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Public Perceptions and Trust Dimensions of Military Autonomous Vehicles in the Age of Artificial Intelligence

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Abstract: The development of autonomous vehicle technologies over the past decade has opened up new strategic, economic, and security policy opportunities for both the civilian and defense sectors. Technological innovations have also led to significant changes in the structure of warfare: unmanned aerial vehicles (drones), self-driving land vehicles, and artificial intelligence-supported systems have become increasingly prevalent in armed conflicts in recent years. These systems not only perform reconnaissance, logistical, or support functions, but are also increasingly involved in actively targeting and autonomously reaching the target area. The development and application of military autonomous systems therefore deserve special attention, as it raises a number of new types of risks and challenges in the areas of cybersecurity, ethical standards, international humanitarian law, and national security. The aim of this research is to map social attitudes and trust levels regarding the use of autonomous vehicles for military purposes. The study examines the opinions of different demographic groups on an empirical basis, paying particular attention to trust in technological developments, assessments of the safety of transport and combat systems, and legal and ethical considerations related to military applications of AI. The results show that the social acceptance of military autonomous systems is closely related to public trust in artificial intelligence and automated systems, as well as the perception of risks associated with them. The study contributes to a deeper understanding of the economic and social impacts of technological innovations for defense purposes and lays the foundation for future research examining the integration of autonomous systems into military infrastructure, taking into account regulatory, security policy, and social aspects.

Keywords: Autonomous vehicles, Artificial intelligence, Military technology, Public trust, Ethical concerns

Introduction

The Social, Legal and Ethical Challenges of Autonomous Vehicles

Self-driving vehicles represent one of the most dynamic and controversial areas of technological development. These systems are not just engineering innovations but are the bearers of complex social and regulatory dilemmas that redefine the framework of transport, responsibility and ethics. The operation of autonomous vehicles is determined by different levels of automation. The taxonomy developed by SAE International (2016) distinguishes six levels from full manual control to full autonomy. This scale indicates not only the degrees of technological progress, but also the different public attitudes towards each level (Schoettle & Sivak, 2016).

Regulatory frameworks have a significant impact on the potential for technology adoption. In the European Union, the Vienna Convention requires all vehicles to have a human driver (United Nations, 1968), which places a barrier to full autonomy. In the United States, by contrast, the National Highway Traffic Safety Administration (NHTSA) has developed safety standards that have enabled faster time to market (Atiyeh, 2021). China is also at the forefront of autonomous systems development, supported by extensive government R&D programmes.

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However, social acceptance of self-driving cars depends on a number of factors. Public attitudes are influenced by age, gender, education and technological attitudes (Cavoli et al., 2017). Although a significant proportion of the public is sceptical about reliability and pricing (Howard & Dai, 2014; König & Neumayr, 2017), some research suggests that social trust can be increased if autonomous technology is initially introduced in public transport (Kyriakidis et al, A similar result was found in a Chinese study, which showed that individual differences, such as age and attitudes towards the technology, significantly affect the adoption of self-driving buses (Li et al., 2022). However, trust is fragile: users are often reticent in the initial period following adoption (Kettles & Van Belle, 2019), and many are concerned about accidents due to software failures. However, confirmation may come if evidence is available that autonomous systems reduce the risk of accidents, especially in extreme conditions.

At the heart of the ethical dilemmas are the decisions made in accident situations. The theoretical position is that the vehicle should make a decision with the least possible loss, but individuals often put their own safety first. According to Gogoll and Muller (2017), ethical operation can only be guaranteed if the principles of human decision-making are incorporated into the operation of systems. The question of liability is also controversial: in the event of an accident, the question arises whether the manufacturer, the programmer or the driver can be held liable (Borenstein et al., 2019; Goodall, 2014; Servin, 2023; Woollard, 2023). In this context, Bo (2024) pointed out that the responsibility of programmers does not end with the completion of development but extends to the entire life cycle of the operation of the systems.

Security risks are of particular importance in the context of cyber threats. Perger (2022) has described cyberterrorism as attacks aimed at crippling infrastructures or achieving political objectives. And military drones and autonomous weapon systems raise new ethical and legal questions that require an integrated approach to the human and technological factors of defence strategies (Kumar & SM, 2019). The pace of progress is currently slowed by both technical and societal barriers. According to Viktor and Fodor (2024), the lack of vehicle-to-vehicle (V2V) communication and data security issues pose serious challenges. Kovács, Hőgye-Nagy, and Kurucz (2021) point out that situational awareness and user awareness can contribute to improving security. Nevertheless, extreme weather, cyber threats and infrastructure deficiencies continue to hinder widespread deployment (Chougule et al., 2023; Gál, 2024).

The social impact of accidents may increase scepticism, particularly in Europe (Othman, 2023), while populations in developing countries are more open to new technologies (Jaradat et al,2020) Although self-driving vehicles with their advanced sensing systems can contribute to improving road safety, lack of regulation, infrastructure and trust remain major barriers (Szatmáry & Lazányi, 2022). Overall, the development of autonomous vehicles poses not only technological but also social and ethical challenges, which need to be addressed for widespread adoption.

Military Dimensions and Social Acceptance of Autonomous Systems

The military application of autonomous systems and artificial intelligence represents one of the most significant strategic and technological turning points of the 21st century. The digitalisation of warfare and the spread of automated decision-making are fundamentally reshaping military operations, security policy and global stability. AI-based systems are capable of autonomously executing tasks, supporting decisions and complementing command in complex environments. However, technological capabilities alone do not guarantee successful military integration. The confidence of society and military personnel is key to the effective deployment of these systems.

Hagos and Rawat (2022) emphasise that although AI and machine learning offer revolutionary opportunities for tactical autonomy, the development of systems that provide full autonomy is limited by a number of technical and operational barriers. Future models must be able to handle the complexity of real-world military environments while maintaining transparency and reliability. Research by Madsen and colleagues (2024) has shown that reinforcement learning (RL) can be effective in defending against cyber attacks, but the robustness of the systems requires further development.

The quality and transparency of the decision-making process is a particularly critical issue. Neuro-symbolic AI, which combines the learning capabilities of neural networks with symbolic reasoning, could open up new horizons in military decision support (Hagos & Rawat, 2024). This hybrid model could offer faster and more meaningful decisions but can only become socially acceptable if human control is continuously ensured. Anneken and co-authors (2025) highlight that incorporating ethical frameworks, such as human-in-the-loop and human-on-the-loop models, as well as eXplainable AI (XAI), is essential in military AI development. These will not only enhance military effectiveness, but also social trust.

The ambivalent nature of AI has been pointed out by Rashid et al. (2023): while AI has the potential to significantly enhance military capabilities - from logistics to cybersecurity - its irresponsible use can destabilise the global security system. The Russo-Ukrainian war offers a practical example of how small unmanned systems (SUAS) have become a key component of reconnaissance and support operations (Kelly et al., 2023). Kula and Çelebi's (2025) studies of autonomous naval systems highlighted the importance of swarm intelligence and machine learning, while emphasising the risk of cyber threats and ethical dilemmas. Overall, the literature warns that the military application of autonomous systems can only become sustainable if the technological options are accompanied by a strengthening of societal trust and consideration of ethical requirements. The future of autonomous vehicles therefore does not depend solely on engineering solutions, but at least as much on society's ability to respond appropriately to the security, legal and ethical challenges that arise.

The social, legal, ethical and military dimensions described above clearly show that the proliferation of autonomous vehicles and AI-based systems is not just a technological issue. Public trust, regulatory frameworks and the assignment of ethical responsibilities are crucial to how and to what extent these systems can be integrated into transport and warfare. One of the key challenges for future research is to examine how public perception and user trust influence the adoption of autonomous systems and under what conditions the technology can be safely and ethically integrated into everyday life and military strategies.

Method

Research Methodology

The methodological approach of this research was based solely on primary data, which provides a comprehensive picture of the social acceptance of self-driving vehicles through the experiences and attitudes of respondents. The data was collected using convenience sampling, which, although not allowing generalisation of the results to the whole population, provides an opportunity to explore relevant correlations. Sociodemographic variables such as age, gender and educational attainment, as well as technological affinity were given priority in the study. Analysing these will help to understand the extent to which individual differences influence the adoption of autonomous technologies, a relationship that has been highlighted in previous research (Li et al., 2022). Descriptive statistical methods, Spearman's rank correlation and independent samples t-test were used to analyse the data using the *SPSS 25* statistical software package. These procedures allowed us to examine the relationships between different background variables and attitudes towards autonomous vehicles. It is important to stress, however, that the sample is not representative, so the generalisability of the conclusions drawn from the results is limited. Nevertheless, the study provides valuable insights into the attitudes of different social groups towards self-driving technologies and the factors that shape confidence or scepticism. Several objectives underpinned the research. On the one hand, it aimed to investigate the impact of the regulatory environment and, on the other hand, to explore the role of individual attitudes and experiences of technology use in the adoption of autonomous vehicles. Mapping societal perceptions can help to guide future regulatory, industry and research directions.

Description of the Sample

Data was collected using an anonymised online questionnaire**.** The online format had several advantages: it facilitated honest responses, reduced the proportion of socially undesirable responses, and allowed for fast and efficient data processing. However, it also had drawbacks. A common problem with online surveys is low response rates and bias due to voluntary participation, which can affect the sample composition. In addition, there may be inconsistencies in the interpretation of questions, which can introduce uncertainty into the results. After sample cleaning, 2312 respondents were included in the analysis. The age of respondents ranged from 10 to 90 years. Figure 1 illustrates the distribution of respondents by age. The distribution indicates relatively stronger participation from younger cohorts, but the wide age range shows that the questionnaire reached a broader span of ages, allowing for a detailed examination of different aspects of social acceptance The results of the survey, although not representative, can provide significant insights into the evolution of public opinion and contribute to a better understanding of the social acceptance of future self-driving vehicles.

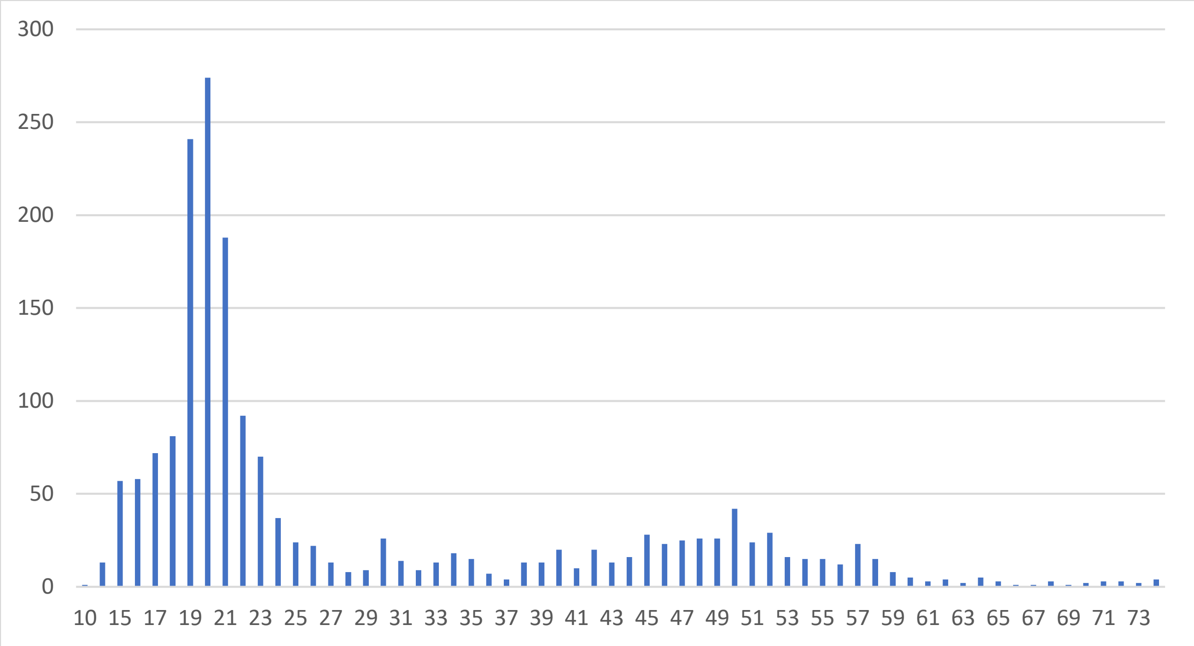

Figure 1. Distribution of respondents by age (N = 2,312)

The survey explored attitudes towards autonomous vehicles along eight targeted questions covering technological, social and military dimensions. The questions focused on the following main themes:

- *Biggest technological challenge***:** The question aimed to explore what respondents perceive as the main barriers to the deployment of self-driving vehicles. The results could contribute to setting development priorities.
- *Cybersecurity risks***:** This dimension looked at IT vulnerabilities and concerns about hacker attacks on autonomous vehicles. The question measured the extent to which respondents considered unauthorised use of the technology likely.
- *Communication with human road users*. This aspect is particularly important in urban transport.
- *The need for a regulatory framework:* This question asked to what extent they considered clear legislation on responsibility, ethics and safety to be essential.
- *Most challenging transport environment:* Respondents were asked whether they perceived the operation of autonomous systems in urban traffic, on motorways or in extreme weather conditions as the most challenging.
- *Military combat applications:* This question explored attitudes towards the deployment of self-driving vehicles in armed conflicts, in particular the acceptability of decision-making without human intervention.
- *Most suitable military tasks:* respondents could rate whether they considered autonomous vehicles to be most suitable for logistical, reconnaissance, surveillance or combat tasks. The results help to understand the societal perception of military technologies.
- *Likelihood of terrorist use:* This question asked how much respondents feared that self-driving vehicles would be used for malicious purposes, such as terrorist attacks.

Through these questions, the survey provided a comprehensive picture of societal perceptions of the use of self-driving vehicles in civilian and military applications. Together, these dimensions have enabled an understanding of how respondents from different demographic and attitudinal backgrounds perceive the risks and opportunities of autonomous technologies. The research provides an empirical basis that can contribute to a better understanding of the embeddedness of self-driving vehicles in society and help shape future regulatory, development and safety policy guidelines. The above methodological framework and the definition of the dimensions of investigation allowed the research to explore in detail the specificities of societal attitudes towards self-driving vehicles, the results of which are presented in the next chapter.

Results and Discussion

The Civil (Non-Military) Dimension

The civil (non-military) dimension of attitudes toward autonomous vehicles (AVs) can be read as a demand-side story about how consumers price risk, how they value safety externalities, and what institutional arrangements they require to move from curiosity to adoption. Using the survey of N = 2,312 respondents with English value labels applied, the evidence indicates modest baseline support, fragile cybersecurity trust, and—importantly—overwhelming demand for visible communication in mixed traffic and for clear legal rules that allocate liability. These four levers—support, trust, communication, regulation—jointly determine the speed and cost of diffusion. The narrative below integrates the observed distributions with standard economic mechanisms.

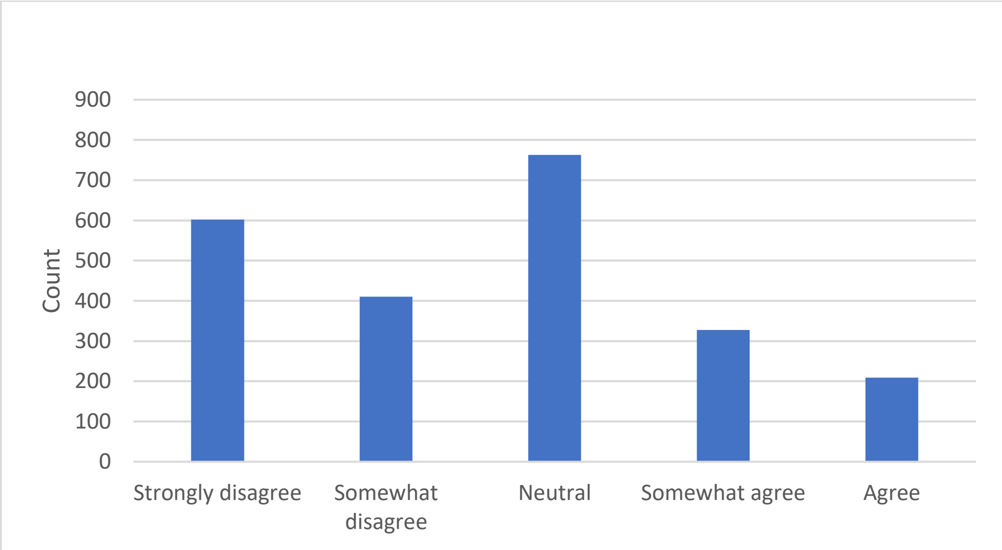

Figure 2**.** Support for introducing autonomous vehicles (N = 2,312)

The cross-section of support is not yet right-shifted toward acceptance. A combined 43.7% of respondents oppose introduction (26.0% “Strongly disagree” and 17.7% “Somewhat disagree”), 33.0% are neutral, and only 23.2% express support (14.2% “Somewhat agree” and 9.0% “Agree”). In an adoption-diffusion framework, such a distribution implies that perceived private benefits (time savings, comfort, access) are outweighed by perceived costs (safety concerns, loss of control, learning costs) for a large share of the population. The large neutral mass is strategically pivotal because it represents relatively low switching costs if credible information reduces uncertainty; this is the segment where marginal persuasion is cheapest. For firms, the implication is higher customer acquisition costs and a slower S-curve without complementary measures that directly address risk perceptions; for policymakers, localized pilot corridors with transparent performance dashboards can convert neutrals at lower fiscal cost than broad subsidies. Trust in AV cybersecurity behaves like a credence attribute: consumers cannot verify protection ex ante and thus rely on signals. The distribution is skewed toward distrust: 15.0% report “Do not trust at all” and 37.0% “Rather do not trust,” while 42.7% “Rather trust, but with reservations” and only 5.3% “Fully trust.” In transaction-cost terms, low trust inflates the subjective risk premium attached to AV use, depresses willingness to pay, and raises the hurdle rate for private investment. It also creates a credibility gap that marketing alone cannot bridge because the underlying uncertainty is technical and systemic rather than merely perceptual. Two instruments mitigate this. First, verifiable disclosures—third-party penetration tests, conformity to recognized security standards, and routine update logs—reduce information asymmetry and allow both consumers and insurers to convert vague fears into assessable risk. Second, a complementary legal infrastructure that clarifies ex post liability converts ambiguous tail risks into insurable, priceable risks (see below). These instruments are strategic complements: disclosures persuade when paired with rules that bite, and rules are more effective when the technical evidence base is transparent.

Table 1. Trust in autonomous vehicles' cybersecurity (N = 2,312)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not trust at all	346	15,0	15,0	15,0
	Rather do not trust	856	37,0	37,0	52,0
	Rather trust, but with reservations	988	42,7	42,7	94,7
	Fully trust	122	5,3	5,3	100,0
	Total	2312	100,0	100,0	

If trust concerns largely unseen software defenses, the next lever—vehicle–pedestrian communication—addresses visible behavior in mixed traffic, where AVs create safety externalities for non-users (pedestrians, cyclists, conventional drivers). Here the preference signal is unambiguously strong: 62.5% rate enhanced communication as "Very important," 30.6% as "Important, but not primary," and only 6.8% assign low or no importance. Economically, this reveals two features. First, consumers place high marginal value on legible, standardized external human–machine interfaces (HMI): eye-contact analogues, intent signaling, crosswalk interactions, and predictable yielding behavior reduce coordination failures and perceived risk. Second, because benefits accrue even to non-adopters, there is a public-good component that private firms may underprovide without coordination. A cost-effective policy response is standard-setting: common iconography, light colors, message timing, and acoustic cues (akin to brake-light conventions) generate coordination gains, so each new AV benefits from an installed base of expectations. For firms, early compliance with emerging HMI norms yields reputational dividends and lowers neighborhood-level opposition in dense urban markets.

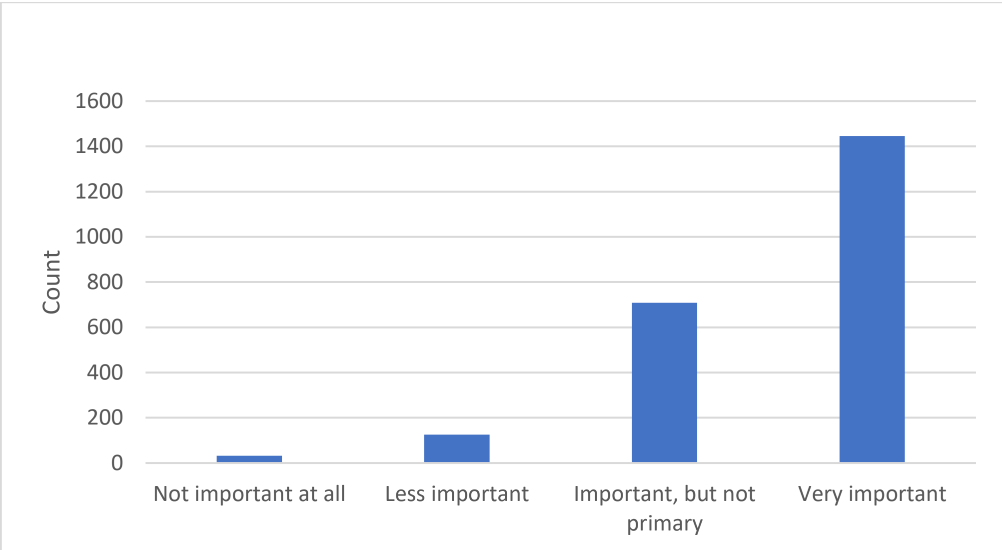

Figure 3. Importance of vehicle–pedestrian communication for safety (N = 2,312)

Legal regulation to clarify liability closes the loop by reallocating risk to the least-cost avoider and making losses contractible. The survey reveals near-consensus: 69.9% rate legal clarification "Very important," 22.8% "Important, but not primary," and only 7.3% assign low or no importance. In regulatory-economics language, the distribution signals high social demand for rule-based risk allocation: consumers currently price in uncertainty over who pays when things go wrong (owner, manufacturer, software provider, government, insurer), while producers face elevated cost of capital due to litigation risk and unclear compliance duties. Clarifying ex ante who bears which class of risks (design defects, software faults, misuse, maintenance neglect) reduces deadweight loss by improving insurance design, speeds claims resolution, and feeds back into trust by demonstrating credible, enforceable backstops. This is also where public and private incentives can align: an industry that invests in compliance-ready designs and documentation earns a trust premium, while regulators gain a lever to align incentives with safety outcomes (e.g., strict liability for defects paired with safe-harbor provisions for certified software updates).

Table 2. Importance of legal regulation to clarify liability (N = 2,312)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not important at all	36	1,6	1,6	1,6
	Less important	131	5,7	5,7	7,2
	Important, but not primary	528	22,8	22,8	30,1
	Very important	1617	69,9	69,9	100,0
	Total	2312	100,0	100,0	

Taken together, the four levers point to a trust-and-rules-first path to adoption. Baseline support is modest, so price competition or advertising alone is unlikely to accelerate diffusion if fundamental uncertainties persist. Cybersecurity distrust is widespread, but the modal stance—"trust with reservations"—is elastic to credible information and enforceable guarantees. Communication standards are a low-regret, high-impact coordination fix with broad public support; they reduce everyday frictions precisely in the situations where social acceptance is formed—crossings, merges, ambiguous right-of-way cases. Legal clarity, finally, converts catastrophic tail risks from ambiguous liabilities into priced risks, unlocking insurance markets and lowering capital costs for producers. A pragmatic sequencing is therefore: (i) adopt visible communication standards in pilot areas to normalize behavior and reduce day-to-day anxiety; (ii) legislate and operationalize clear liability rules that map faults to actors; (iii) institutionalize cybersecurity disclosures and certifications tied to those rules. This order targets the large neutral middle identified in the support distribution and should shift the mass toward acceptance at the lowest marginal persuasion cost.

The Military Dimension

The military dimension of attitudes toward autonomous vehicles (AVs) speaks directly to how citizens balance operational effectiveness against ethical risk, and how they price uncertainty in life-and-death contexts. Using the survey of N = 2,312 respondents with English value labels applied, three patterns dominate the landscape: first, baseline acceptability of fully autonomous military vehicles in combat (no human intervention) is divided but leans modestly positive; second, the public clearly differentiates between missions, favoring reconnaissance and logistics over kinetic operations; third, perceived threat of terrorist misuse is high and could act as a drag on acceptance unless mitigated by credible safeguards. These patterns interact with civil support for AVs and with demographics, creating a structured map of where legitimacy is strong and where it is fragile.

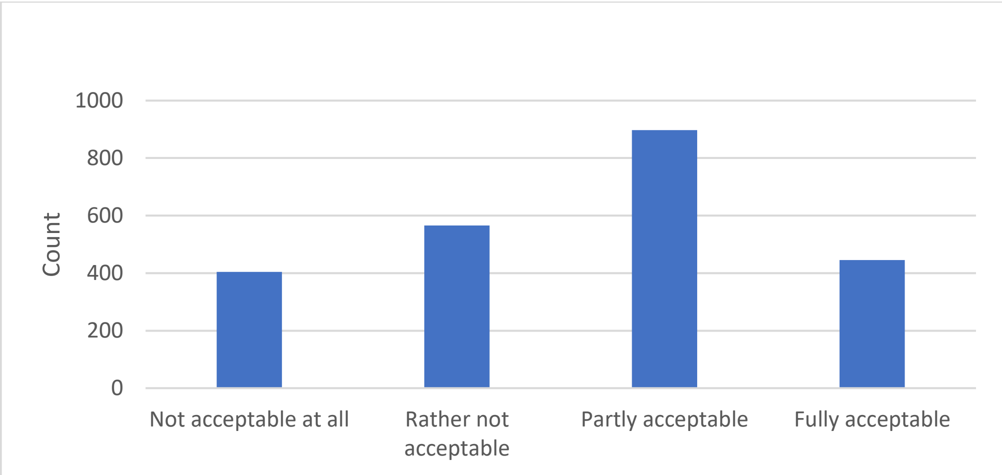

Figure 4. Acceptability of autonomous military vehicles (No human intervention) in combat (N = 2,312)

On acceptability, the distribution suggests a cautious, conditional mandate: 17.5% judge such deployment “Not acceptable at all,” 24.5% “Rather not acceptable,” 38.8% “Partly acceptable,” and 19.2% “Fully acceptable.” Aggregating the top two categories yields 58.0% who are at least partly accepting, yet the minority of full endorsement (19.2%) underscores the salience of control and accountability in lethal contexts. From a defense-economics vantage point, this profile implies that the social license is elastic to governance design: where command responsibility, auditability, and ex post review are robust, marginal acceptance is likely to rise; where these are vague, the “rather not acceptable” group will harden into outright opposition. Gender and education gradients reinforce this: acceptability differs significantly by gender ($\chi^2 = 35.4$, $p < .001$), with men more often in the “Fully acceptable” category, and varies by education ($\chi^2 = 54.2$, $p < .001$), hinting that technical familiarity and perceived capability shape risk tolerance. For capability planners, the implication is to tie autonomy to bounded mandates—clearly scoped mission envelopes, explicit fail-safe criteria, and legally codified review—so that the median voter perceives restraint rather than unfettered delegation of lethal force.

Mission preferences are sharply stratified, revealing how citizens allocate autonomy across the production function of defense. When asked which tasks are most suitable for autonomous vehicles, 48.4% choose reconnaissance and surveillance, 36.7% logistics and transport, and only 15.0% combat operations (valid N ≈ 2,307 after missing). This ranking is economically coherent: the first two categories deliver high expected value per unit risk—exposure to enemy fire is reduced while information and supply resilience are increased—whereas autonomous kinetic action concentrates downside risk in the very domain where error costs are catastrophic and reputationally irreversible. The public, in effect, prices mission externalities: ISR and logistics generate positive spillovers (fewer casualties, fewer convoys) with low moral hazard, while autonomous combat concentrates moral hazard and attribution problems. Strategically, this points to a phased portfolio: scale autonomy where the social cost–benefit ratio is clearly favorable and build legitimacy through demonstrated performance, then reconsider kinetic roles only under strict human-on-the-loop constraints and transparent rules of engagement.

Table 3. Most suitable military tasks for autonomous vehicles *(N = 2,312)*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Reconnaissance and surveillance	1116	48,3	48,4	48,4
	Logistics and transport	846	36,6	36,7	85,0
	Combat operations	345	14,9	15,0	100,0
	Total	2307	99,8	100,0	
Missing	System	5	,2		
Total		2312	100,0		

The third pillar is perceived threat of terrorist misuse. Here the distribution is heavy on the "likely" side: 42.4% "Likely" and 27.9% "Very likely," with only 6.1% "Not likely at all" and 23.5% "Less likely." In risk-analysis terms, respondents are assigning a fat-tail penalty to technology: even if baseline risk is low, the perceived severity of a successful misuse inflates the expected disutility and shifts preferences toward precaution. Left unaddressed, this fear can bleed into otherwise favorable views on non-combat missions, depressing the revealed willingness to accept autonomy even where net benefits are high. The policy lever is to decouple legitimate military autonomy from the misuse narrative through concrete, auditable safeguards: hardened geofencing and remote-disable protocols; strong chain-of-custody for hardware and models; export and end-use controls; red-team exercises with public reporting; and integration of domestic counter-UAS defenses. Each instrument turns a diffuse fear into a monitored control, lowering the subjective variance that drives the high "likely" mass.

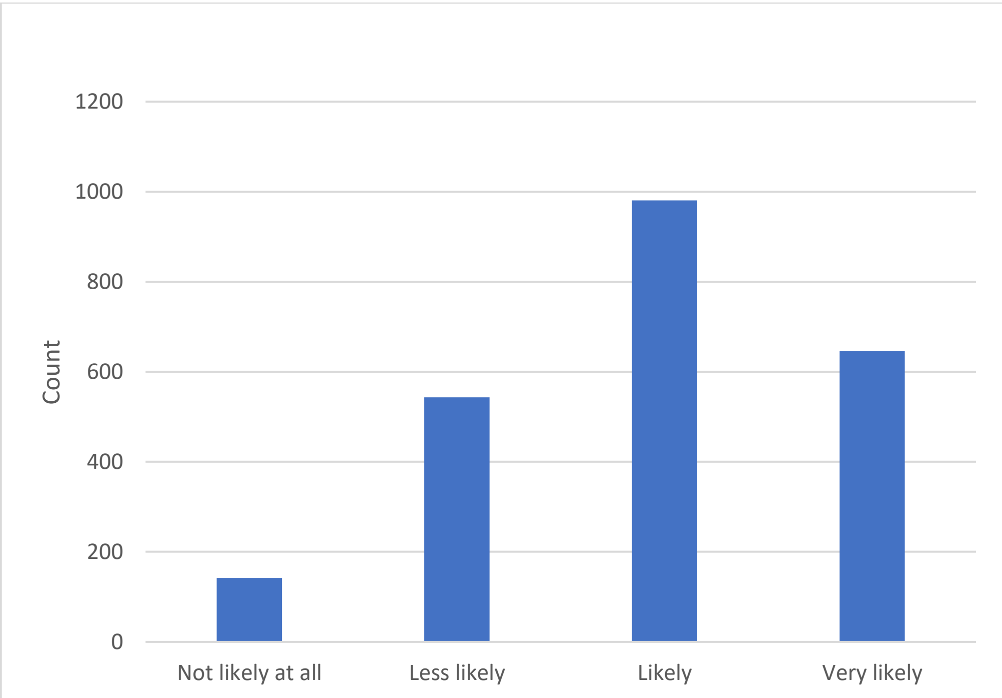

Figure 5. Likelihood terrorists use autonomous vehicles for attacks (N = 2,312)

Table 4. Support for introducing autonomous vehicles * Acceptability of autonomous military vehicles (no human intervention) in combat Crosstabulation (N = 2,312)

		Not acceptable at all	Rather not acceptable	Partly acceptable	Fully acceptable	
Support for introducing autonomous vehicles	Strongly disagree	28,7%	23,1%	32,9%	15,3%	100,0%
	Somewhat disagree	15,9%	25,9%	42,0%	16,3%	100,0%
	Neutral	13,2%	27,3%	43,5%	16,0%	100,0%
	Somewhat agree	11,3%	23,2%	40,2%	25,3%	100,0%
	Agree	13,4%	17,7%	30,1%	38,8%	100,0%
Total		17,5%	24,5%	38,8%	19,2%	100,0%

Crucially, military acceptance is not independent of the civil sphere. Cross-tabulation with civil support for introducing AVs shows a strong monotone gradient ($\chi^2 = 142.3$, $p < .001$): respondents who "Agree" with civil introduction are far more likely to find military use acceptable (e.g., 38.8% "Fully acceptable" in the "Agree" group versus 15.3% among "Strongly disagree"). At the same time, the rank-based association is modest (Spearman $\rho \approx 0.173$), indicating that a sizable minority differentiates sharply between civilian mobility and lethal military contexts. For strategy, this means two distinct trust architectures: a civil trust stack (safety performance, pedestrian communication, liability clarity) and a military trust stack (rules of engagement, human oversight, post-hoc accountability, misuse safeguards). Progress in the civil stack helps but cannot substitute for visible reassurance on the uniquely military risks of autonomy. In communications, conflating the two can backfire; instead, planners should explicitly acknowledge the difference in moral stakes and foreground the additional constraints attached to military autonomy. The association between civil support for introducing AVs and the acceptability of fully autonomous military vehicles in combat is statistically significant, Pearson's $\chi^2(12, N = 2{,}312) = 142.25$, $p < .001$, with acceptance rising monotonically across support categories.

A workable sequencing emerges from these distributions. Begin by amplifying autonomy in reconnaissance and logistics, the domains with clear public support and favorable cost–risk profiles, and pair deployment with rigorous after-action transparency to build a performance record. In parallel, legislate and promulgate mission-bounded autonomy doctrines: explicit "halt/hand-off" triggers, authenticated command channels, immutable audit logs, and clearly specified human-on-the-loop duties for any operation with plausible kinetic consequences. Simultaneously, close the misuse expectation gap through visible controls—technical (geofencing, remote disable), organizational (segregated development and operations), and legal (end-use enforcement)—with periodic, public red-team reporting. Only once these layers are in place should consideration be given to expanding autonomous roles in kinetic missions, and even then under graduated oversight that makes residual risk allocations legible to both operators and the public. This sequencing aligns with revealed preferences: it respects the public's mission ordering, addresses the salient tail-risk fears, and leverages the positive spillovers from civil AV trust without pretending they solve the uniquely military accountability problem.

Conclusion

This article reports indicative evidence from a large, well-labeled, non-probability survey of attitudes toward autonomous vehicles (AVs) in civil and military settings. The dataset comprises N = 2,312 completed questionnaires gathered online through convenience and snowball recruitment. As no probability frame, quotas or post-stratification weights were applied, estimates should be interpreted as patterns within the obtained sample rather than population parameters. Coverage is strongest among younger and urban respondents—typical of networked surveys—which is analytically useful for early-adoption contexts but implies selection and self-selection biases that caution against national prevalence claims. On the civil side, baseline support for introducing AVs is modest and skewed toward caution. A total of 43.7% oppose introduction (26.0% "Strongly disagree", 17.7% "Somewhat disagree"), 33.0% are neutral, and 23.2% express support (14.2% "Somewhat agree", 9.0% "Agree"). Trust in AV cybersecurity is fragile: 15.0% report "Do not trust at all" and 37.0% "Rather do not trust", while 42.7% "Rather trust, but with reservations" and only 5.3% "Fully trust". Within the sample, support and cybersecurity trust covary strongly (Spearman $\rho \approx 0.41$; Pearson $r \approx 0.40$, $p < .001$), consistent with a credence-attribute mechanism whereby security assurances raise willingness to adopt. Age correlates negatively with cybersecurity trust ($r = -0.115$, $p < .001$), suggesting systematically greater scepticism among older respondents, while the age–support association is weak and not statistically significant. Two enabling conditions command near-consensus: respondents emphasise the importance of clear vehicle–pedestrian communication (62.5% "Very important", 30.6% "Important, but not primary") and of clarifying legal liability (69.9% "Very important", 22.8% "Important, but not primary"). Support differs by gender, education and residence (χ^2 tests, $p \leq .005$), indicating that segmentation matters for both policy design and market communication. On the military side, acceptance of fully autonomous military vehicles in combat (no human intervention) is cautious but non-trivial: 17.5% "Not acceptable at all", 24.5% "Rather not acceptable", 38.8% "Partly acceptable", 19.2% "Fully acceptable". Mission preferences are sharply differentiated: autonomy is judged most suitable for reconnaissance/surveillance (48.4%) and logistics/transport (36.7%), and least suitable for combat operations (15.0%; valid N ≈ 2,307). Perceived risk of terrorist misuse is high (42.4% "Likely", 27.9% "Very likely"), a tail-risk concern that can depress acceptance unless countered with credible safeguards. Military acceptance rises monotonically with civil support (Pearson's $\chi^2(12, N = 2{,}312) = 142.25$, $p < .001$), yet the rank association is modest (Spearman $\rho \approx 0.173$), implying that many respondents distinguish sharply between civilian mobility and lethal military contexts. Gender and education relate to military acceptance (χ^2 $p < .001$), consistent with differences in perceived capability, risk and accountability. Taken together, the evidence points to a "trust-and-rules first" pathway to adoption. In civil contexts, the large neutral middle is elastic to credible reductions in uncertainty in everyday interactions and to legible allocation of tail risks; in military contexts, legitimacy hinges on bounded mandates, human oversight and auditable safeguards. We therefore propose five actionable recommendations. First, institutionalise cybersecurity transparency and assurance: third-party penetration testing, conformance to recognised standards, publicly accessible security update logs and software bills of materials, backed by independent certification; these measures convert credence claims into verifiable signals and should be tied to procurement incentives. Second, standardise external human–machine interfaces for mixed traffic—common iconography, light patterns, message timing and acoustic cues—piloted in dense urban corridors with public performance dashboards; this coordination device reduces day-to-day frictions and accelerates social learning. Third, clarify liability ex ante by legislating fault allocation (owner vs. manufacturer vs. software provider vs. operator) and evidentiary rules; pair strict liability for defects with safe-harbour provisions for certified software updates to make risks insurable, shorten claims cycles and lower capital costs. Fourth, target communication and product design to the neutral segment and to older cohorts that report lower cybersecurity trust; emphasise legibility at conflict points (crossings, merges) where attitudes are formed, and report near-miss and incident metrics transparently. Fifth, sequence military autonomy where the social cost–benefit ratio is clearly favourable—reconnaissance/surveillance and logistics—while reserving kinetic roles for tightly bounded use cases under human-on-the-loop oversight; implement immutable audit logs, authenticated command channels, rigorous red-team exercises with public reporting, hardened geofencing and remote-disable functions, and chain-of-custody plus export/end-use controls to decouple legitimate military autonomy from the terrorism-misuse narrative. Monitoring should track conversion of neutrals, trust uplift, incident rates in pilot zones, and claim resolution times post-liability reform. Executed in this order—visible communication standards, liability clarity, security assurance, and scaled deployment in low-controversy military missions—the programme aligns with revealed preferences, lowers perceived risk premia, and offers the fastest route to durable social licence at the lowest marginal persuasion cost.

Scientific Ethics Declaration

* The authors declare that the scientific ethical and legal responsibility of this article published in EPESS journal belongs to the authors.

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Conflict of Interest

* The authors declare that they have no conflicts of interest

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References

Anneken, M., Burkart, N., Jeschke, F., Kuwertz-Wolf, A., Mueller, A., Schumann, A., & Teutsch, M. (2025). Ethical considerations for the military use of artificial intelligence in visual reconnaissance. *arXiv preprint arXiv:2502.03376.*

Hagos, D. H., & Rawat, D. B. (2022). Recent advances in artificial intelligence and tactical autonomy: Current status, challenges, and perspectives. *Sensors, 22*(24), 9916.

Hagos, D. H., & Rawat, D. B. (2024). *Neuro-symbolic AI for military applications*. IEEE Transactions on Artificial Intelligence.

Kelly, T. K., Putney, A., Parker, T., Camm, F., Ellinger, E., Girardini, K., ... & Wong, J. P. (2023). *Small uncrewed aircraft systems in divisional brigades*. RAND Corporation.

Kula, S., & Çelebi, U. B. (2025). Technological transformation and future perspectives in autonomous maritime systems. *Marine Technology, 227*(1), 22–33.

Madsen, H., Grov, G., Mancini, F., Baksaas, M., & Sommervoll, Ć. (2024). Exploring reinforcement learning for incident response in autonomous military vehicles. *arXiv preprint arXiv:2410.21407.*

Rashid, A. B., Kausik, A. K., Al Hassan Sunny, A., & Bappy, M. H. (2023). Artificial intelligence in the military: An overview of the capabilities, applications, and challenges. *International Journal of Intelligent Systems, 2023*(1), 8676366.

Atiyeh, C. (2021). *US autonomous car safety rules finalized. Car and Driver*. https://www.caranddriver.com/news/a35247978/us-autonomous-car-safety-rules-finalized

Bo, M. (2024). Are programmers in or out of control? The individual criminal responsibility of programmers of autonomous weapons and self-driving cars. In S. Gless & H. Whalen-Bridge (Eds.), *Human–robot interaction in law and its narratives: Legal blame, procedure, and criminal law* (pp. 23–47). Cambridge University Press.

Borenstein, J., Herkert, J. R., & Miller, K. W. (2019). Self-driving cars and engineering ethics: The need for a systems-level analysis. *Science and Engineering Ethics, 25*(2), 383–398.

Cavoli, C., Phillips, B., Cohen, T., & Jones, P. (2017). *Social and behavioural issues with automated vehicles: A literature review.* UCL Transport Institute.

Chougule, A., Chamola, V., Sam, A., Yu, F. R., & Sikdar, B. (2023). Comprehensive survey of limitations in autonomous driving and its impact on accidents and collisions. *IEEE Open Journal of Vehicular Technology, 5,* 142–161.

United Nations. (1968). *Convention on road traffic.* Retrieved from https://net.jogtar.hu/jogszabaly?docid=98000005.tvr

Gál, I. H. (2024). A gépjárműgyártás kockázatainak csökkentése. *Safety Science Review, 6*(1), 27–40.

Gogoll, J., & Muller, J. F. (2017). Autonomous cars: In favor of a mandatory ethics setting. *Science and Engineering Ethics, 23*(3), 681–700.

Goodall, N. J. (2014). Ethical decision making during automated vehicle crashes. *Transportation Research Record, 2424*(1), 58–65.

Howard, D., & Dai, D. (2014, January). Public perceptions of self-driving cars: The case of Berkeley, California. *Transportation Research Board 93rd Annual Meeting*. Washington, DC, United States. The National Academies of Sciences, Engineering, and Medicine.

Jaradat, M., Jibreel, M., & Skaik, H. (2020). Individuals' technology perception and its relationship with ambition, unemployment, loneliness, and insomnia in the gulf. *Technology in Society, 60,* 101199.

Kettles, N., & Van Belle, J. P. (2019, August). Examining the antecedents of autonomous car adoption using an enhanced UTAUT model. In 2019 *International Conference on Advances in Big Data, Computing and Data Communication Systems* (icABCD) (pp. 1–6). IEEE.

Kovács, G., Hőgye-Nagy, Á., & Kurucz, G. (2021). Human factor aspects of situation awareness in autonomous cars: An overview of psychological approaches. *Acta Polytechnica Hungarica, 18*(7), 7–24.

Konig, M., & Neumayr, L. (2017). User resistance toward radical innovation: The case of self-driving cars. *Transportation Research Part F: Traffic Psychology and Behaviour, 44*, 42–52.

Kumar, N., & SM, V. (2019). Use of modern technology to counter terrorism. Centre for Internal and Regional Security.https://www.researchgate.net/profile/Narender-Kumar/publication/333609468_Use_of_Modern_Technology_to_Counter_Terrorism/links/5cf66baf4585153c3db225db/Use-of-Modern-Technology-to-Counter-Terrorism.pdf

Kyriakidis, M., Happee, R., & de Winter, J. C. F. (2015). Public opinion towards automated driving: Results of an international questionnaire among 5000 respondents. *Transportation Research Part F: Traffic Psychology and Behaviour, 32*, 127–140.

Li, Z., Niu, J., Li, Z., Chen, Y., Wang, Y., & Jiang, B. (2022). The impact of individual differences on the acceptance of self-driving buses: A case study of Nanjing, China. *Sustainability, 14*(18), 11425.

Othman, K. (2023). Examining the impact of self-driving car accidents on public attitude: Evidence from different countries across continents. In 2023 *5th International Conference on Smart Systems and Inventive Technology (ICSSIT)* (pp. 1579–1584). IEEE.

Perger, Á. (2022). Potential targets of cyber-attacks: Legal regulation of drones and self-driving cars. *Journal of Law and Social Sciences, 7*, 46–52.

SAE International. (2016). *2016 U.S. DoT chooses SAE J3016 for vehicle autonomy policy guidance*. Retrieved from https://articles.sae.org/15021

Schoettle, B., & Sivak, M. (2016). *Motorists' preferences for different levels of vehicle automation: 2016.* University of Michigan, Sustainable Worldwide Transportation.

Servin, C. K. (2023). The ethical dilemma of self-driving cars: Conservative solution. In V. Snášel, J. Kacprzyk, & P. Sharma (Eds.), Recent trends in research and innovation, fundamentals and applications. *8th World Conference on Soft Computing* (Vol. II, pp. 93–98). Springer Nature Switzerland.

Szatmáry, R., & Lazányi, K. (2022). Do autonomous cars represent a safer solution? In *IFIP International Conference on Human Choice and Computers* (pp. 443–455). Springer Nature Switzerland.

Viktor, P., & Fodor, M. (2024). Adapting self-driving technology. In 2024 *IEEE 11th International Conference on Computational Cybernetics and Cyber-Medical System*s (ICCC) (pp. 153–158). IEEE.
Woollard, F. (2023). The new trolley problem: Driverless cars and deontological distinctions. *Journal of Applied Philosophy, 40*(1), 49–64.

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