Who Guards the Passenger When the Driver Is Gone? Cabin Recording, Human Assistance and Driverless Taxi Use

Program Riset ITB 2026

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Abstract

Removing the driver from a taxi removes the person who has watched over the passenger. Operators can substitute cameras that record the cabin or a button that connects the passenger to a human, but it is unclear which of the two reassures riders, at what privacy cost and for whom. Two studies were conducted in Indonesia. Study 1 asked 98 ride-hailing users in Greater Jakarta directly which safeguards they would accept: 70% would ride with cabin recording kept for seven days, 41% with no recording, and 45% of women but 11% of men rejected the unrecorded cabin. Study 2 was a between-subjects scenario experiment with 271 panel members who imagined riding home alone at night in one of three cabins: no camera, passive recording, or on-demand live assistance from a 24-hour control centre. On-demand assistance raised willingness to book (Hedges' g = 0.37); passive recording did not (g = 0.04). Perceived safety moved with willingness, privacy concern did not, and women were less willing overall. The result held after adjustment for sample composition, and direct questions overstated the value of recording. What passengers miss in a driverless cabin is someone who can act, not something that watches.

Keywords: driverless taxi; personal security; guardianship; remote assistance; privacy; gender

Introduction

A taxi driver does more than drive. The driver is also a witness, a helper and, in the terms of routine activity theory, a capable guardian. When the driver is removed, the passenger travels in an enclosed, unstaffed cabin. Studies of driverless buses and pooled rides in Finland, the United States, China, India and Pakistan show that travellers notice the loss, women and night-time travellers most of all.

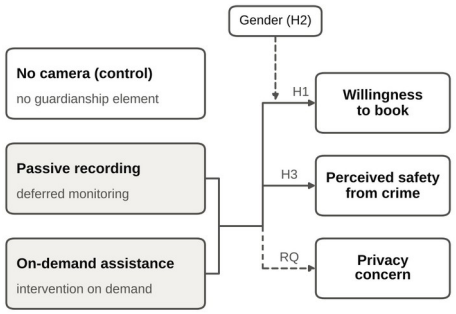
Operators have two substitutes: cameras that record the cabin, and a channel to a remote human who can see, speak and act. Earlier scenario studies bundle the two as 'CCTV and emergency button', concern shared vehicles in which the feared offender is a fellow passenger, and let each respondent compare options side by side. For a private ride, where no stranger is in the cabin, it is not known which substitute matters, or whether direct questions give the same answer as an experiment.

RQ1: does a substitute guardian raise willingness to ride a driverless taxi, and does passive recording differ from on-demand human assistance? **RQ2:** do the substitutes change perceived safety from crime and privacy concern? **RQ3:** do the effects differ between women and men? **RQ4:** do direct questions and an experiment lead to the same conclusion?

The study separates two elements of guardianship, monitoring and intervention, and tests them from the standpoint of the person being guarded. It is part of the Program Riset ITB 2026 project on trust transfer in shared autonomous mobility.

Research Method

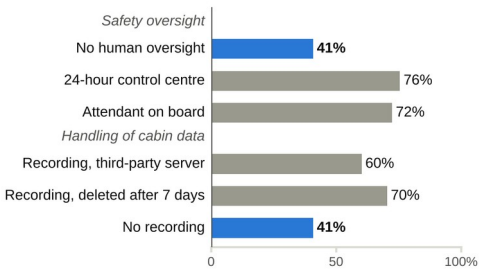
Two studies used an Indonesian online panel (Populix). Study 1 (13 and 14 November 2026) surveyed 98 ride-hailing users in Greater Jakarta. Each respondent stated whether they would use a driverless taxi under three forms of safety oversight and three ways of handling cabin data, so that all options were judged side by side. Study 2 (15 November 2026) was a scenario experiment: one private trip home at 9 p.m., booked through the usual app at the usual fare, with one of three cabin notices (Picture 1). The absence of a driver, the fare, the waiting time and ordinary in-app customer service were identical in all three versions.



Picture 1. Study 2 design: three cabins, the guardianship element of each, and the hypotheses.

Sample and allocation. The three versions were fielded as separate quota surveys of 100 respondents (50 women, 50 men); a panel member could enter only one. The control, recording and assistance versions opened at 07:31, 11:08 and 13:49 on the same day. Respondents who failed either of two comprehension questions were screened out, leaving 271 (91, 88 and 92). Allocation was by survey, not by individual randomisation, so estimates are checked with covariate adjustment and reweighting.

Measures and analysis. Willingness to book, perceived safety from crime and privacy concern were single items on scales of 1 to 7, followed by a factual manipulation check. Pre-specified contrasts against the control cabin used Welch tests with the Holm correction; equivalence tests, ordinal models and robustness analyses (Tobit models for ceiling effects, trimming bounds for screening) complement them. Picture 2 shows the Study 1 benchmark.



Picture 2. Study 1: share of respondents who would use a driverless taxi under each option (n = 98). Blue bars: no oversight and no recording.

Discussion & Result

Direct questions. Without human oversight or without cabin recording, the share willing to ride fell from between 70% and 76% to 41%. Whether a recording exists mattered; who stores it and for how long did not. The unrecorded cabin was rejected by 45% of women and 11% of men, although this gap was unstable across the two waves.

Experiment. On-demand assistance raised willingness to book by 0.52 points (95% CI 0.11 to 0.92; g = 0.37; 76% against 60% chose 6 or 7; the pre-specified share rating 5 to 7 was 91% against 82%, p = 0.075). Passive recording did not (0.05 points; g = 0.04; equivalent to zero within 0.3 SD). Assistance was also rated safer than recording (0.42 points) and mainly reduced the number of respondents who felt unsafe. Privacy concern tended to be higher with either camera (0.42 and 0.51 points, not significant) and was unrelated to willingness (r = −0.08), whereas perceived safety was closely related to it (r = 0.78). Women were less willing than men (5.59 against 5.94), and the features did not narrow the gap (Picture 3).

Robustness. The effect of assistance was positive in every specification (0.34 to 0.73 points); its confidence interval included zero in some reweighted analyses. One respondent in five misreported the camera regime after reading it. Standardised effects were far larger under direct questions (0.74 for recording, 0.85 for a control centre) than in the experiment (0.04 and 0.37).



Picture 3. Study 2: mean ratings (1 to 7) with 95% confidence intervals by cabin: no camera, passive recording, on-demand assistance.

Conclusion

The capacity to summon a human, placed in the passenger's hands, substitutes for the driver as guardian. Deferred monitoring by a camera does not. Guardianship theory gains the standpoint of the guarded person, and direct questions are shown to overstate the value of surveillance features.

Operators: treat a staffed, immediate assistance channel as part of the core service; continuous recording will not attract passengers, and a camera that stays off until summoned costs nothing in willingness.

Regulators: require a passenger-initiated channel to a human with a maximum response time; mandatory recording is hard to justify on acceptance grounds and sits uneasily with data minimisation.

Next step: a randomised replication with multi-item measures and a factorial design (recording by assistance), since allocation here was by survey and measures were single items.