

Livelihoods, Urban Access and Crash Involvement in Kikwit Motorcycle-Taxi Services: Evidence on Working Conditions, Safety Practices and Governance

Kaputu Nzila Georges¹; Kuyunsa Mayu Alain²; Banze Mukanya Anjou³

¹Author; ²Co-Author

¹UCKIN Kikwit (Christian University of Kinshasa), Democratic Republic of the Congo

²University of Kinshasa - Professor, Democratic Republic of the Congo

³UNIKAM (University of Kamina), Democratic Republic of the Congo

Publication Date: 2026/09/23

Abstract: In Kikwit, motorcycle-taxi activity sits at the intersection of employment scarcity, everyday mobility and road injury exposure. This article evaluates these three dimensions within one empirical design rather than treating them as separate policy questions. Field evidence gathered in 2024 covered 384 participants: 240 drivers, 104 service users and 40 owners or other actors connected with the activity. Driver data were used to describe livelihood dependence, operating arrangements, work intensity, safety practices and governance perceptions; user data documented accessibility; and a multivariable logistic model examined correlates of having reported at least one crash in the preceding 12 months. One driver in two cited unemployment or unstable work as the main reason for entering the occupation, while 66.3% described the activity as the principal source of household income. Among users, 77.9% judged motorcycle taxis quicker than available alternatives and 70.2% considered them important for reaching peripheral zones. Seventy-four drivers, representing 30.8% of the driver sample, reported a recent crash. The adjusted model identified longer-than-11-hour workdays with greater crash odds (aOR=1.99; 95% CI: 1.10-3.61). Lower odds were observed for drivers who had received road-safety training (aOR=0.40; 95% CI: 0.21-0.74), those reporting regular helmet practice (aOR=0.38; 95% CI: 0.21-0.69), and those holding a valid license (aOR=0.48; 95% CI: 0.26-0.89). Because the study is cross-sectional and several measures are self-reported, these estimates are interpreted as associations, not effects. The evidence supports a professionalization strategy that combines competence verification, safer work organization, social and insurance protection, clearer governance and protection of the mobility function that users rely on.

Keywords: Crash Involvement; Governance; Informal Employment; Kikwit; Motorcycle Taxi; Road Safety; Urban Accessibility; Working Conditions.

How to Cite: Kaputu Nzila Georges; Kuyunsa Mayu Alain; Banze Mukanya Anjou (2026) Livelihoods, Urban Access and Crash Involvement in Kikwit Motorcycle-Taxi Services: Evidence on Working Conditions, Safety Practices and Governance. *International Journal of Innovative Science and Research Technology*, 11(9), 892-899. <https://doi.org/10.38124/ijisrt/26sep385>

I. INTRODUCTION

Motorcycle-taxi services have become embedded in the transport economy of many sub-Saharan African cities because they can operate on roads and in neighborhoods that conventional public transport serves poorly. Their appeal is also economic: entry into the occupation is comparatively accessible for people facing a shortage of regular salaried jobs [1]-[3]. These two functions are closely connected in Kikwit, where the service provides mobility while simultaneously generating daily earnings for drivers.

The same activity also carries a substantial safety burden. Motorcyclists form part of the group of road users that bears a high share of traffic injury and mortality, particularly in lower-income settings [4]. For motorcycle-taxi drivers, exposure is occupational as well as behavioral. Hours spent earning income are hours spent in traffic, so work organization, economic pressure, training and protective practice can all matter for crash involvement. Research from African and Asian settings has linked long working time, fatigue mechanisms and difficult employment conditions with unsafe riding or crash outcomes [5], [6], [11].

This combination creates a policy problem that cannot be solved by treating safety, employment and mobility independently. Restrictive regulation may reduce access to a service used by peripheral communities, while an employment-centered approach may ignore injury costs. Recent scholarship instead argues for integrating motorcycle taxis into urban mobility governance and for evaluating both their accessibility contribution and the conditions under which the service is produced [3], [7], [8], [14].

Kikwit offers a useful setting for such an integrated analysis. Previous work has described visible crash vulnerability in the city [9] and has also reported fragmented levies, administrative difficulties, infrastructure constraints and weak social protection in the local motorcycle-taxi sector [10]. What remains insufficiently documented is how livelihood dependence, service accessibility, work intensity, safety practice and perceived governance appear together in the same local evidence base.

The study therefore pursues three linked objectives: to characterize the occupation as a source of income and a

provider of urban access; to identify observed driver characteristics associated with self-reported crash involvement; and to examine governance perceptions that may affect professionalization. The article does not claim that the cross-sectional design establishes causal pathways. Its contribution lies in connecting labor conditions, mobility value and safety outcomes within one empirical interpretation.

➤ Conceptual Lens

The conceptual lens treats motorcycle-taxi activity as a system with four interacting domains. The first is livelihood formation, reflected in entry motives, household dependence and operating arrangements. The second is accessibility, reflected in speed, waiting time, trip purpose and service to peripheral areas. The third combines work exposure and safety practice, including daily hours, licensing, training and helmet use. The fourth is governance, which includes clarity of rules, controls, levies, parking organization, associations and institutional coordination. These domains are linked analytically, but the arrows in the framework should not be read as causal effects proven by the data.

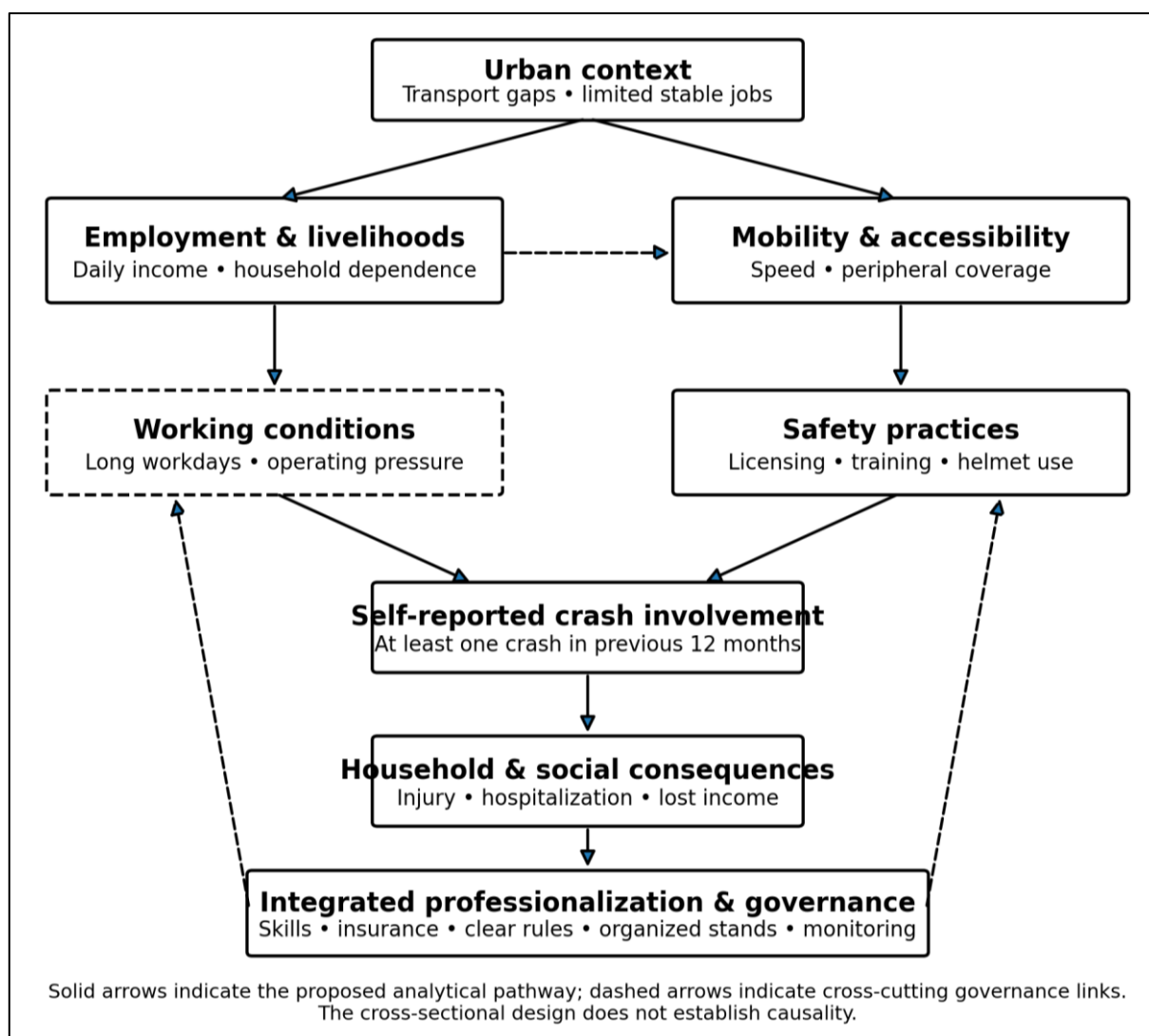


Fig 1 Conceptual Organization of Livelihood, Accessibility, Work Conditions, Safety Practices, Crash Involvement and Governance. Arrows Denote Analytical Links, Not Causal Estimates.

II. MATERIALS AND METHODS

➤ *Design, Setting and Respondent Groups*

Fieldwork conducted in 2024 used a quantitative cross-sectional design, with interviews, direct observation and documentary material serving as contextual sources. Data collection covered Kazamba, Lukemi, Lukolela and Nzinda, the four communes of Kikwit in Kwilu Province, Democratic

Republic of the Congo. The overall quantitative target was 384 respondents, a size consistent with the conventional large-population calculation at 95% confidence, maximum variability ($p=0.50$) and 0.05 precision. Because the three respondent categories supplied different types of evidence, they were analyzed according to their specific roles rather than pooled as one homogeneous sample.

Table 1 Respondent Groups and their Analytical Use

Respondent group	n	Primary analytical contribution
Motorcycle-taxi drivers	240	Livelihoods, work conditions, safety, crashes, governance
Users	104	Service use, access, waiting time, perceived mobility value
Owners / other economic actors	40	Context on operating and economic arrangements

The driver group formed the inferential sample for the crash model. Recruitment was spread across communes, taxi stands and circulation corridors. This improved spatial coverage, but the absence of a complete driver register meant that strict individual probability sampling was not possible; population-wide extrapolation must therefore remain cautious.

➤ *Variables and Field Measures*

The driver instrument recorded age and other socio-demographic information, reasons for joining the occupation, motorcycle ownership or rental status, receipts and operating costs, trip volume, hours worked, household uses of earnings, licensing, road-safety training, helmet practice, association membership, insurance, crash history and perceptions of sector governance. Instead of asking only for a single profit estimate, gross receipts and principal operating costs were captured separately and net daily income was derived from their difference.

The user instrument focused on frequency of use, trip purpose, comparative speed, access to peripheral areas, reported waiting time and stated time saved. Interviews with institutional and association stakeholders, as well as field observation, were used to interpret rules, controls, parking organization, insurance and safety practices. These contextual sources were not converted into frequency estimates.

For regression analysis, the outcome was coded 1 when a driver reported at least one road crash in the 12 months before the survey and 0 otherwise. The source model supplied six explanatory variables: association membership; experience of five years or more; a workday above 11 hours; regular helmet practice; previous road-safety instruction; and possession of a valid driving license. The 11-hour boundary is an operational category from the original analysis and is not presented as a physiological fatigue threshold. Governance items used a five-point perception scale and

should not be interpreted as a validated psychometric instrument.

➤ *Statistical Procedures*

Descriptive results are reported as counts, percentages and means where appropriate. For the driver crash outcome, a multivariable logistic specification was used with the six predictors listed above. Exponentiating the fitted coefficients produced adjusted odds ratios, and uncertainty is shown with 95% confidence intervals. Statistical testing used a 5% significance criterion. The driver dataset contained 240 observations and 74 reported crash events. Interpretation of the fitted model is deliberately limited to association because the design is observational, exposure measures are not all continuous, and potentially relevant variables such as directly measured fatigue, speed, mileage, education and work zone were not available in the source model.

➤ *Ethics and Quality Safeguards*

Participation was voluntary, the questionnaires were anonymous, and reporting was conducted at aggregate level. Reported receipts and costs were checked for arithmetic inconsistencies before analysis. The crash-recall window was limited to 12 months. No customer, driver or account-level identifier is disclosed in this article. The source documentation available for preparation of the manuscript does not contain an ethics-committee approval number; consequently, no approval identifier is claimed.

III. RESULTS

➤ *Livelihood Profile and Mobility Value*

Drivers were predominantly young: 76.3% were below 35 years of age. Unemployment or absence of stable work was the principal stated reason for occupational entry for 50.0% of the driver sample. Operating arrangements were diverse: 35.8% owned the motorcycle they used, 25.0% were under hire-purchase and 39.2% operated through daily rental.

Table 2 Daily Net Income by Motorcycle Operating Arrangement

Operating arrangement	n	Share (%)	Mean net income (CDF/day)
Owner	86	35.8	22 828
Hire-purchase	60	25.0	15 096
Daily rental	94	39.2	13 905

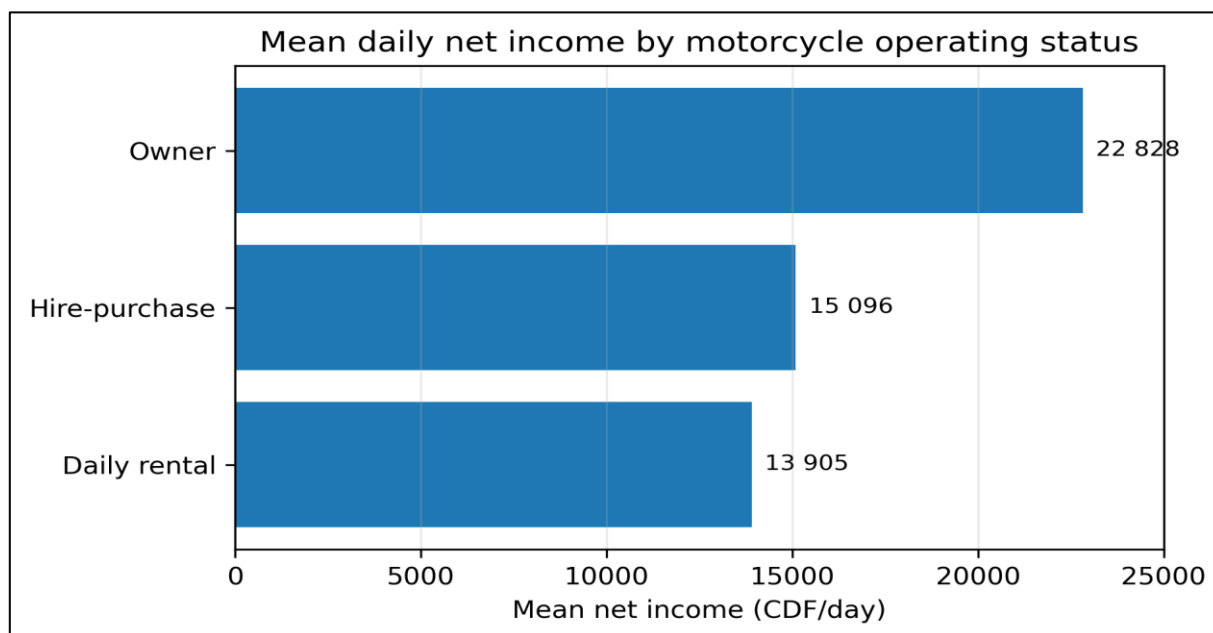


Fig 2 Mean Daily Net Income Across Operating Arrangements. Field Survey, 2024; Driver Sample n=240.

Average net income was highest among owners at 22,828 CDF per day. Hire-purchase drivers averaged 15,096 CDF and daily renters 13,905 CDF. The observed gap between owners and daily renters was 8,923 CDF per day. These figures describe the sample only; the source analysis did not provide a formal between-group test, so no inferential claim is attached to this income gradient.

Work exposure was substantial. Drivers reported an average of 27.1 trips and 10.6 working hours per day, on roughly six days per week. Motorcycle-taxi earnings were the main household income source for 66.3%. Household spending patterns showed that 87.5% used earnings for food, 77.5% for schooling and 51.7% for health needs. Only 14.6% reported regular saving, while 21.2% reported investment.

Table 3 User Indicators of the Mobility Contribution of Motorcycle Taxis

Indicator	Observed value
Users reporting daily use	56.7%
Service judged faster than available alternatives	77.9%
Service considered important for peripheral areas	70.2%
Trips for work or economic activity	42.3%
Mean reported waiting time	5.1 minutes

Users also reported an average time saving of 20.5 minutes per trip. Taken together, the user indicators portray motorcycle taxis as part of routine mobility, with particular value attached to speed and the ability to reach peripheral parts of the city.

➤ Crash Experience, Compliance and Protection

Table 4 Driver Crash, Compliance and Protection Indicators

Indicator	n	%
At least one crash in previous 12 months	74	30.8
Injury among drivers with a reported crash*	52	70.3
Hospitalization among drivers with a reported crash*	15	20.3
Valid driving license	105	43.8
Road-safety training	101	42.1
Regular helmet use	163	67.9
Association membership	161	67.1
Insurance coverage	32	13.3

*For Injury and Hospitalization, the Denominator is the 74 Drivers who Reported a Crash. Field Survey, 2024.

A recent crash was reported by 74 drivers, equal to 30.8% of the driver sample. Among those 74, 52 reported an injury and 15 reported hospitalization. Safety and institutional protection were uneven. Regular helmet use and

association membership were reported by about two-thirds of drivers, while valid licensing and road-safety training were reported by fewer than half. Insurance was uncommon at 13.3%.

➤ *Multivariable Associations with Crash Involvement*

Table 5 Adjusted Associations with Self-Reported Crash Involvement (n=240; 74 Events)

Predictor comparison	aOR	95% CI	p
Valid license: yes vs no	0.48	0.26-0.89	0.019
Road-safety training: yes vs no	0.40	0.21-0.74	0.004
Regular helmet use: yes vs no	0.38	0.21-0.69	0.002
Work >11 h/day vs ≤11 h	1.99	1.10-3.61	0.023
Experience ≥5 y vs <5 y	1.24	0.68-2.26	0.486
Association member: yes vs no	0.89	0.48-1.66	0.719

Outcome: At Least One Self-Reported Road Crash During the Preceding 12 Months. aOR = Adjusted Odds Ratio. Adjustment is Limited to the Six Listed Variables.

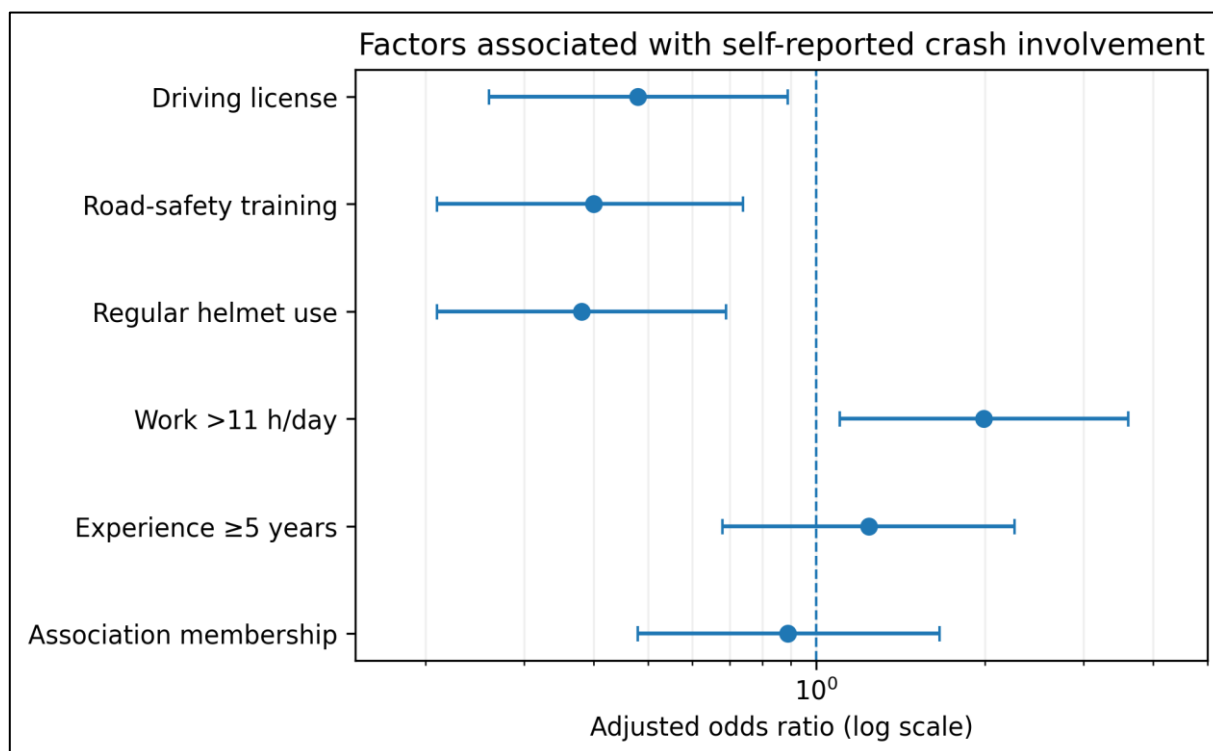


Fig 3 Adjusted Odds Ratios with 95% Confidence Intervals for the Driver Crash Outcome.

Four variables met the 5% significance criterion. Valid licensing, road-safety training and regular helmet use were each associated with lower odds of reporting a crash. A workday exceeding 11 hours was associated with higher odds. Neither five or more years of experience nor association membership showed a statistically detectable

association in the fitted model. The helmet result is interpreted as a marker of a wider safety-practice profile rather than evidence that a helmet prevents a collision.

➤ *Perceived Governance*

Table 6 Driver Ratings of Governance Dimensions

Governance dimension	Mean /5	Rank
Association effectiveness	3.12	1
Parking organization	2.59	2
Clarity of rules	2.49	3
Road-safety enforcement	2.39	4
Fairness of controls	2.22	5
Transparency of levies	2.08	6

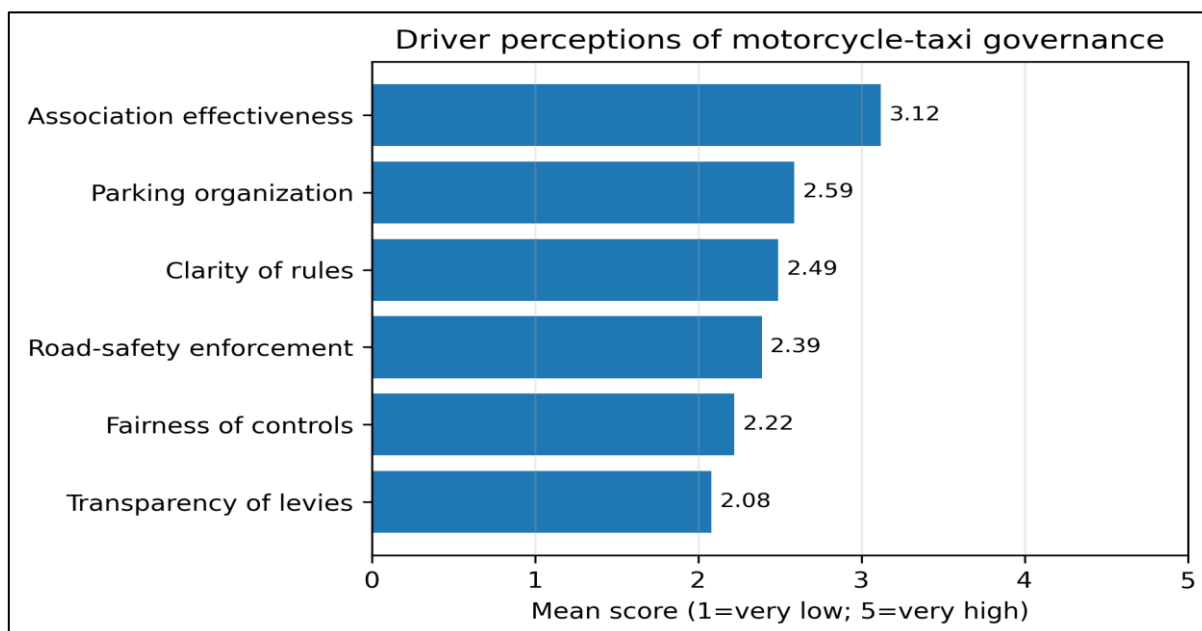


Fig 4 Mean Driver Ratings of Selected Motorcycle-Taxi Governance Dimensions. Field Survey, 2024; n=240.

The weakest ratings concerned transparency of levies (2.08/5) and fairness of controls (2.22/5). Association effectiveness ranked first at 3.12/5, followed by parking organization at 2.59/5. Road-safety training was also the most frequently stated reform priority, reported by 27.9% of drivers. The scores are perception measures and are not treated as direct measurements of institutional performance.

IV. DISCUSSION

➤ *Motorcycle Taxis as Livelihood and Access Infrastructure*

The Kikwit evidence shows why a motorcycle-taxi policy framed only as transport regulation is incomplete. Half of surveyed drivers linked entry into the occupation to unemployment or unstable work, and two-thirds depended on it as the household's principal income source. This livelihood role resembles patterns reported elsewhere in sub-Saharan Africa, where motorcycle-taxi work can absorb labor while also exposing workers to insecure and demanding conditions [2], [6]. The descriptive income differences across ownership arrangements further suggest that the terms under which a driver accesses the productive asset influence the amount of daily income retained.

The user findings add a second dimension. More than three-quarters of users viewed the service as faster than alternatives, and seven in ten regarded it as important for peripheral areas. Such results are consistent with research describing motorcycles as connectors between poorly served neighborhoods and employment, markets and services [3], [14]. This means that a policy designed solely to suppress the activity could remove an accessibility function before a realistic substitute is available.

➤ *Work Exposure and Crash Involvement*

The association for long workdays is the clearest occupational signal in the regression. Drivers reporting more than 11 hours of work per day had nearly twice the adjusted

odds of reporting a crash compared with those at or below the operational cut-point. The result is compatible with the idea that income production and traffic exposure occur simultaneously: extending the workday also extends time at risk on the road. Comparable literature has drawn attention to fatigue-related crash involvement and to long working hours as part of the risk environment of motorcycle-taxi driving [5], [11].

That interpretation must remain cautious. The survey did not measure fatigue physiologically, did not record speed or distance travelled at the time of an event, and cannot establish temporal causation between work patterns and crashes. The 11-hour category is therefore useful as a screening indicator in this dataset, not as a universal safety threshold. Repeated-measures or longitudinal designs with continuous exposure measures would be needed to test the mechanism directly.

➤ *Skills, Protective Practice and Professionalization*

Licensing and road-safety training were both associated with lower adjusted crash odds. Evidence from Kampala has likewise linked a structured motorcycle-taxi program with safer riding practice and lower crash risk after adjustment for individual characteristics [12], [13]. The convergence supports a professionalization approach centered on demonstrated competence and recurrent training rather than paperwork alone.

Regular helmet use was also negatively associated with the crash outcome, but its meaning differs from the licensing and training variables. Helmets are designed primarily to reduce injury severity after impact. The observed association may therefore indicate a broader safety-conscious driver profile, including unmeasured prudent behaviors, rather than a direct anti-collision effect. This distinction is important because the data cannot isolate the mechanism.

Experience of at least five years and association membership were not statistically significant in this model. Longevity in the occupation does not automatically imply safer practice, and membership itself cannot substitute for services such as training, insurance, maintenance support, monitoring or clear operational standards. Associations are most likely to contribute when they provide concrete functions and cooperate effectively with institutions [3], [15].

➤ *Governance and Policy Implications*

The governance ratings reveal a gap between administrative presence and perceived institutional quality. Drivers rated levy transparency, fairness of controls and road-safety enforcement below the midpoint of the scale, while association effectiveness received the strongest, though still moderate, rating. These findings add a safety dimension to previously documented formalization constraints in Kikwit [10]. Registration and revenue collection alone are therefore an incomplete definition of formalization.

A more useful policy direction is professionalization. In practical terms, this means linking accessible licensing to competence assessment; providing refresher safety training; incorporating fatigue awareness and work-time risk into road-safety programs; clarifying owner responsibility for maintenance and vehicle condition; expanding insurance options compatible with daily cash flows; organizing official stands; and improving the transparency of levies and controls. The mobility contribution of the service should be preserved while the conditions of production become safer and more accountable.

Monitoring can be built around a compact indicator set: licensing, training participation, insurance, regular helmet practice, daily working time, reported crashes, quality of taxi stands, user waiting time, peripheral access and user satisfaction. Tracking these dimensions together would prevent performance from being reduced either to enforcement statistics or to transport availability alone.

➤ *Limitations and Research Priorities*

Several features limit the strength of inference. First, the study is cross-sectional, so temporal ordering and causality cannot be demonstrated. Second, crashes, work conditions, compliance and income are largely self-reported and may contain recall or social-desirability error. Third, a complete register of drivers was unavailable, preventing simple random sampling and limiting external generalization. Fourth, the logistic model includes only six available predictors and omits potentially important covariates such as age, education, speed, route, mileage and directly measured fatigue. Finally, the governance scores capture driver perceptions rather than audited institutional performance.

Future studies could strengthen the evidence through longitudinal follow-up, objective crash records, probability sampling when a reliable register becomes available, GPS-based distance and route exposure, continuous working-time measures, validated fatigue instruments and independent governance indicators. Such extensions would allow the

occupational pathways suggested here to be tested more directly.

V. CONCLUSION

Motorcycle-taxi activity in Kikwit performs three functions at once: it absorbs labor, provides rapid access across the city and exposes drivers to a meaningful road-safety burden. The survey shows substantial household dependence on the occupation and strong user reliance on its speed and peripheral reach. It also shows that almost one-third of drivers reported a crash in the prior year, while licensing, training and regular helmet use were associated with lower adjusted crash odds and very long workdays with higher odds.

The study does not demonstrate causal effects, but it does change the policy frame. Road safety in this sector is connected not only to individual riding choices but also to employment conditions, work exposure and the quality of governance. The central implication is therefore to organize the sector so that its livelihood and accessibility benefits can be retained while verified skills, safer working patterns, protection, insurance and institutional transparency are progressively strengthened.

REFERENCES

- [1]. R. Cervero, *Informal Transport in the Developing World*. Nairobi: United Nations Centre for Human Settlements (UN-Habitat), 2000.
- [2]. D. Ehebrecht, D. Heinrichs, and B. Lenz, "Motorcycle-taxis in sub-Saharan Africa: Current knowledge, implications for the debate on informal transport and research needs," *Journal of Transport Geography*, vol. 69, pp. 242-256, 2018. <https://doi.org/10.1016/j.jtrangeo.2018.05.006>
- [3]. F. Owino et al., "The urban motorcycle taxi sector in Sub-Saharan Africa: Needs, practices and equity issues," *Urban, Planning and Transport Research*, vol. 12, no. 1, 2354400, 2024. <https://doi.org/10.1080/21650020.2024.2354400>
- [4]. World Health Organization, *Global Status Report on Road Safety 2023*. Geneva: WHO, 2023.
- [5]. K. S. Nambiza, A. Neven, R. Peter, W. G. Kazaura, and K. Brijs, "A systematic PRISMA review of traffic crashes, risk factors, determinants of risk behaviors, and interventions among motorcycle taxi riders," *Transportation Research Part F: Traffic Psychology and Behaviour*, vol. 116, 103438, 2026. <https://doi.org/10.1016/j.trf.2025.103438>
- [6]. L. Diaz Olvera, A. Guézéré, D. Plat, and P. Pochet, "Earning a living, but at what price? Being a motorcycle taxi driver in a Sub-Saharan African city," *Journal of Transport Geography*, vol. 55, pp. 165-174, 2016. <https://doi.org/10.1016/j.jtrangeo.2015.11.010>
- [7]. T. Courtright and R. Behrens, "The role and impact of motorcycle-taxis: A systematic review," *Transportation Research Procedia*, vol. 89, pp. 104-116, 2025. <https://doi.org/10.1016/j.trpro.2025.05.050>

- [8]. R. Chetto et al., “Emerging business models and service options for motorcycle taxis: Insights from 10 cities in Sub-Saharan Africa,” *Transportation Research Procedia*, vol. 89, pp. 327-337, 2025. <https://doi.org/10.1016/j.trpro.2025.05.065>
- [9]. T. Phippard, “Urban fractures: Mobility, risk and the accidenté in Kikwit, Democratic Republic of Congo,” *Africa*, vol. 93, no. 1, pp. 140-158, 2023. <https://doi.org/10.1017/S0001972023000165>
- [10]. R. Nkeke Okar-Mbel, S. Ntuaboy Osonkie, F. Kuzanwa Olame, and G. Yamba Ekow, “Formalisation, contraintes et perspectives du secteur taxi-moto à Kikwit (2018-2024),” *Revue Internationale de la Recherche Scientifique*, vol. 4, no. 1, pp. 439-449, 2026. <https://doi.org/10.5281/zenodo.18346448>
- [11]. L. T. Truong, H. T. T. Nguyen, and R. Tay, “A random parameter logistic model of fatigue-related motorcycle crash involvement in Hanoi, Vietnam,” *Accident Analysis & Prevention*, vol. 144, 105627, 2020. <https://doi.org/10.1016/j.aap.2020.105627>
- [12]. K. Muni, O. Kobusingye, C. Mock, J. P. Hughes, P. M. Hurvitz, and B. Guthrie, “Motorcycle taxi program is associated with reduced risk of road traffic crash among motorcycle taxi drivers in Kampala, Uganda,” *International Journal of Injury Control and Safety Promotion*, vol. 26, no. 3, pp. 294-301, 2019. <https://doi.org/10.1080/17457300.2019.1594952>
- [13]. K. Muni, O. Kobusingye, C. Mock, J. P. Hughes, P. M. Hurvitz, and B. Guthrie, “Motorcycle taxi program increases safe riding behaviours among its drivers in Kampala, Uganda,” *Injury Prevention*, vol. 26, no. 1, pp. 5-10, 2020. <https://doi.org/10.1136/injuryprev-2018-043008>
- [14]. P. Pochet and G. Lesteven, “The spread of motorcycles in sub-Saharan Africa: Dynamics and public issues,” *Transportation Research Procedia*, vol. 82, pp. 3237-3250, 2025. <https://doi.org/10.1016/j.trpro.2024.12.097>
- [15]. S. Ntramah et al., “Safety, health and environmental impacts of commercial motorcycles in Sub-Saharan African cities,” *Urban, Planning and Transport Research*, vol. 11, no. 1, 2259233, 2023. <https://doi.org/10.1080/21650020.2023.2259233>