct-level fragmentation in TAM- and UTAUT-based autonomous vehicle acceptance studies and evaluates whether model labels provide a reliable basis for comparison. The study draws on a broader structured review of Web of Science Core Collection publications indexed in SCI-EXPANDED and SSCI between 2023 and 2025. The initial search yielded 313 records, of which 247 were retained in the analytical corpus after title and abstract screening. For this conference paper, the analysis was narrowed to TAM- and UTAUT-related studies, including classical, extended, integrated, and hybrid variants. A construct-level coding matrix was used to identify which constructs were explicitly measured or modeled in each study. The findings show substantial internal fragmentation: 31 TAM-related studies produced 28 distinct construct configurations, whereas 24 UTAUT-related studies produced 23. Although perceived usefulness, perceived ease of use, performance expectancy, effort expectancy, and social influence remained visible, many studies added trust, perceived risk, safety, hedonic motivation, technology readiness, HMI, or shared mobility. The paper concludes that construct configuration provides a stronger basis for comparison than model label alone.

Keywords: Autonomous Vehicle Acceptance, Construct-Level Fragmentation, Technology Acceptance Model, UTAUT, Construct Configuration, Measurement Architecture.

I. INTRODUCTION

Autonomous vehicle acceptance has become a major research area as automated mobility systems move from technological experimentation toward public deployment. Although autonomous vehicles are often discussed in terms of their potential contributions to urban mobility, traffic safety, accessibility, and transport efficiency, their large-scale adoption depends on how users perceive, evaluate, and accept these technologies. Unlike ordinary digital technologies, autonomous vehicles require users to delegate control, rely on automated decision-making, and interact with a mobility system whose consequences extend beyond personal convenience. For this reason, acceptance of autonomous vehicles cannot be understood solely as a matter of technical readiness; it is also a behavioral and measurement problem shaped by user perceptions, model design, and construct selection [1].

A substantial body of autonomous vehicle acceptance research relies on established technology acceptance models. Among these, the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) are particularly prominent. Recent reviews show that these models remain among the most frequently used theoretical frameworks in autonomous vehicle adoption studies [2]. Their appeal is understandable. TAM provides a parsimonious explanation of acceptance through perceived usefulness and perceived ease of use, while UTAUT extends this logic by incorporating performance expectancy, effort expectancy, social influence, and facilitating conditions. These constructs remain relevant because users continue to evaluate autonomous vehicles in relation to expected benefit, usability, effort, performance, and social approval.

However, the frequent use of TAM and UTAUT does not mean that studies labeled as such are directly comparable. In autonomous vehicle research, the same theoretical label may conceal very different construct configurations. One TAM-based study may measure only perceived usefulness, perceived ease of use, and behavioral intention, while another may extend the model to include trust, perceived risk, safety perception, hedonic motivation, or the shared mobility context. Similarly, UTAUT-based studies may retain the original model structure in some cases, while in others they may incorporate automation-specific constructs such as trust in automation, human–machine interaction, perceived safety, or shared service conditions. This creates a methodological problem: the model name remains stable, but the actual measurement content changes substantially across studies.

This problem is especially important because recent evidence suggests that acceptance of autonomous vehicles is highly sensitive to context, user group, automation level, and cultural setting. Meta-analytic findings indicate that heterogeneity in autonomous vehicle acceptance studies may be associated with differences in survey year, automation level, cultural background, and sample composition [3].

Studies on older drivers further suggest that classical acceptance constructs may not consistently operate across specific user populations, necessitating more automation-sensitive measurement approaches [4]. Cross-cultural evidence also shows that constructs such as hedonic motivation and social influence may function differently across national and developmental contexts [5]. These findings indicate that construct configuration, rather than model label alone, is central to the interpretation of autonomous vehicle acceptance research.

Despite this issue, much of the literature still discusses acceptance studies primarily by naming the theoretical model used. This approach risks overstating comparability. If two studies are both classified as TAM- or UTAUT-based but operationalize different sets of constructs, their findings cannot be synthesized solely on the basis of the model family. A construct-level perspective is therefore needed. Such a perspective asks not merely whether a study uses TAM or UTAUT, but which constructs are actually measured, how they are combined, and whether the resulting model architecture is comparable across studies.

The present conference paper addresses this narrower problem by focusing on construct-level fragmentation within TAM- and UTAUT-based autonomous vehicle acceptance studies. It draws on a broader structured review of recent autonomous vehicle acceptance research indexed in Web of Science between 2023 and 2025. From an initial pool of 313 records, 247 studies were included in the analytical corpus. For the purpose of this paper, attention is limited to the TAM and UTAUT model families and their extensions. This focused design allows the study to examine whether model labels provide a reliable basis for comparison or whether construct configurations offer a more precise analytical unit. The study is guided by two research questions:

- RQ1. How consistently are TAM- and UTAUT-based autonomous vehicle acceptance studies operationalized at the construct level?
- RQ2. Which construct configurations most clearly indicate the limits of model-label-based comparison in autonomous vehicle acceptance research?

By addressing these questions, the paper contributes to research on autonomous vehicle acceptance in two ways. First, it shows that TAM and UTAUT continue to provide useful theoretical foundations, but their use in autonomous vehicle studies remains uneven. Second, it argues that future reviews and empirical studies should move beyond model-label comparisons and more explicitly report construct configurations. In this sense, the paper treats each study's construct profile as the more informative unit for comparison than the theoretical model label reported by the authors. The paper, therefore, positions construct-level coding as a necessary methodological step to improve comparability, synthesis, and the development of cumulative knowledge in autonomous vehicle acceptance research.

II. METHOD

A. Review Design

This study was designed as a focused, construct-level review of TAM- and UTAUT-based research on the acceptance of autonomous vehicles. It draws on a broader structured review of recent autonomous vehicle acceptance studies but narrows the analytical scope to studies that used TAM, UTAUT, or their extended and hybrid variants. The purpose of this focused design is not to evaluate the predictive performance of TAM or UTAUT, nor to compare their statistical superiority. Instead, the study examines whether studies that use the same model labels actually operationalize autonomous vehicle acceptance using comparable construct configurations.

The review adopts a measurement-oriented perspective. In this approach, the unit of analysis is not only the theoretical model reported by a study, but also the set of constructs through which the model is operationalized. This distinction is necessary because studies of autonomous vehicle acceptance often retain familiar labels such as TAM, extended TAM, UTAUT, UTAUT2, or integrated UTAUT, while substantially modifying the construct structure. Therefore, the analysis focuses on model–construct alignment, construct-level variation, and the implications of this variation for comparability across studies.

B. Literature Search and Study Selection

The literature search was conducted in the Web of Science Core Collection on 24 February 2026. The search was limited to the Science Citation Index Expanded (SCI-EXPANDED) and Social Sciences Citation Index (SSCI). Only English-language publications were included, and document types were restricted to Articles, Early Access, and Review Articles. The time frame covered publications from 2023, 2024, and 2025.

The search was conducted in the Topic field using a Boolean search string combining autonomous vehicle terms with acceptance/adoption and measurement-related terms:

TS=(("autonomous car*" OR "automated car*" OR "autonomous vehicle*" OR "automated vehicle*") AND (acceptance OR adoption) AND (survey OR scale))

The initial search yielded 313 records. These records were screened at the title and abstract level to determine whether they addressed autonomous vehicle acceptance, adoption, user perception, behavioral intention, technology acceptance models, trust, risk, safety, human–machine interaction, or shared autonomous mobility. Studies focusing only on vehicle hardware, sensor performance, radar calibration, algorithmic control architecture, or technical engineering performance without a user acceptance or measurement component were excluded.

After title and abstract screening, 66 records were excluded. The remaining 247 studies were assessed at the full-text level and constituted the broader analytical corpus. No additional studies were excluded after full-text assessment. For the present conference paper, the analysis was further narrowed to studies coded as TAM-related or UTAUT-related, including classical, extended, enhanced, integrated, and hybrid variants of these two model families.

C. Focused Subset for the Present Analysis

The broader coding matrix included 247 studies. Within this corpus, studies were classified according to the theoretical or conceptual model used. For the present analysis, two model families were selected: TAM-based studies and UTAUT-based studies. TAM-related studies included those coded as TAM, extended TAM, enhanced TAM, TAM extension, or hybrid TAM-based designs. UTAUT-related studies included those coded as UTAUT, UTAUT2, extended UTAUT, integrated UTAUT, UTAUT4-AV, or related UTAUT-based variants.

This subset was selected for two reasons. First, TAM and UTAUT are among the most frequently used model families in research on autonomous vehicle acceptance. Second, both models have recognizable core constructs, which makes them suitable for examining whether model labels correspond to stable measurement content. The analysis, therefore, asks whether TAM- and UTAUT-based studies preserve a comparable construct structure or whether they use the same model labels to describe substantially different construct configurations.

D. Data Extraction and Construct-Level Coding

A standardized data extraction matrix was developed for the broader corpus and then used to identify the TAM- and UTAUT-based subset. For each study, the matrix recorded bibliographic information, publication year, journal name, model used, analysis method, level classification, and the presence of selected acceptance constructs.

The construct-level coding focused on variables commonly used in research on technology acceptance and autonomous vehicle acceptance. These included perceived usefulness, perceived ease of use, performance expectancy, effort expectancy, social influence, trust, perceived risk, safety perception, technology readiness, hedonic motivation, facilitating conditions, relative advantage, human–machine interaction, and shared mobility context. For this conference paper, regulatory, ethical, cybersecurity, and governance-related variables were not analyzed in detail because the purpose was to isolate construct fragmentation within TAM and UTAUT model families rather than to examine the full multi-level scope of autonomous vehicle acceptance.

A conservative coding rule was applied. A construct was coded as present only when it was explicitly measured, modeled, or operationalized in the study. Concepts mentioned only in the introduction, conceptual background, discussion, or implications were not coded as measured constructs. In cases where different labels appeared to refer to closely related constructs, coding decisions were based on the conceptual definition and item content reported in the original study rather than on the construct label alone. For example, constructs labeled as "safety perception," "perceived safety," or reverse-oriented risk items were examined to determine whether they captured perceived protection, threat, uncertainty, or loss-related concern. When the underlying item content indicated the same analytical dimension, the construct was coded under the corresponding harmonized category; when the meaning was ambiguous or substantively different, the original construct distinction was retained. This procedure reduced artificial fragmentation caused by differences in terminology while avoiding the conflation of constructs that were similar in label but differed in measurement content.

E. Methodological Boundaries

The findings should be interpreted as evidence of measurement fragmentation within two dominant model families rather than as a complete map of the autonomous vehicle acceptance literature. This focused scope is appropriate for a conference paper because it allows the analysis to address a specific methodological problem: the risk of assuming comparability from model labels when the underlying construct configurations differ.

Because the present paper is based on construct-level mapping rather than statistical model comparison, it does not claim that broader construct configurations produce higher or lower explained variance than classical or lean models. Reported R^2 values were not used as a comparative outcome because the reviewed studies differed in sample composition, acceptance object, automation context, analytical method, and construct operationalization. Treating R^2 values as directly comparable under these conditions would risk attributing performance differences to model breadth when they may instead reflect contextual or methodological heterogeneity. The contribution of this paper is therefore limited to identifying measurement fragmentation and its implications for comparability; systematic comparison of explained variance should be addressed in a future meta-analytic or model-comparison study.

III. Findings

A. Fragmentation in TAM-Based Studies

The focused analysis identified 31 TAM-related studies within the broader corpus. These included studies explicitly coded as TAM, extended TAM, enhanced TAM, TAM extension, TAM-based, TAM–TPB hybrid, and other TAM-informed variants. The most important finding is that TAM-based research on autonomous vehicle acceptance does not constitute a single, stable measurement architecture. Although these studies share the TAM label, they operationalize acceptance through substantially different construct configurations. Across the 31 TAM-related studies, 28 distinct construct configurations were identified. This indicates that TAM is frequently used as a flexible theoretical entry point rather than as a standardized measurement template.

The classical TAM core remains visible but is rarely used in isolation. Perceived usefulness appeared in 29 of the 31 TAM-related studies, and perceived ease of use appeared in 26 studies. This confirms that the TAM family continues to rely heavily on the original logic of usefulness and ease of use. For example, Guan et al. examined private vehicle drivers' acceptance of autonomous vehicles using perceived usefulness, perceived ease of use, and social influence, without incorporating constructs such as trust, perceived risk, safety, or shared mobility [6]. Similarly, Zhu et al. used a TAM-related adoption design to compare partially autonomous and fully autonomous vehicles based on perceived usefulness, perceived ease of use, and hedonic

motivation [7]. These studies illustrate the continued relevance of the classical TAM structure for capturing individual-level evaluation of autonomous vehicle use.

However, the broader pattern shows that most TAM-based studies extend the classical structure with additional constructs. Trust was coded in 25 TAM-related studies, perceived risk in 21, social influence in 19, and safety perception in 15. This pattern suggests that the classical TAM core is typically supplemented by constructs that reflect the safety-critical and uncertainty-based nature of autonomous mobility. For instance, Jing et al. combined perceived usefulness with trust, risk, and safety in a study of public concerns following automated-vehicle crashes [8]. Zhang et al. used an enhanced TAM structure in which perceived usefulness and perceived ease of use were combined with trust, safety, and human–machine interaction [9]. These examples show that TAM-based AV acceptance studies often go beyond usefulness and ease of use, as the adoption of autonomous vehicles involves more than functional evaluation.

The internal variation within the TAM family is especially visible in extended TAM studies. Some studies retain a relatively compact extension, adding only a few additional constructs. Farmer et al., for example, combined perceived usefulness and perceived ease of use with trust, safety, hedonic motivation, and shared mobility context in a study on trust transfer and intention to use shared autonomous vehicles [10]. Rahim et al. examined automated bus acceptance through perceived usefulness, perceived ease of use, trust, safety, and shared mobility context [11]. In another context, Sakuljao et al. (2023) extended the acceptance model by incorporating trust, perceived risk, and environmental concern as key determinants in their study of acceptance of conditionally automated vehicles in Thailand [12]. For instance, Pan and Zheng (2025) expanded the model by integrating willingness to pay (WTP), curiosity, prior knowledge, social influence, perceived risk, driving experience, and driving enjoyment into the TAM framework [13].

Hybrid TAM models further demonstrate that the TAM label alone cannot indicate what is actually being measured. Some studies combine TAM with TPB, TRA, or broader behavioral frameworks. Liao et al. used an extended TPB–TAM model to examine young people's intention to use shared autonomous vehicles, incorporating perceived usefulness, perceived ease of use, social influence, trust, risk, and shared mobility context [14]. Datta et al. used a modified TAM–TPB structure that included usefulness, ease of use, performance expectancy, effort expectancy, social influence, trust, risk, hedonic motivation, facilitating conditions, and shared mobility [15]. Rahman and Thill adopted a TAM–TPB–TRA hybrid design in a study of pooled autonomous vehicle use, combining usefulness, ease of use, social influence, trust, risk, and shared mobility [16]. These studies share a TAM connection, yet their construct configurations differ substantially.

The role of shared autonomous mobility also contributes to fragmentation within TAM-based research. The shared mobility context was coded in 11 TAM-related studies. In these cases, acceptance is not limited to an individual's intention to use or purchase a private autonomous vehicle. Instead, it involves a willingness to use shared autonomous vehicles, autonomous shuttles, robotaxis, or pooled autonomous services. Yu et al. examined shared autonomous vehicle attitudes by combining perceived usefulness, perceived ease of use, risk, and shared mobility context [17]. Liao et al. used social media data mining and questionnaire data to examine the public's intention to use shared autonomous vehicles, considering usefulness, ease of use, social influence, trust, risk, safety, and shared mobility [18]. Zhang et al. examined residents' acceptance of shared autonomous vehicles and community parking demand through usefulness, ease of use, social influence, trust, risk, safety, and shared mobility context [19]. These studies show that shared mobility changes the content of TAM-based acceptance measurement by introducing service context, co-use conditions, and collective mobility expectations.

The analysis also shows that some TAM-based studies shift the model toward specific user groups, transport modes, or cultural contexts. Zeng et al. used a smart-car acceptance model among middle-aged and elderly users, combining usefulness, ease of use, social influence, trust, risk, safety, technology readiness, and hedonic motivation [20]. Vacca et al. examined gender differences in AV acceptance using an extended TAM framework that included usefulness, ease of use, social influence, and trust [21]. Pang et al. (2024) integrated TAM with the Theory of Planned Behavior (TPB), examining the effects of attitude and perceived behavioral control, while testing demographic factors such as income and education levels as moderators [22]. These studies support the view that TAM-based models are often adapted to specific empirical settings, thereby increasing contextual relevance but reducing direct comparability.

Taken together, the TAM-based subset reveals a clear pattern of construct-level fragmentation. The original TAM constructs of perceived usefulness and perceived ease of use remain central, but they are rarely sufficient for research on autonomous vehicle acceptance. Most studies combine trust, risk, social influence, safety, hedonic motivation, technology readiness, HMI, and shared mobility. The result is not a single TAM-based measurement tradition, but a family of related yet highly variable construct architectures. This finding directly supports the paper's main argument: model labels are useful for a broad theoretical orientation, but they do not provide sufficient information to compare AV acceptance studies. Construct configuration offers a more precise basis for synthesis than the TAM label alone.

B. Fragmentation in UTAUT-Based Studies

The focused analysis identified 24 UTAUT-related studies within the broader corpus. These studies were coded as UTAUT, UTAUT2, extended UTAUT, integrated UTAUT, UTAUT4-AV, or UTAUT-informed hybrid models. Similar to the TAM subset, the UTAUT-based studies did not form a single, stable measurement architecture. Although UTAUT has a more elaborate theoretical structure than TAM, especially through performance expectancy, effort expectancy, social influence, and facilitating conditions, its use in autonomous vehicle acceptance research varies substantially across empirical contexts. Within the 24 UTAUT-related studies, 23 distinct

construct configurations were identified. This degree of variation suggests that UTAUT is often used less as a standardized measurement template than as a flexible theoretical entry point for adapting acceptance models to specific autonomous mobility contexts. Such flexibility increases contextual sensitivity, particularly in studies addressing shared mobility, automation-related trust, perceived risk, safety, or human–machine interaction. However, it also limits direct comparability across studies and may weaken cumulative model testing when each empirical setting introduces a substantially different construct architecture. From a methodological perspective, this fragmentation does not necessarily invalidate UTAUT-based research, but it does require reviewers and future researchers to interpret findings at the level of construct configuration rather than model label alone.

The core UTAUT constructs remain visible, but they are not uniformly retained across studies. Performance expectancy and effort expectancy are frequently used to capture expected functional gains and perceived effort associated with autonomous vehicle use. Social influence also appears regularly, reflecting the role of social expectations, peer approval, and perceived normative pressure in shaping acceptance. For example, Wu et al. examined shared autonomous vehicle acceptance by combining effort expectancy, social influence, trust, facilitating conditions, vehicle autonomy, and shared mobility context [23]. This study illustrates a relatively broad UTAUT-based architecture in which classical UTAUT constructs are integrated with automation-specific and service-context variables.

However, other UTAUT-based studies retain a more selective configuration. Koh and Yuen used a UTAUT2- and CASA-informed model that included performance expectancy, effort expectancy, social influence, hedonic motivation, facilitating conditions, and interaction quality, while trust, perceived risk, and safety were not coded as measured constructs in the selected coding scheme [24]. This example is important because it shows that even when a model is adapted to automated mobility and interaction contexts, it may still exclude constructs that other AV studies treat as central. The model label, therefore, does not indicate whether a study includes trust, risk, safety, HMI, or shared mobility in its measurement structure.

Integrated UTAUT models show another form of variation. Kenesei et al. combined performance expectancy, effort expectancy, social influence, trust, perceived risk, and facilitating conditions in a study of autonomous mobility acceptance [25]. This configuration places trust and risk closer to the core of the model rather than treating them as peripheral extensions. By contrast, other UTAUT-based studies emphasize the service or mobility context more strongly. Wei et al. used a UTAUT2-based design in a robotaxi/shared autonomous mobility context, combining performance expectancy, effort expectancy, social influence, hedonic motivation, and shared mobility context, but without the same degree of explicit risk or safety integration [26]. These examples show that UTAUT-based AV acceptance studies vary not only in the number of constructs included, but also in the type of acceptance problem they prioritize.

The UTAUT4-AV configuration provides one of the clearest examples of an AV-specific extension. Bellet and Banet incorporated perceived usefulness, performance expectancy, effort expectancy, social influence, perceived risk, safety perception, technology readiness, hedonic motivation, and shared mobility context in an automated shuttle acceptance study [27]. This configuration is broader than many classical UTAUT applications because it recognizes that automated mobility involves perceived risk, safety, readiness, affective motivation, and shared service conditions. Yet this broader structure also illustrates the fragmentation problem. Once UTAUT is extended to incorporate AV-specific variables, the resulting model becomes difficult to compare directly with UTAUT studies that retain only performance, effort, social influence, and facilitating conditions.

A further source of fragmentation arises from the different roles assigned to similar constructs. In some UTAUT-based studies, trust is treated as an additional antecedent of acceptance. In others, it is connected to interaction quality, automation confidence, service provider reliability, or shared mobility experience. Similarly, social influence may be used as a standard UTAUT construct, but in AV research, it can also reflect perceived social legitimacy, prestige, public confidence, or willingness to use shared autonomous mobility under normative pressure. Performance expectancy may refer to travel efficiency, service quality, reduced effort, or mobility convenience, depending on the study context. As a result, even when the same construct label appears across UTAUT-based studies, its operational meaning may differ.

The shared mobility context intensifies this variability. Many UTAUT-based AV studies are not concerned with private autonomous vehicle ownership, but with robotaxis, shared autonomous shuttles, autonomous public transport, or on-demand mobility services. In these settings, acceptance depends not only on a vehicle's perceived performance but also on service reliability, shared-use conditions, interaction with operators, and willingness to use automated mobility as part of a transport system. For example, Wu et al. embedded shared mobility and HMI quality into a UTAUT-based framework [23], while Wei et al. emphasized robotaxi-related service adoption through UTAUT2 constructs and shared mobility context [26]. These studies share the UTAUT family label, yet their measurement focus differs because the acceptance object itself is different.

The UTAUT subset, therefore, confirms the central argument of this paper: model labels alone are insufficient for determining comparability. UTAUT-based studies may share a common theoretical ancestry, but they do not necessarily measure the same acceptance architecture. Some studies retain the original UTAUT logic, while others extend it with trust, risk, safety, technology readiness, hedonic motivation, HMI, facilitating conditions, or shared mobility context. This variation is methodologically significant because literature reviews that group studies only under the UTAUT label may overlook differences in construct coverage and measurement scope.

Taken together, the UTAUT-based studies reveal a pattern of structured flexibility rather than standardization. The UTAUT label provides a recognizable theoretical

foundation, but AV acceptance research repeatedly modifies this foundation to fit the specific demands of automated, shared, and interaction-dependent mobility systems. This does not make UTAUT unsuitable for AV acceptance research. It shows that UTAUT must be interpreted at the construct-configuration level. For cumulative research synthesis, the key question is not simply whether a study used UTAUT, but which UTAUT constructs were retained, which AV-specific constructs were added, and how these constructs were positioned within the measurement model.

IV. Discussion

The findings of this focused review show that TAM and UTAUT remain valuable theoretical foundations for research on autonomous vehicle acceptance, but their model labels do not provide a sufficient basis for comparison. Both model families offer recognizable conceptual cores: TAM is mainly associated with perceived usefulness and perceived ease of use, whereas UTAUT is associated with performance expectancy, effort expectancy, social influence, and facilitating conditions. However, the empirical studies reviewed in this paper rarely use these models in a fully standardized form. Instead, they adapt, extend, and recombine them with context-specific constructs such as trust, perceived risk, safety, hedonic motivation, technology readiness, human–machine interaction, and shared mobility. This finding supports earlier observations that TAM and UTAUT are widely used in AV adoption studies, while also showing that their actual measurement content differs considerably across studies [2].

The main implication is that AV acceptance research should be synthesized at the construct-configuration level rather than the model-label level. The analysis identified 31 TAM-related studies with 28 distinct construct configurations and 24 UTAUT-related studies with 23 distinct configurations. This degree of internal variation means that studies cannot be treated as directly comparable simply because they are classified as TAM-based or UTAUT-based. For example, a TAM-based study centered on perceived usefulness, perceived ease of use, and social influence [6] differs substantially from a TAM extension that integrates usefulness, ease of use, social influence, trust, risk, technology readiness, hedonic motivation, HMI, and shared mobility context [13]. The same applies to UTAUT-based research: a model integrating performance expectancy, effort expectancy, social influence, trust, facilitating conditions, HMI quality, and shared mobility [23] should not be interpreted as equivalent to a UTAUT2/CASA-informed structure that does not operationalize trust, risk, or safety as measured constructs [24].

This finding has consequences for how cumulative knowledge is built in AV acceptance research. Reviews and meta-analyses that group studies only by model family risk mask major differences in what is actually measured. Construct-level heterogeneity may partly explain why AV acceptance findings vary across populations, contexts, and automation scenarios. Prior meta-analytic work has already shown that acceptance findings may be affected by survey year, automation level, cultural setting, and sample composition [3]. The present paper adds that variation may also arise from the internal architecture of measurement models. Even when studies appear theoretically similar, their construct sets may differ enough to limit direct synthesis.

The results also clarify why studies of autonomous vehicle acceptance tend to modify classical technology acceptance models. AVs differ from conventional information technologies in that they involve the delegation of control, safety-sensitive interactions, and mobility-service contexts. Therefore, it is understandable that researchers extend TAM and UTAUT with trust, risk, safety, HMI, and shared mobility constructs. These extensions should not be seen as methodological weaknesses in themselves. They become problematic only when the resulting construct configuration is not clearly reported or when studies are compared only through model labels. In this respect, the use of adaptive models is justified, but it requires transparent construct-level documentation.

Future AV acceptance reviews should therefore incorporate construct-level coding as a standard methodological step. Each study should be coded not only for the model it claims to use, but also for the constructs it actually measures. This includes identifying which original TAM or UTAUT constructs are retained, which AV-specific constructs are added, and whether the acceptance object pertains to private vehicle use, shared autonomous mobility, robotaxis, autonomous shuttles, or broader acceptance of automated driving. Rather than introducing new model labels or abbreviated taxonomies, future reviews should report each study's construct profile in a transparent and comparable format. Such reporting would make it possible to distinguish between studies that use a relatively classical acceptance structure and those that employ an expanded AV-specific measurement architecture. It would also reduce the risk of treating studies as comparable merely because they share the same model family label.

For empirical researchers, the findings suggest that model selection should be accompanied by explicit justification of constructs. Researchers should explain why particular constructs are included or excluded, especially when they modify TAM or UTAUT for autonomous vehicle contexts. For reviewers, the findings suggest that “TAM-based” and “UTAUT-based” should be treated as preliminary categories rather than final analytical units. The more reliable basis for comparison is the construct configuration through which acceptance is operationalized. This shift would improve transparency, reduce false comparability, and strengthen cumulative synthesis in autonomous vehicle acceptance research.

V. Conclusion

This paper examined construct-level fragmentation in TAM- and UTAUT-based studies of autonomous vehicle acceptance. Drawing on a broader corpus of 247 studies indexed in Web of Science between 2023 and 2025, the analysis focused on the subset of studies that used TAM, UTAUT, or their extended and hybrid variants. The findings show that both model families remain central to research on autonomous vehicle acceptance, but their use is far from uniform. Within the TAM subset, 31 studies produced 28 distinct construct configurations. Within the UTAUT subset, 24 studies produced 23 distinct construct configurations. This

indicates that model labels provide only a partial description of what is actually measured.

The main conclusion is that research on autonomous vehicle acceptance should move beyond model-label-based comparisons. A study identified as TAM-based or UTAUT-based may retain the classical constructs of the original model, but it may also incorporate trust, perceived risk, safety, hedonic motivation, technology readiness, human–machine interaction, or shared mobility. These additions are often justified by the specific nature of autonomous mobility, where users must evaluate automated control, system reliability, service context, and interaction quality. However, when these extensions are not reported and compared at the construct level, they create false comparability across studies that appear theoretically similar but measure different acceptance architectures.

The study, therefore, argues that construct configuration should be the primary basis for comparing research on autonomous vehicle acceptance. Model family remains useful as an initial classification category, but it should not be used as the final analytical unit. Future reviews, meta-analyses, and empirical studies should report which original TAM or UTAUT constructs are retained, which AV-specific constructs are added, and how these constructs are positioned within the measurement model. This would improve transparency, strengthen cumulative synthesis, and reduce the risk of treating operationalized models as equivalent differently.

The paper is limited by its focused scope. It does not provide a complete map of all autonomous vehicle acceptance models, nor does it assess the statistical quality or predictive validity of individual studies. Accordingly, the findings should not be interpreted as evidence that broader or narrower construct configurations are statistically superior; they show only that model labels conceal substantial variation in measurement architecture. Its contribution is methodological: it demonstrates that construct-level coding is necessary for evaluating comparability within dominant model families. Future research can extend this approach to other theoretical frameworks, including TPB, IDT, trust-based models, and multi-level acceptance frameworks. A more systematic construct-level reporting practice would support stronger, clearer, and more cumulative knowledge development in autonomous vehicle acceptance research.

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