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Urban Mobility Study in Dhaka: Rickshaws in Transition

A Study of INNOVISION Consulting

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Venue: 8th Floor (West), BDBL Building 12, Kawran Bazar C/A, Dhaka-1215

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22	160+	500+	1.5mn~
Countries	Clients	Projects	beneficiary households

Study Background

The urban transport landscape in Dhaka is undergoing a significant structural shift, as informal, battery-powered rickshaws are increasingly replacing traditional pedal rickshaws.

This study, conducted by Innovision Consulting, analyzes the human and economic motivations driving this transition. The primary goal is to compare socio-economic dynamics between pedal and battery rickshaws, passenger demand dynamics, and incentives for garage owners to provide a rigorous, data-backed framework for formulating future urban policies.

Context & Framework

The Urban Mobility Landscape

The Urban Challenge:

Dhaka's mobility is defined by congestion, with movement being a primary concern for residents.

The Transition:

A significant shift is occurring from traditional pedal rickshaws to informal battery-driven versions.

Objectives:

- To compare the socio-economic dynamics between battery and pedal rickshaws that explain the proliferation of battery rickshaws in Dhaka
- To understand the demand side dynamics or the passengers' perspectives on battery and pedal rickshaws
- To define the garage owner's incentives and challenges related to battery and pedal rickshaws
- To define policies and interventions that can address the structural challenges in the proliferation of the battery rickshaws in Dhaka
- To define the roles of the different stakeholders in implementing these interventions.

Methodology

The **Cochran (1977) formula** was used for determining the sample size for an **unknown population**.

$$n_0 = (z^2 \cdot p \cdot (1 - p)\Big)/e^2$$

- **Confidence Level: 95%** (corresponding to a Z-score of Z = 1.96).
- **Estimated Population Proportion (p): 50%** (or 0.5), which is standard for maximizing the required sample size when the true proportion is unknown.
- **Margin of Error (e): 5%** (or 0.05).

Sample Size:

Rickshaw Pullers:
384

Rickshaw Passengers:
392

Garage Owners:
63

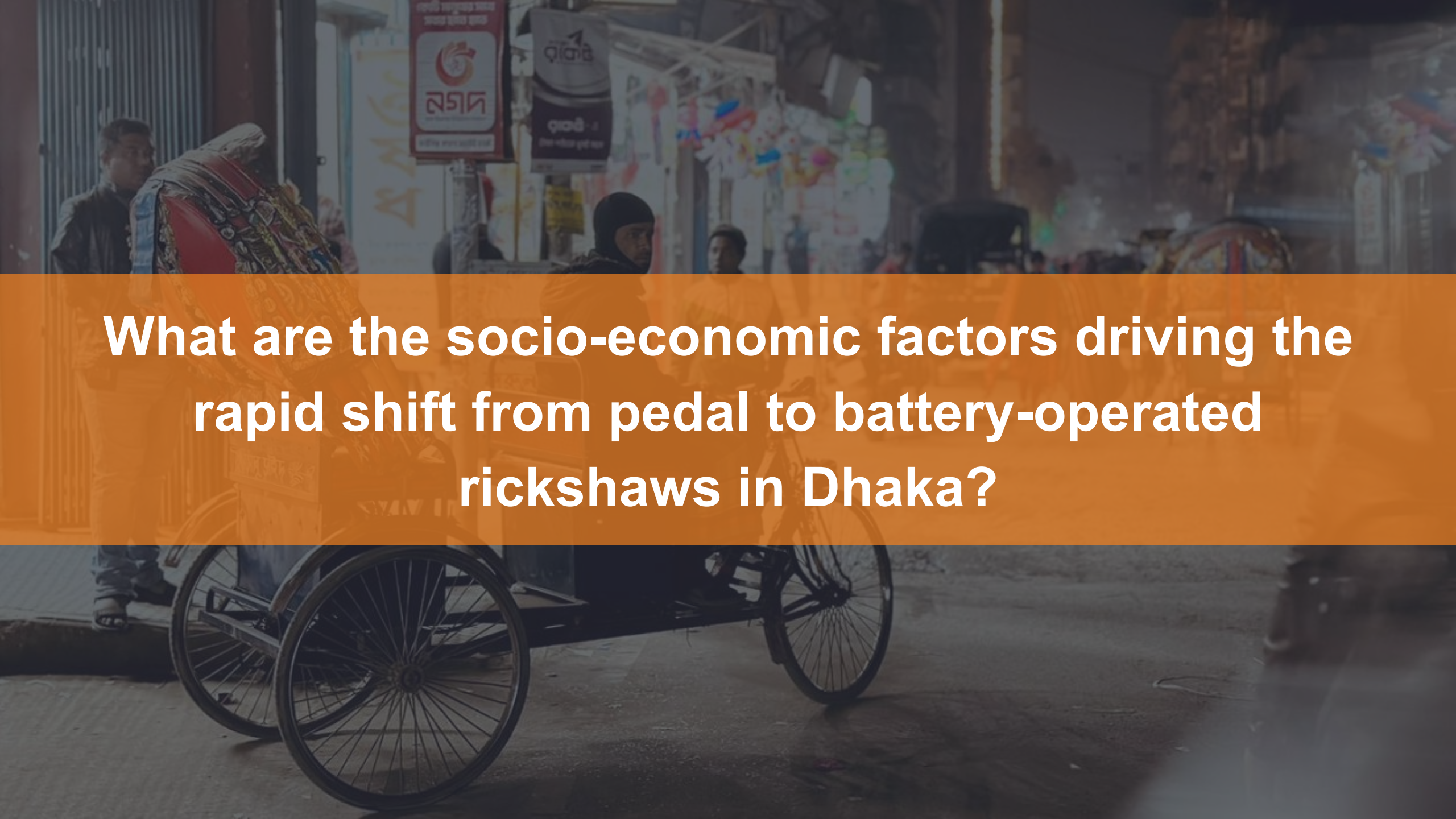
Sample Distribution

Dhaka North City Corporation (DNCC)

- Mohammadpur
- Dhaka Uddyan
- Mirpur 1
- Kochukhet
- Uttara 10
- Uttarkhan

Dhaka South City Corporation (DSCC)

- Khilgaon
- Rampura
- Hazaribagh
- Lalbagh
- Jatrabari
- Motijhil



What are the socio-economic factors driving the rapid shift from pedal to battery-operated rickshaws in Dhaka?

The Workforce & The Shift

Profile of the Workforce

Age Group	Pedal Rickshaw	Battery Rickshaw
18-25	6%	13%
26-35	18%	34%
36-45	38%	31%
46-55	20%	14%
56-65	12%	7%
66+	6%	1%

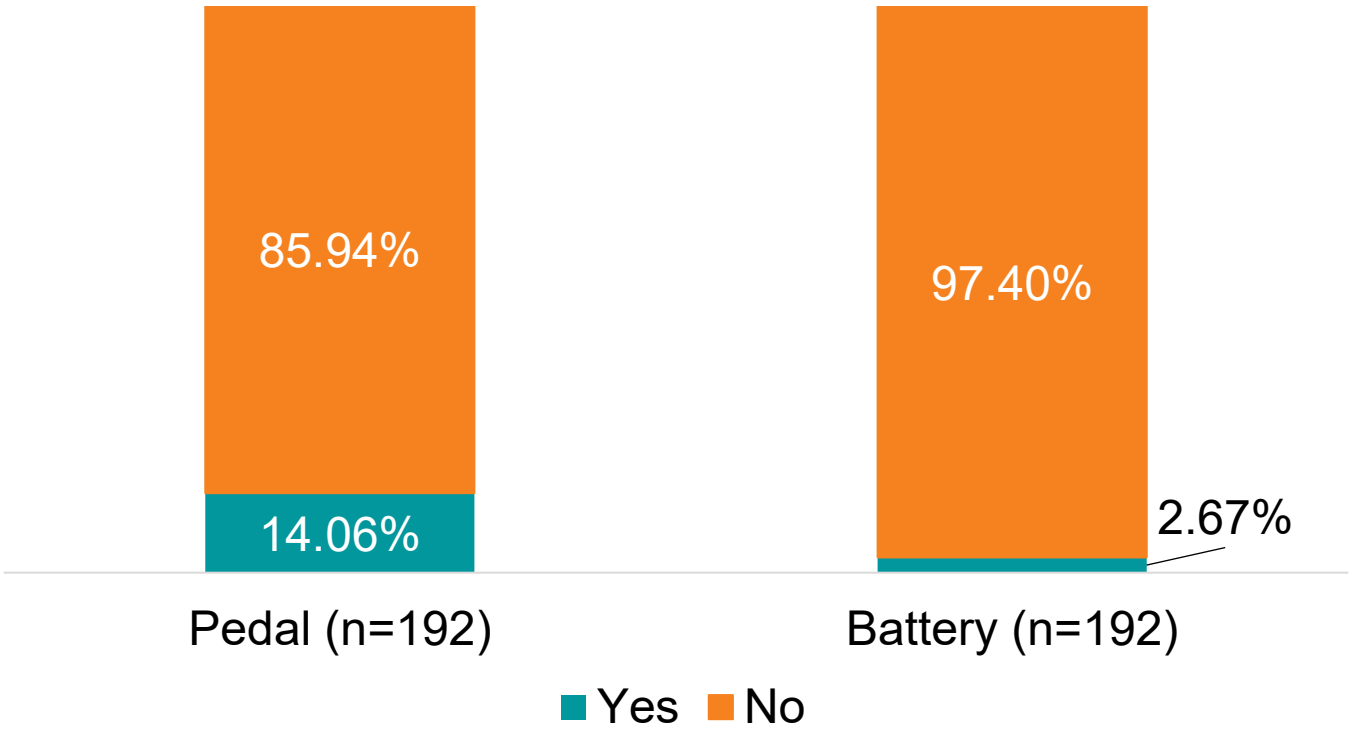
The battery rickshaw drivers are younger than the pedal rickshaw drivers

Education Level	Pedal Rickshaw	Battery Rickshaw
No Formal Education	39.58%	34.38%
Class 1-5	34.38%	33.33%
Class 6-10	23.44%	28.13%
Class 11–12	2.60%	2.60%
Bachelors	-	1.04%
Diploma/Vocational	-	0.52%

Battery rickshaw drivers are comparatively more educated than pedal rickshaw drivers.

Vehicles Registered
(Pedal vs Battery Rickshaw)

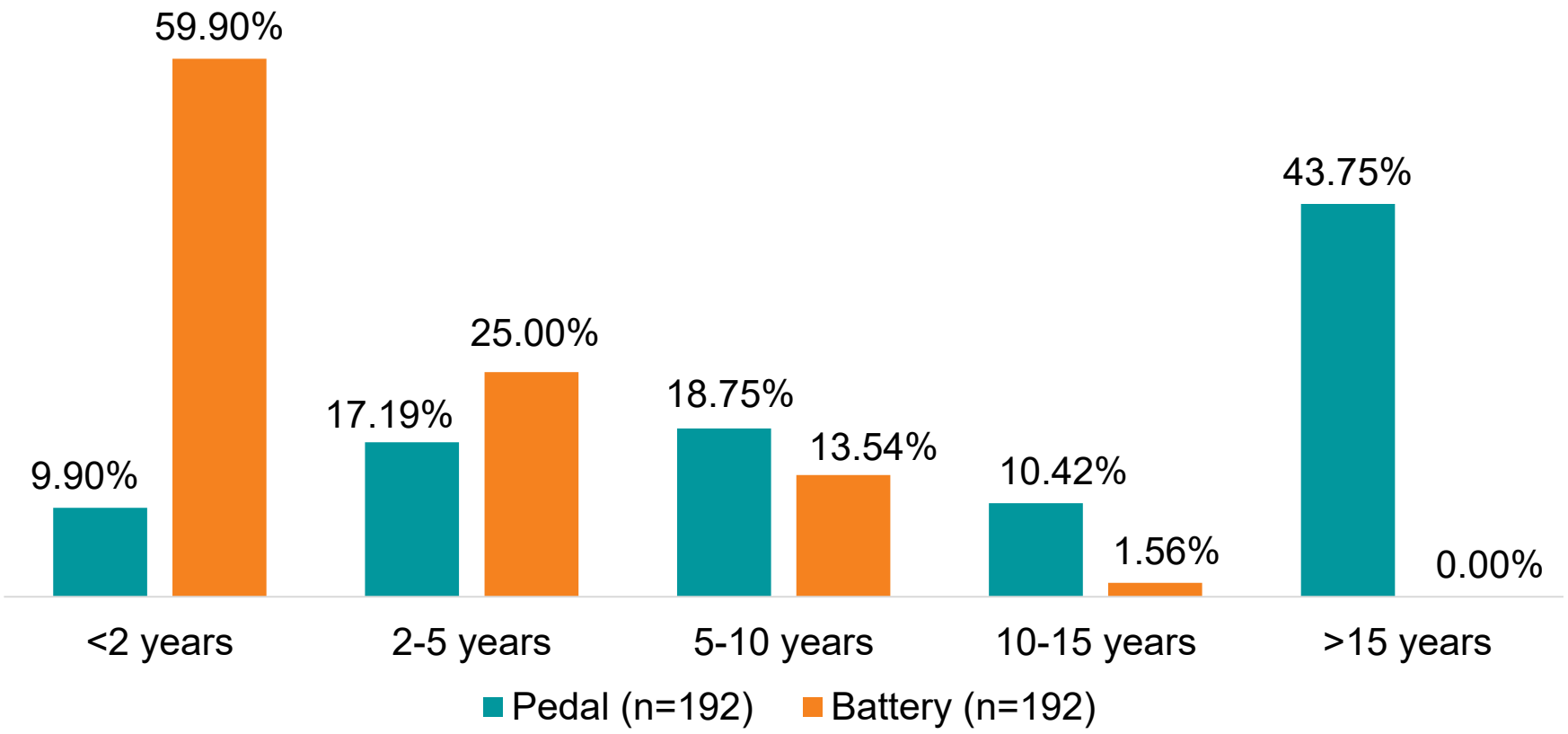
Rickshaws are mostly **illegal.** However, a larger proportion of **battery rickshaws** are **unregistered**.



Driving Experience of the Rickshaw Drivers

Pedal Drivers: Highly experienced veterans (Avg. 15 years of experience).

Battery Drivers: Inexperienced operators (59.90% have <2 years of experience).



Trip Breakdown for Rented and Self-Owned Rickshaws

Trips	Pedal Rickshaw	Battery Rickshaw
11 to 20	44.81%	24.19%
21 to 30	42.62%	36.56%
31 to 40	11.48%	26.88%
41 to 50	1.09%	12.37%

Battery rickshaw drivers complete a **higher number of trips** per day

12.57% of **pedal rickshaw drivers** complete **31-5**0 trips a day

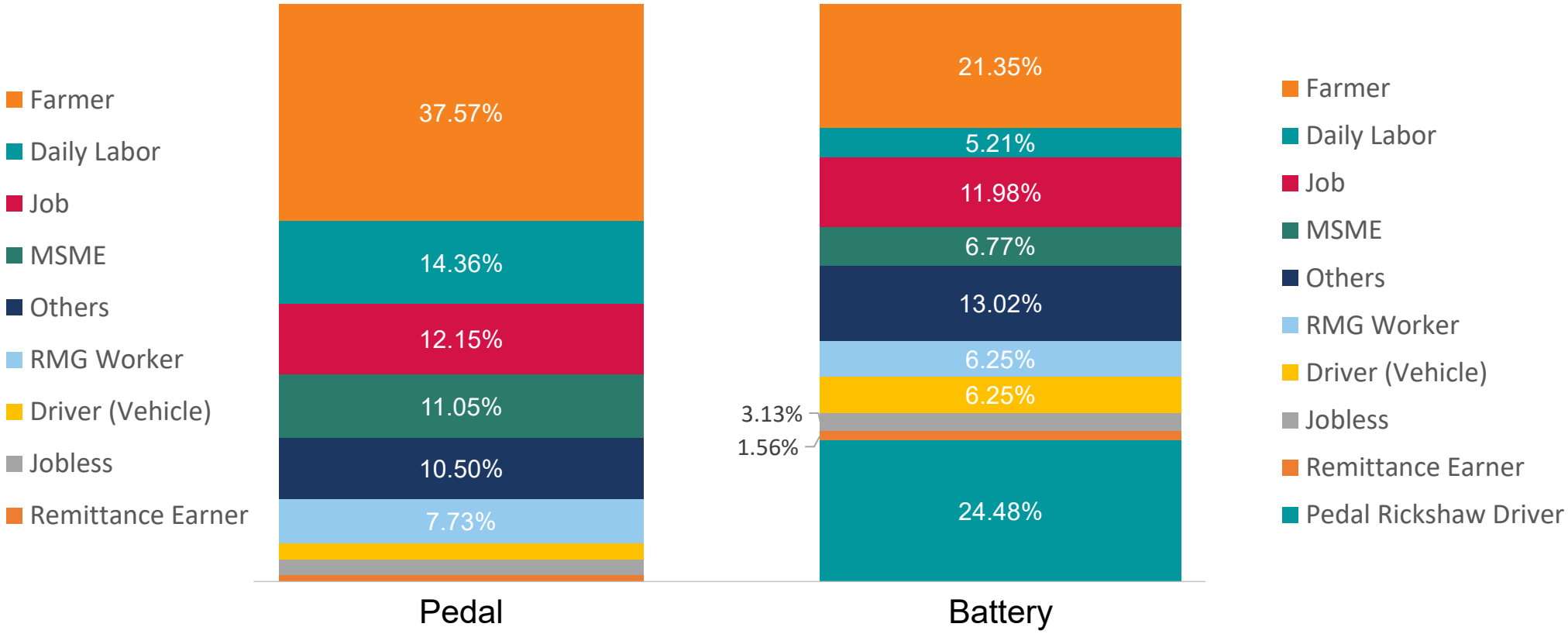
39.25% of the **battery rickshaw drivers** complete **31-50** trips per day.

Previous Profession of Rickshaw Drivers

Farmer - Largest group, 37.57% of pedal and 21.35% of battery drivers.

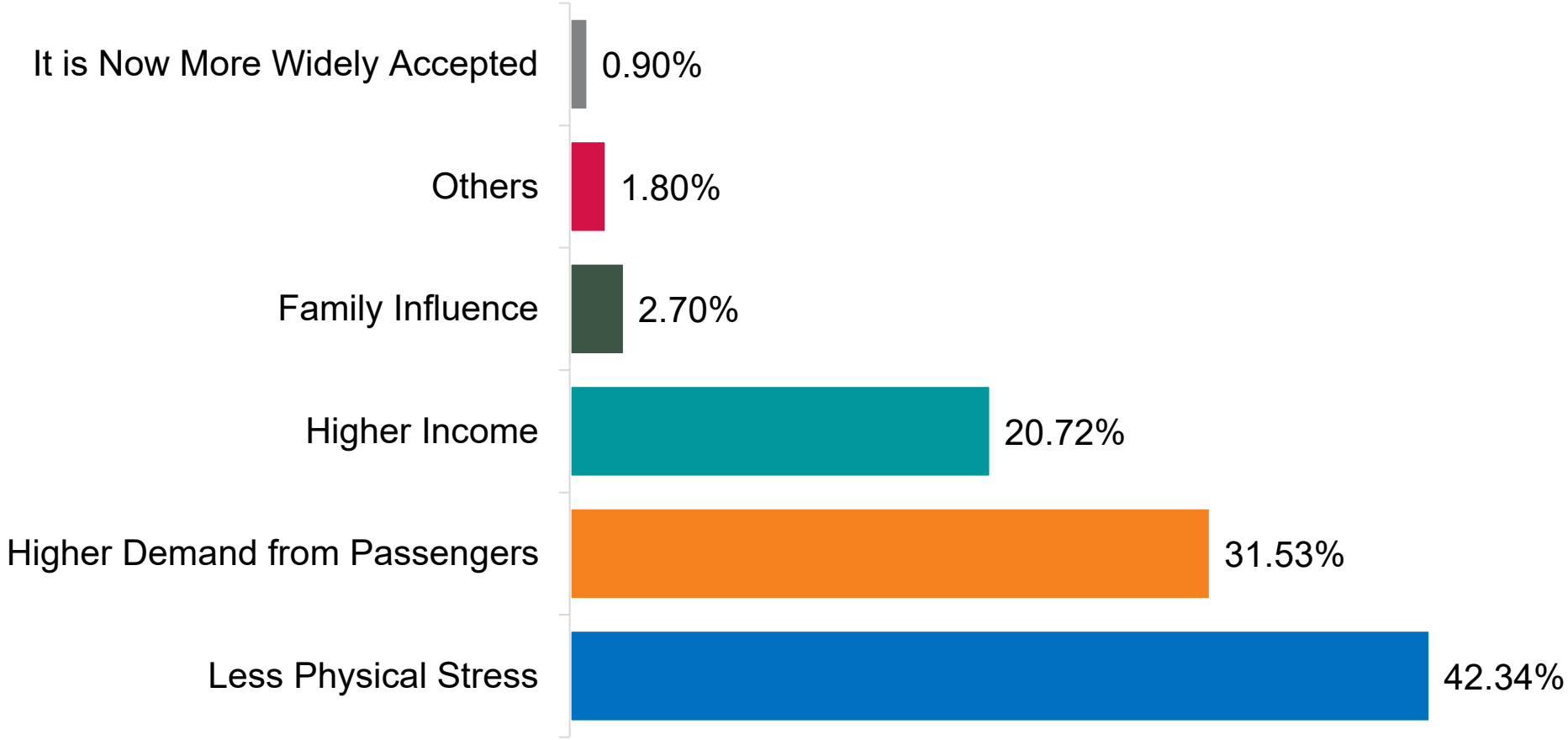
Pedal to Battery Transition - 24.48%

75% of battery rickshaw drivers are new entrants

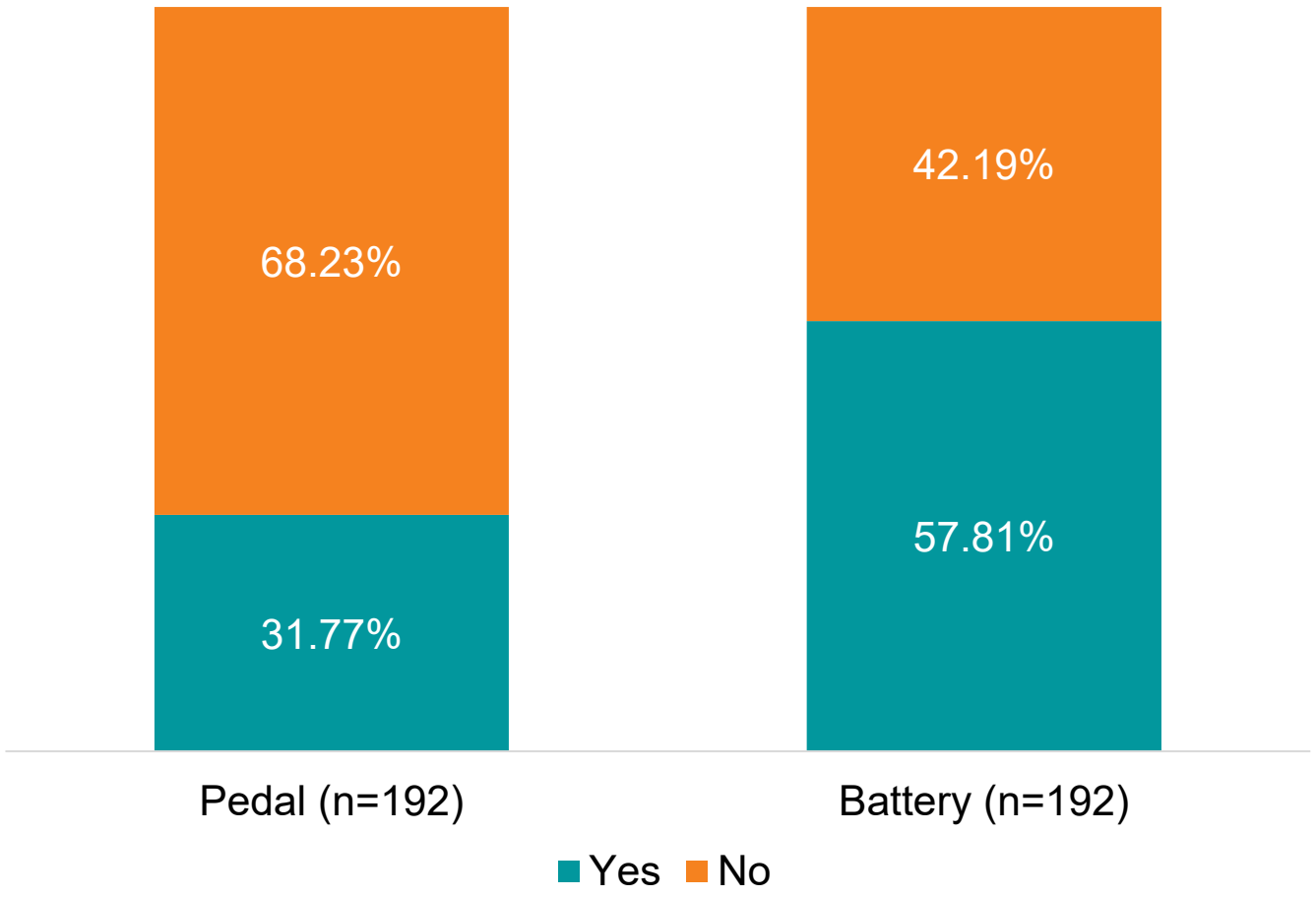


Transition Incentives for Rickshaw Drivers

Over 70% of drivers who switch from pedal to battery rickshaws cite reduced physical strain (42.34%) and stronger passenger demand (31.53%) as their primary motivations, with physical ease leading as the top factor.



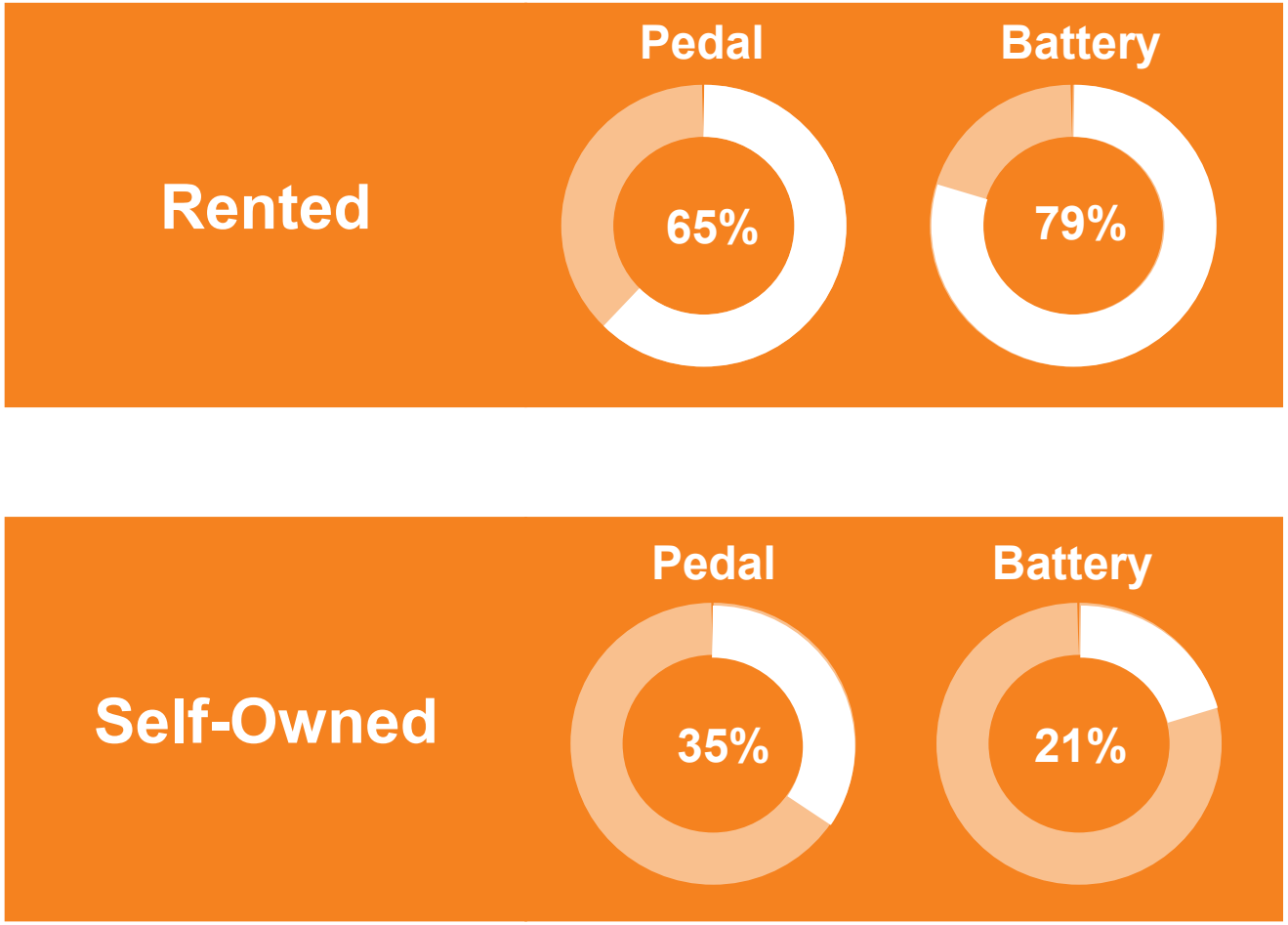
Income as a Driver of Transition



57.81% of battery drivers reported an **income increase** after switching, compared to only **31.77% of pedal drivers**.

Rickshaw Ownership and Earnings: Sources of Finance and Income

Ownership (Rented vs Self-Owned)

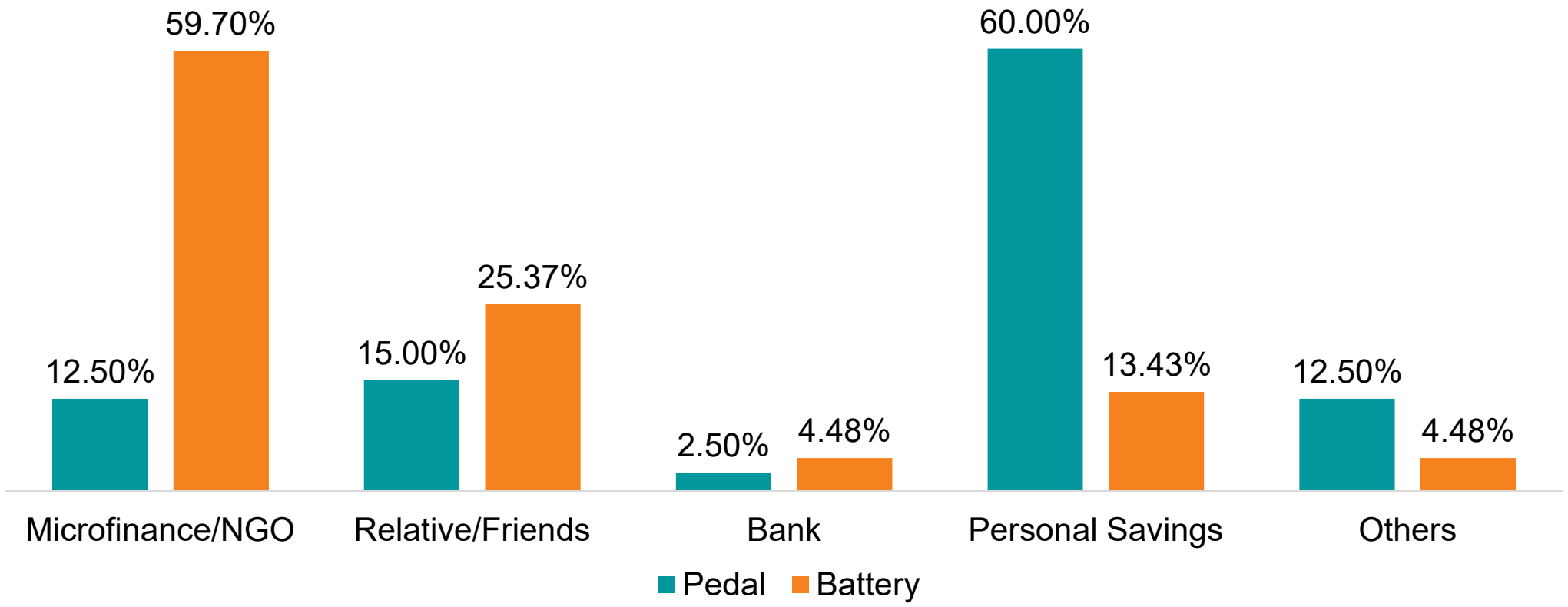


Most rickshaw drivers **cannot afford** to buy a rickshaw.

They primarily **rent**.

Financing Sources for Rickshaw Pullers

Most **pedal rickshaw pullers** invest in pedal rickshaws by using their **own savings**, whereas 51% of **battery rickshaw pullers** see **microcredit** as their main source of financing.



Income and Cost Breakdown

Income	Pedal	Battery
Average Daily Net Income for Rented Rickshaws	BDT 484	BDT 418
Average Daily Income for Self-Owned Rickshaws	BDT 530	BDT 970
Rental Payment	**Pedal**	**Battery**
Average Daily Rental Payment	BDT 132	BDT 414
Purchase Price	**Pedal**	**Battery**
Average **Purchase Price**	BDT 9,237	**BDT 83,194**

Garage Owner Perspective:

Owners prefer battery rickshaws because they command higher daily rent.

Why do passengers choose battery over pedal rickshaws?

The Market Demand

Profile of the Passenger

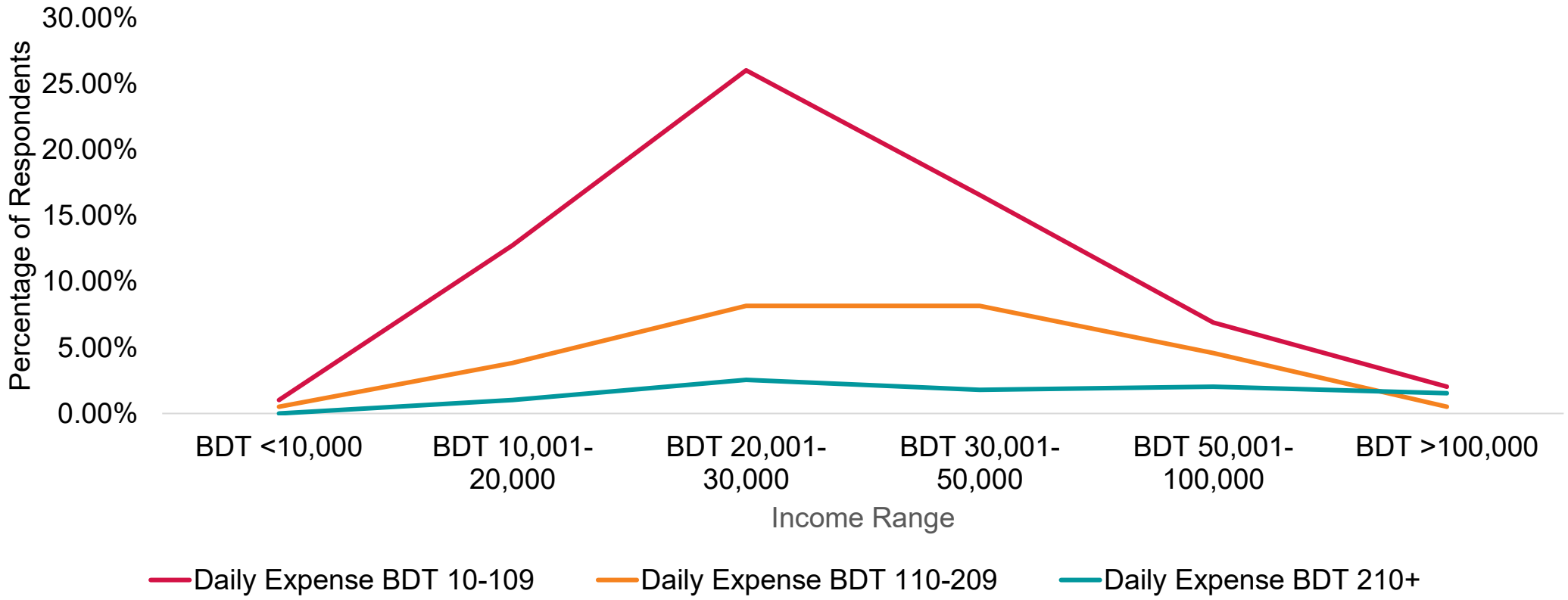
	Income Range				
Age Range	<20,000	**20,001-30,000**	30,001-50,000	50,000-100,000	>100,000
18-25	34.67%	**27.08%**	22.12%	22.64%	31.25%
26-34	21.33%	**29.86%**	25.96%	16.98%	18.75%
35-44	22.67%	**22.22%**	25.00%	33.96%	18.75%
45-54	18.67%	**12.50%**	18.27%	16.98%	12.50%
55-64	2.67%	**4.86%**	5.77%	7.55%	18.75%
65+	0.00%	**3.47%**	2.88%	1.89%	0.00%
n=	75	**144**	104	53	16

Rickshaw usage is highest among passengers earning **BDT 20,001–30,000.**

79% of the passengers within this income bracket are aged between **18 and 44 years.**

Relationship between Passengers' Income and Expense

Passenger spending on rickshaw rides rises with income up to the **BDT 20,001–30,000** bracket, after which higher-income groups show a declining reliance on rickshaws.

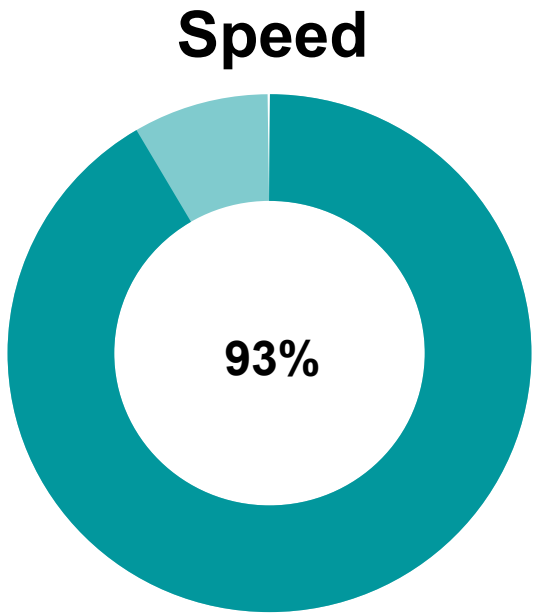


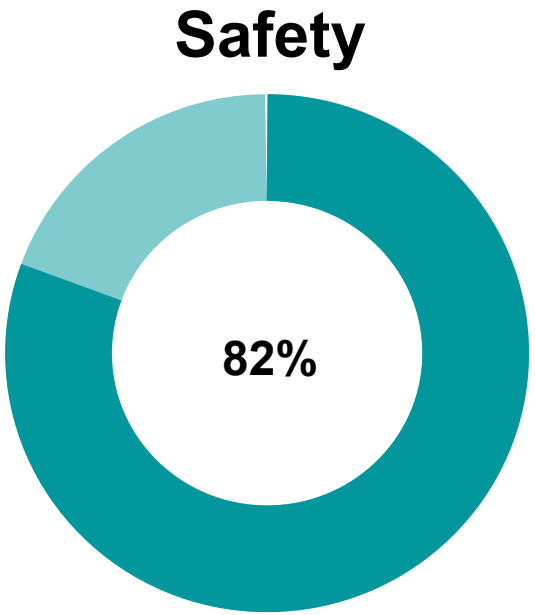
Passengers' Reasons for Travelling by Rickshaw

Rickshaw use is primarily tied to connectivity within the transport ecosystem**.** The top use of rickshaws is for **going to work (17.34%)** and then to **commute to public transport (13.77%).**

Purpose	Ranked as one
Going to office (workers/self-employed)	17.34%
Short ride to public transport	13.77%
Children's school (those with children)	9.94%
Carrying goods	9.18%
Shopping	8.16%
Students going to school/university	6.63%
Leisure/outing	5.35%
Other (hospital, relatives, tuition, etc.)	2.29%

Preference Between Safety and Speed



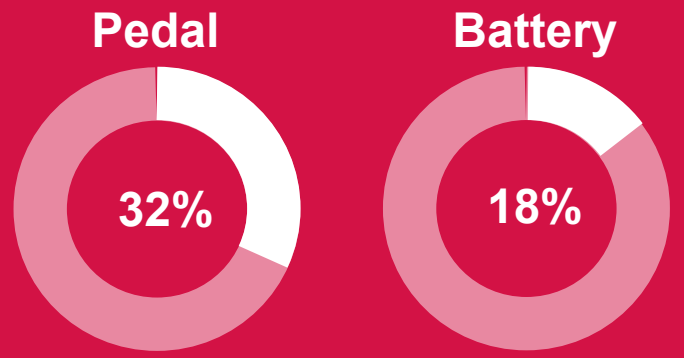


Despite safety fears, the functional need for speed drives 74% of passengers to use battery rickshaws for daily commutes.

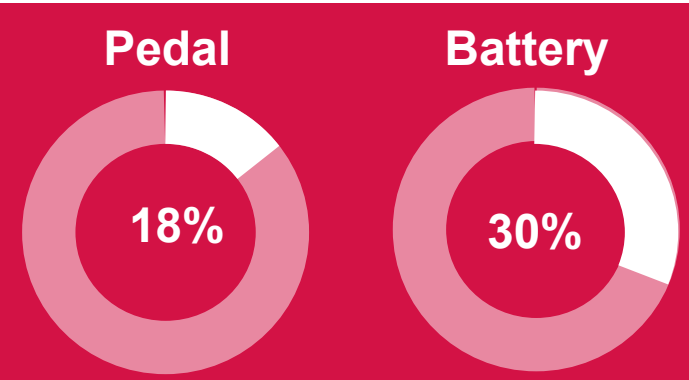
Critical Challenges
(Triangulating Perspectives)

Incidents of Accident

Accidents Reported by Rickshaw Drivers

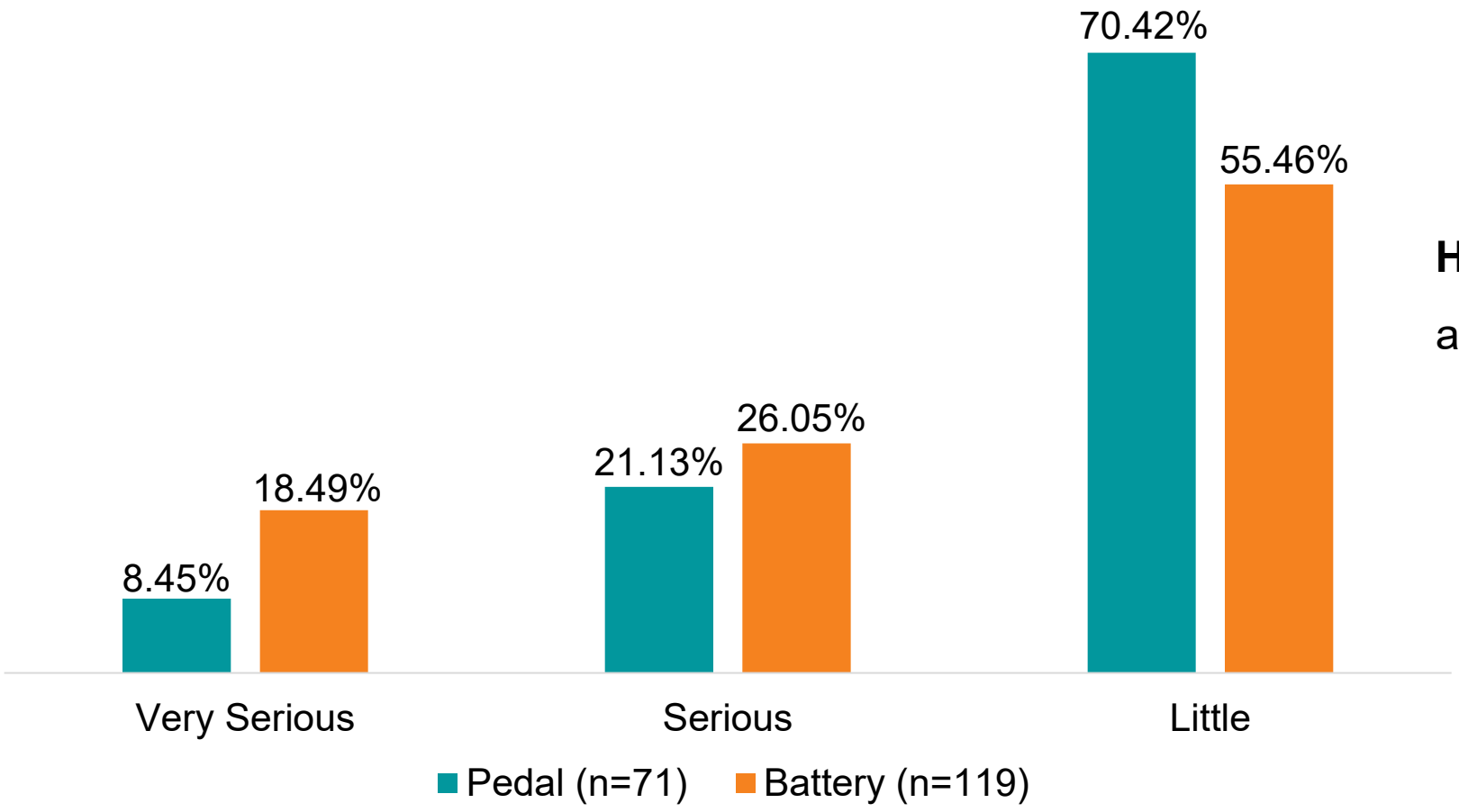


Accidents Reported by Rickshaw Passengers



Battery drivers likely **underreport accidents** due to fear of **regulatory crackdowns**.

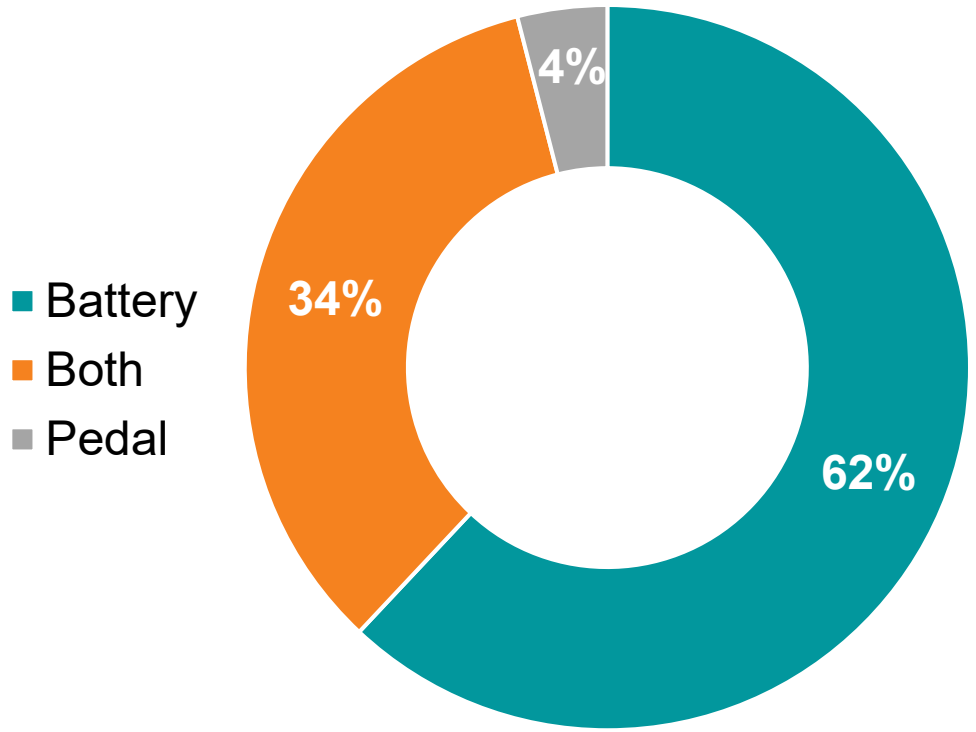
Accident Severity Amongst Passengers

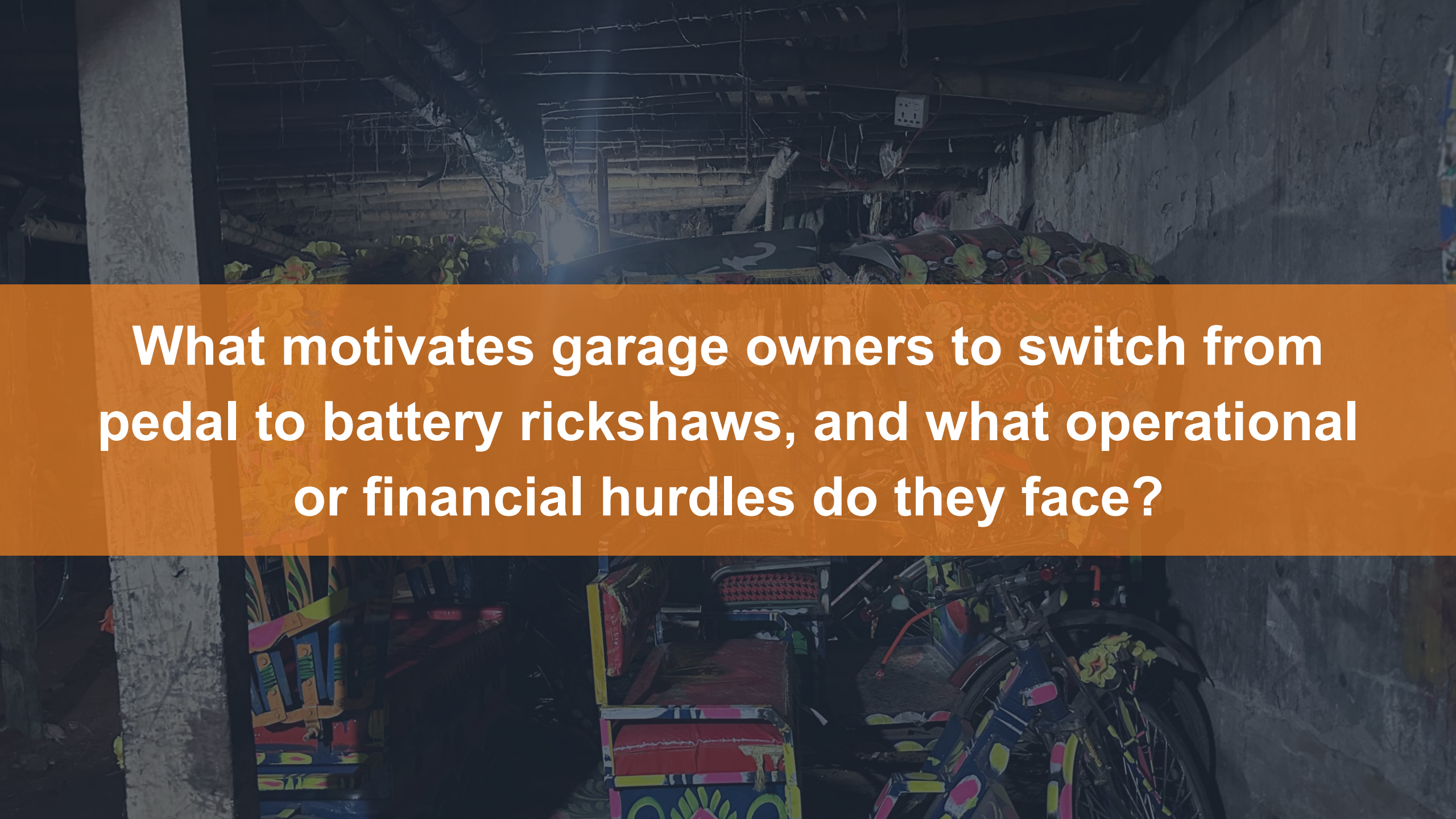


Higher incidence and severity of accidents associated with **battery-operated rickshaws**.

Vehicle Type Causing Traffic Congestion

62% respondent specifically blame **battery rickshaws** for the gridlock.

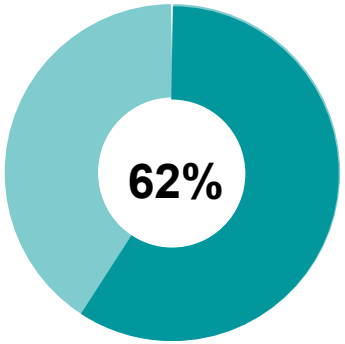




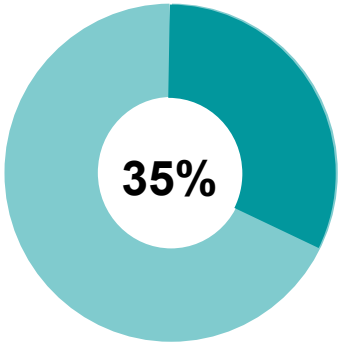
What motivates garage owners to switch from pedal to battery rickshaws, and what operational or financial hurdles do they face?

The Garage Owners’ Perspective

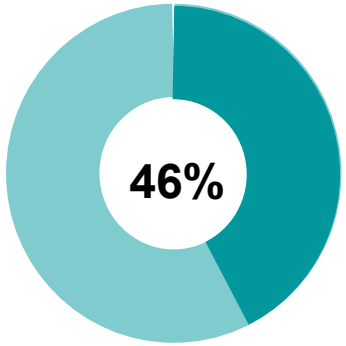
The Garage Owners' Incentives and Preferences



Garage owners **prefer battery rickshaws** over pedal rickshaws due to **high demand** and **greater income potential**



Transformed their **pedal fleets to battery rickshaws**

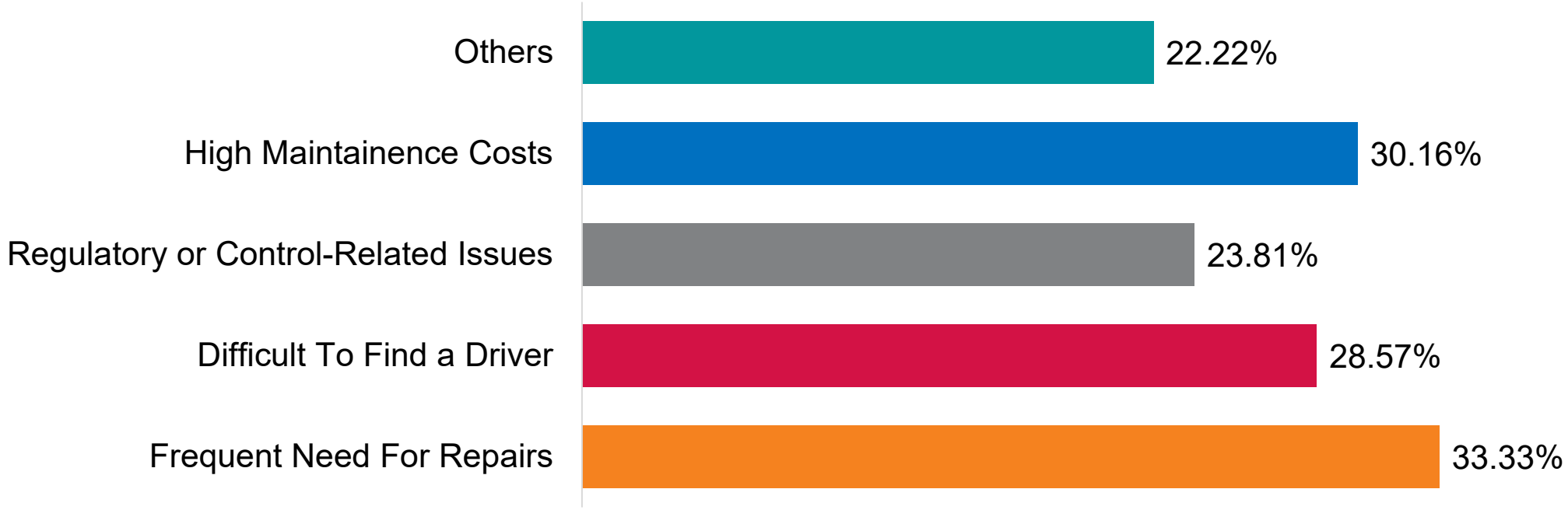


Willing to switch businesses:

- "modified" battery vehicles
- ride-sharing cars
- showing openness to modernization

Challenges Faced by Garage Owners

Almost two-thirds (63.49%) of the respondents consider high maintenance (30.16%) and frequent need for repair (33.33%) to be the most critical challenge to run a rickshaw garage.



Strategic Recommendations

Policy Recommendations

Standardize the Design of Battery Rickshaws

- The high rate of accidents reported by battery rickshaws suggests the need to improve and standardize their design.

Regulate Entry of New Battery Rickshaws; Facilitate Transition from Pedal to Battery

- Large number of battery rickshaw pullers are new entrants.
- They must be given alternative jobs while pedal rickshaw pullers are facilitated to transition to battery rickshaws through affordable credit.

Incentivize Formalization

- As pedal rickshaw pullers are supported to transition to battery rickshaws, affordable credit could be used to incentivize formalization

Policy Recommendations

Inspire Through Training and Traffic Awareness

- Offer traffic training and awareness support
- Bring the rickshaws under mass transit system to make the job functional and aspirational

Provide Alternatives to Rickshaws for Passengers

- Rickshaws are used primarily for short distance commutes.
- By improving walkways and removing congestion on walkways, the demand for traffic for shorter distance commutes could be reduced
- Alternative short-distance commute systems, like electric vehicles, can reduce demand for rickshaws

Institutional Framework for Implementation

Stakeholder	Responsibility
City Corporations (DNCC and DSCC)	Update and enforce vehicle registration and enforce zone-based restrictions to keep battery rickshaws on inner roads
Bangladesh Road Transport Authority (BRTA)	Establish national safety standards, speed limits, and formal licensing protocols for vehicles and drivers.
Dhaka Metropolitan Police (DMP)	Enforce traffic regulations, speed limits, and route restrictions to keep battery rickshaws off prohibited highways.
NGOs & MFI	Provide affordable credit to help drivers and garage owners transition from informal loans to standardized.
Private Sector	Partner with the public sector to introduce standardized electric vehicles and shift assembly toward regulated manufacturing.

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