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Assessing the Sustainability of Electric Motorcycle Taxi Business in East-Africa:

A Case Study Zembo, Kampala (Uganda)

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Overview

1. Context
2. Literature Review: **Fragmented infrastructure and service**
3. Case Study: **Zero Emission Mobility Boda (Zembo)**
4. Research Question: “**How to insert ourselves…**”
5. Methodology: **Surveys**
6. Expected Outcomes

Regular traffic jam in Kampala, Uganda

1. Research Context

Transdisciplinary research with members of different institutions

- i3-CRG, Management Research Center (Ecole polytechnique Cnrs, IPP): A. Amiraly
- Institute for Sustainable Mobility (ParisTech, Renault): J. Grébert
- Industrial Engineering and Management Systems (Amirkabir Univ.): M. Hasannia
- Urban Action Lab, Geography Department (Makerere University): P. Kasaija
- School of Environment and Sustainability (Michigan University): T. Courtright
- Funding: Chair Energy and Prosperity (Institut Louis Bachelier)

Context of the study

- Bottleneck : Public infrastructure deficiency
- Last mile connectivity : Private operators (Motorcycle/Boda)
- Electric micro-mobility : Insertion of private operators in a competitive market
- Difficulty : Vested interests (politicians, transport lobbies : formal/informal)

2. Literature review

Modern Infrastructure Ideal # Disruption

= network based system # alternative options

Splintering urbanism (Graham and Marvin, 2001; Graham 2010)

= fragmentation of the fabric of the cities

Heterogeneous infrastructure configurations

(Lawhon et al. 2018)

= Decentralized models

= innovations

(private companies)

Regular traffic jam in Kampala, Uganda

3. Case Study: Zembo

Development

- 2018 : Launch in Kampala (100 e-boda) 2021 (200 e-boda)
- Assembling chinese motorcycles (Uganda) + Lease and Own system
- Setting-up a network of Swapping stations (14 grid + 3 solar)
- Battery delivery + Swapping (Stations + Shops)

Model

- Vehicle loan (Tugende) : 2 years of instalments > Driver = Owner vehicle
- Battery delivery (Zembo) : Pay as you go > Source of income for Zembo
- Swapping system (Zembo) : Stations (Zembo) + Shops (Franchisee)

>Driver's centrality in the business: Income sustainability issue

> Sub contractors (Loan system with Tugende) : Duty of vigilance

Interview with an E-driver

Questions ahead

- Internalization of the leasing model > Externalization to be continued (no added value for Zembo)
- Management of swapping stations > Internalization to be continued (centrality of the model)

4. Research Question

RQ

How Zembo as an electric motorcycle company operates to capture the share of the competitive market of motorcycle taxi?

RQ 1

What are the income and the expenditures generated by the drivers' business (e-moto)?

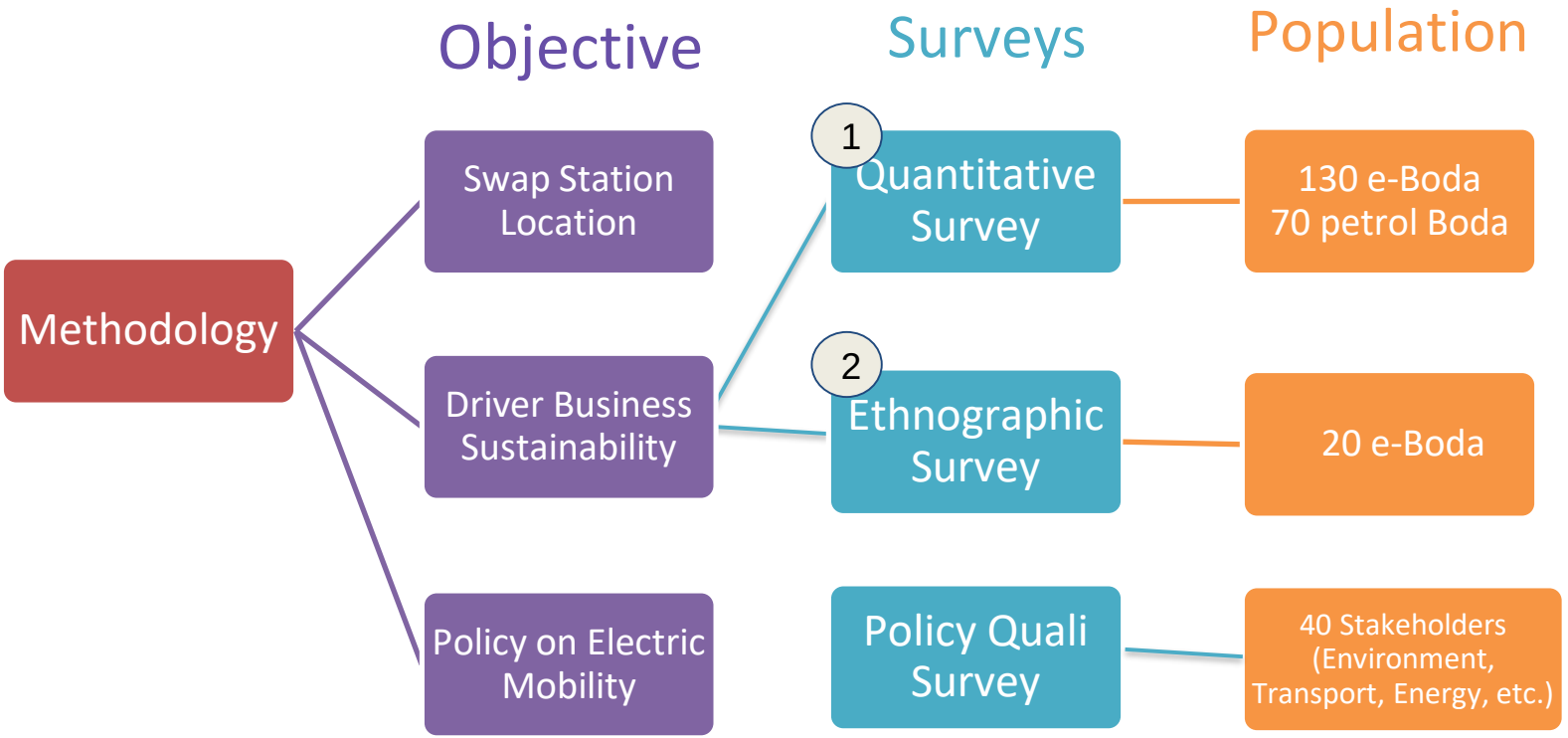
RQ 2

What kind of resources drivers mobilize to optimize their business?

RQ 3

How can these resources potentially impact their business?

5. Methodology: Surveys



5. Methodology: Quanti Survey (n:200)
13 Topics

1. Household's income and expenditures
2. Making the choice of an E-Boda
3. Trips: Time/Duration/Distance
4. Turnover & costs
5. Investing in an E-Boda
6. Willingness to change
7. Strengths & weaknesses
8. Stages
9. Swapping stations
10. Digital system
11. Payment system
12. Boda passenger relations
13. Improving infrastructure and service for E-Boda

Driver and passenger of E-motorcycle

Swapping Station of E-motorcycle

- Electric + Petrol
- Electric Motorcycles
- Petrol Motorcycles

5. Methodology: Quanti Survey (n:200)
Classification of questions

A - Reasons for shifting to E-Boda > INITIAL STEPS
D - Ways to acquiring an E-Boda > INITIAL STEPS

B - Daily activity / trips > ROUTINE E-BODA
C - Net Income (Turnover/Expenditures) > ROUTINE E-BODA

E - Willingness of Petrol-Boda drivers to acquire an E-Boda > OPINION, EXPERIENCE
F - Advantages/Weaknesses of vehicles > OPINION, EXPERIENCE

G H - Physical infrastructure > EXISTING "INFRA"
I J - Service use > EXISTING "SVC"
K - Relations with customers > EXISTING "RELATION"

L - Improvements for infrastructure and services > PROJECTION "INFRA"-"SVC"

6. Expected Outcomes (2022)

Article writing

Journal: Technological Forecasting and Social Change (2021-22)

> Call for paper: "Technology, stakeholder collaboration, and sustainable entrepreneurship in the SDGs"

> Applying this call for paper to our research:

- Technology > **E-mobility** = **Infra** (SS) + **Svc** (Mntc/Swap)
- Entrepreneurship > **Eco. sustainability** = Drivers income
- Stakeholder collab. > **Company + Govt. + Regulation**

Selected references

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