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Examining the Role of Yango Ride-Hailing in Enhancing Taxi Drivers' Income Generation: A Case Study of Lusaka District

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Abstract
This study examines the role of Yango ride-hailing on taxi drivers' income generation in Lusaka District, Zambia, focusing on income stability, scalability, and sustainability. It assesses the influence of Yango's pricing algorithms and commission structures, examines the effect of driver characteristics (experience, working hours, digital literacy, and customer service skills), and compares income patterns between Yango drivers and conventional taxi operators. A mixed-methods approach was employed, analyzing survey data from 150 drivers (100 Yango, 20 dual, 30 conventional) and 30 in-depth interviews using descriptive statistics, t-tests, regression analysis, and thematic analysis. Findings indicate Yango drivers earn 134.8% higher net income (ZMW 1,605.5 vs. ZMW 683.8 weekly) than conventional operators, moderating to 30.8% when controlling for working hours, aligning with a hypothesized 25–40% advantage. High digital literacy and customer service skills increase earnings by 16.5–24.4%, while experience and longer hours enhance scalability. However, high commission fees (16–25%) and operational costs (ZMW 1,123.5/week) undermine sustainability. The study recommends policy reforms to cap commissions, provide fuel subsidies, and enhance driver training to improve income outcomes and support Zambia's digital economy.

Keywords: Ride-Hailing, Yango, Income Generation, Taxi Drivers, Pricing Algorithms, Commission Fees

1. Introduction

Digital ride-hailing platforms have transformed urban transportation globally, offering new income opportunities for drivers while introducing challenges such as high commissions and operational costs. In Zambia, where informal transport employs approximately 28% of the working population (ZamStats, 2022), Yango's introduction in 2022 has reshaped Lusaka's taxi industry. This study investigates Yango's role in enhancing taxi drivers' income generation in Lusaka District, focusing on stability, scalability, and sustainability. Despite the platform's promise of higher earnings through increased trip volumes, limited empirical evidence exists on its economic impact in Zambia, where traditional taxi operators face declining competitiveness due to digital platforms (Mbatha & Mkhize, 2020). Challenges such as high commission fees (15–20%) and operational costs (fuel, maintenance) may erode net profits, while surge pricing may deter price-sensitive passengers (Chongo & Mwale, 2023). This study addresses these gaps by assessing Yango's business model and its interplay with driver characteristics and market dynamics.

1.1 General Objective

To examine the role of Yango ride-hailing in enhancing taxi drivers' income generation in Lusaka District.

1.1.1 Specific Objectives

1. To assess the influence of Yango's pricing algorithms and commission structures on drivers' net income, controlling for operational costs.
2. To evaluate the relationship between driver characteristics (experience, working hours, digital literacy, customer service skills) and income outcomes.
3. To compare income generation patterns between Yango drivers and conventional taxi operators, assessing the platform's value addition.

1.1.2 Hypotheses

H1: Taxi drivers utilizing Yango platform exhibit 25-40% higher income generation capacity than conventional taxi operators, after controlling for operational costs and working hours. H0: Taxi drivers utilizing Yango platform exhibit < 25% higher income generation capacity than conventional taxi operators, after controlling for operational costs and working hours.
H1: The positive relationship between platform use and income generation weakens significantly ($\beta = -0.35$, $p < 0.05$) when accounting for vehicle maintenance costs and platform commission fees. H0: The positive relationship between platform use and income generation does not weaken significantly ($\beta = 0$, $p \geq 0.05$) when accounting for vehicle maintenance costs and platform commission fees.
H1: Drivers with higher digital literacy and customer service skills demonstrate 15-20% greater income generation from the platform compared to peers with equivalent working hours. H0: Drivers with higher digital literacy and customer service skills do not achieve 15–20% greater income generation from the platform compared to peers with equivalent working hours.

1.2 Conceptual Framework

The conceptual framework (Figure 1.1) illustrates the relationship between Yango's operational features (independent variables: pricing algorithms, commission structures) and income generation (dependent variable: net earnings, stability, scalability). Moderating variables include driver characteristics (experience, working hours, digital literacy, customer service skills) and contextual factors (market conditions, regulatory environment). Adapted from Kenney and Zysman's (2016) [29] Digital Platform Ecosystem Model, the framework highlights how platform design and local conditions shape income outcomes in Lusaka's taxi industry.

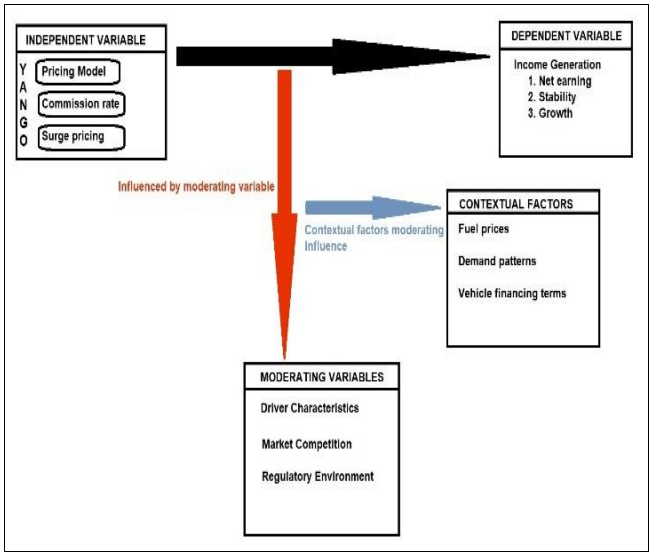

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Fig 1.1: Conceptual framework for assessing Yango's impact on taxi drivers' income generation

2. Literature Review

2.1 Influence of Pricing Algorithms and Commission Structures

Ride-hailing platforms, such as Yango, Uber, and Bolt, leverage dynamic pricing algorithms and commission-based revenue models to optimize driver earnings and operational efficiency. These mechanisms fundamentally reshape income generation in urban transport by balancing supply and demand, but they also introduce significant challenges, including income volatility and reduced net profits due to platform fees. This section synthesizes global, African, and Zambian literature to explore how pricing algorithms and commission structures influence taxi drivers' net income, with a particular focus on their implications for income stability, scalability, and sustainability in Lusaka District's socio-economic and regulatory context.

Dynamic pricing algorithms, often referred to as surge pricing, adjust fares in real-time based on factors such as passenger demand, driver availability, traffic conditions, and time of day. In the United States, Rosenblat and Stark (2016) [41] found that Uber's surge pricing can increase drivers' hourly earnings by up to 50% during peak demand periods, such as rush hours or major events, by incentivizing drivers to work when demand is high. This flexibility allows drivers to capitalize on increased fares, reducing idle time and boosting trip frequency compared to traditional taxi systems with fixed fares. Similarly, Chen and Sheldon (2015) [16] demonstrated that Uber drivers in U.S. cities who strategically work during surge periods earn 20–30% more per hour than those operating in low-demand windows, highlighting the potential of algorithmic pricing to enhance income scalability. However, these benefits are tempered by challenges. Rosenblat (2018) [40] argues that during low-demand periods, algorithmic fare reductions can push earnings below sustainable levels, creating financial uncertainty for drivers reliant on ride-hailing as their primary income source. Moreover, platform commissions, typically ranging from 20–25% on Uber, disproportionately affect short, low-value trips, where fees consume a larger share of the fare, further eroding net income. Drivers also bear operational costs such as fuel, vehicle maintenance, and insurance, which exacerbate income volatility during off-peak periods.

In the African context, ride-hailing platforms have similarly transformed urban transport but face unique challenges due to informal economies and weaker regulatory frameworks. Ndung'u (2019) notes that in Nairobi, platforms like Bolt and Uber increase driver earnings by up to 30% compared to traditional taxis, driven by efficient ride allocation through GPS-enabled algorithms. These systems reduce passenger wait times and optimize driver routes, enhancing trip volumes and income scalability. However, Abiona and Koppensteiner (2021) highlight that commission rates, typically 15–25% across African markets, significantly reduce net income, particularly in price-sensitive markets where passengers resist surge pricing. In Nigeria, Adi and Afolayan (2022) [2] found that drivers on platforms like Bolt face income instability due to inconsistent surge pricing and high operational costs, such as fuel, which account for 30–40% of weekly expenses. These findings underscore the tension between platform efficiency and the financial burdens imposed by commissions and costs, which weaken income sustainability.

In Zambia, the introduction of Yango in 2022 has reshaped Lusaka's transport sector, where informal transport employs approximately 28% of the workforce (ZamStats, 2022). Preliminary surveys indicate that Yango's commission rates, ranging from 15–20%, reduce drivers' net profits despite higher trip volumes averaging 11–15 daily trips compared to 6–10 for conventional taxis (Chongo & Mwale, 2023). Surge pricing offers moderate income boosts, with 70% of

drivers reporting 10–20% earnings increase during peak periods, but its inconsistency (3–14 times weekly) limits reliability (Banda *et al*., 2023) [6]. Additionally, opaque pricing algorithms frustrate drivers, who often lack clarity on fare calculations, as noted in qualitative studies: "I don't understand how Yango sets fares, and the commission cuts too much" (Simatele & Tembo, 2023) [47]. High operational costs, particularly fuel (ZMW 1,123.5/week for Yango drivers vs. ZMW 850 for conventional operators), further challenge income sustainability, aligning with global concerns about platform economies (Rogers, 2015). Unlike developed markets, Zambia's limited regulatory oversight exacerbates these issues, as the Road Transport and Safety Agency (RTSA) lacks specific policies for ride-hailing platforms (RTSA, 2024).

The literature suggests that while pricing algorithms enhance income scalability through increased trip efficiency, commission structures and operational costs introduce significant barriers to income stability and sustainability. In Lusaka, these dynamics are amplified by local market conditions, including fuel price volatility and competition with traditional taxis. This study addresses a critical gap by examining how Yango's pricing and commission models interact with Lusaka's socio-economic landscape, providing empirical evidence to inform policies that balance platform efficiency with driver welfare.

2.2 Driver Characteristics and Income Outcomes

Globally, driver experience and working hours are critical determinants of income on ride-hailing platforms. Wu *et al*. (2021) [55] found that experienced drivers in the United States, particularly those with over five years of driving, earn higher incomes due to strategic route selection and familiarity with high-demand periods, such as rush hours or events. This scalability advantage allows experienced drivers to optimize trip frequency, reducing idle time compared to less experienced peers. Similarly, Chen *et al*. (2019) [17] highlights those drivers working longer hours (10–12 hours daily) on platforms like Uber achieve higher earnings by capitalizing on peak demand, though this often comes at the cost of fatigue, raising sustainability concerns. Rosenblat (2018) [40] notes that reliance on extended hours reflects the precarious nature of platform work, particularly in markets with limited labor protections, a dynamic relevant to Lusaka's informal economy, where drivers often lack alternative income sources.

Digital literacy is a key factor in enhancing income scalability on ride-hailing platforms, as it enables drivers to navigate apps efficiently and accept rides quickly. In Nairobi, Gachoka *et al*. (2022) [24] found that drivers with high digital literacy, proficient in using GPS navigation and ride-hailing apps, increase their daily trip volumes by up to 20%, leading to higher earnings compared to less tech-savvy peers. This aligns with global studies, such as Hall and Krueger (2018) [26], which report that Uber drivers with strong app proficiency in the U.S. reduce downtime and improve ride allocation efficiency. In Zambia, Mweemba and Tembo (2023) [36] suggest that tech-savvy Yango drivers in Lusaka leverage the platform's features to maximize trips, but skill gaps among newer drivers, particularly those transitioning from conventional taxis, limit their income potential. These gaps are exacerbated by limited access to digital training in Zambia's informal sector, where only 35% of drivers have formal technology education (Simatele & Nkonde, 2021) [46].

Customer service skills also play a significant role in income generation, as high passenger ratings influence ride allocation on algorithmic platforms. Wu *et al*. (2021) [55] note that drivers with strong interpersonal skills, such as courteous communication, receive better ratings, leading to more ride assignments and up to 15% higher earnings in global markets. In African contexts, Gachoka *et al*. (2022) [24] report that Nairobi drivers with superior customer service skills earn 10–15% more due to increased tips and ride frequency, a trend applicable to Lusaka, where passenger satisfaction drives platform ratings (Chanda & Mbewe, 2023) [14]. However, the pressure to maintain high ratings can create stress, particularly in price-sensitive markets where passengers expect low fares, as noted by Adi and Afolayan (2022) [2] in Nigeria. In Lusaka, Mweemba and Tembo (2023) [36] highlight that drivers with limited customer service training struggle to compete, underscoring the need for platform-provided skill development.

The literature underscores that driver characteristics moderate the relationship between platform use and income, as outlined in the conceptual framework. In Lusaka, local challenges, such as informal employment structures, amplify the importance of experience and skills. The absence of regulatory support and driver training further complicates skill acquisition. These dynamics suggest that while experienced and skilled drivers can leverage Yango's platform for higher earnings, less skilled drivers face barriers, necessitating interventions to enhance digital literacy and customer service training to ensure equitable income opportunities.

2.3 Yango vs. Conventional Taxi Operators

Globally, ride-hailing platforms outperform traditional taxis by leveraging technology to increase trip volumes and reduce idle time. Hall and Krueger (2018) [26] found that Uber drivers in the United States earn 30–50% more per hour than traditional taxi drivers due to efficient ride-matching algorithms and flexible scheduling. Similarly, Henao and Marshall (2019) [27] report that Denver's ride-hailing drivers achieve higher trip frequencies, reducing downtime by 20–30% compared to conventional taxis, which rely on street hailing or fixed stands. These efficiency gains enhance income scalability, as platforms optimize driver utilization during peak demand. However, Rosenblat (2018) [40] notes that high commission fees (20–25% for Uber) and operational costs, such as fuel and maintenance, erode net income, particularly for short trips, challenging sustainability. These global trends provide a benchmark for understanding Yango's effects in Lusaka, where technological adoption is tempered by local economic constraints.

In African contexts, ride-hailing platforms demonstrate similar advantages but face unique challenges due to informal economies and price-sensitive markets. Adebayo and Iweala (2020) [1] report that in Lagos, ride-hailing drivers earn 20–30% more than conventional operators due to higher trip volumes enabled by GPS navigation and real-time ride matching. In Nairobi, Ndung'u (2019) notes that Bolt and Uber drivers benefit from reduced passenger wait times and optimized routes, increasing daily earnings by up to 30% compared to traditional taxis. However, Abiona and Koppensteiner (2021) highlight that commission rates (15–25%) across African markets significantly reduce net

income, particularly in low-demand periods when promotional discounts lower fares. In Nigeria, Adi and Afolayan (2022) [2] found that fuel costs, accounting for 30–40% of weekly expenses, further erode earnings, a concern relevant to Lusaka, where fuel prices rose by 25% between 2021 and 2023 (ZIPAR, 2023).

In Zambia, Yango's introduction in 2022 has reshaped Lusaka's transport sector, where informal transport employs 28% of the workforce (ZamStats, 2022). Preliminary surveys indicate that Yango drivers achieve 11–15 daily trips compared to 6–10 for conventional taxis, driven by GPS navigation and electronic payments that streamline operations (Chongo & Mwale, 2023). These features reduce idle time and enhance income scalability, as noted by Banda *et al*. (2023) [6]. However, Yango's commission rates and high operational costs challenge sustainability Chongo & Mwale, (2023). Competition with conventional taxis, which rely on fixed fares and personal networks, intensifies market pressures, particularly in price-sensitive areas like Kamwala (Simatele & Tembo, 2023) [47]. The lack of regulatory oversight by the Road Transport and Safety Agency (RTSA, 2024) exacerbates these challenges, as traditional taxis face no platform fees but struggle with declining competitiveness (Mbatha & Mkhize, 2020).

The literature suggests that Yango's technological advantages enhance income generation compared to conventional taxis, but high costs and market dynamics pose barriers to sustainability. The conceptual framework highlights how platform features and contextual factors, such as Zambia's informal economy and fuel price volatility, shape these outcomes. This study fills a critical gap by providing a localized analysis of Yango's value addition in Lusaka, informing policies to balance efficiency gains with driver welfare.

2.4 Literature Gap

The literature review reveals a significant gap in empirical research on the impact of ride-hailing platforms like Yango on taxi drivers' income generation in Zambia, particularly in Lusaka District. While global studies, such as Rosenblat and Stark (2016) [41], highlight the benefits and challenges of dynamic pricing and commissions in developed markets, and African studies like Ndung'u (2019) and Adebayo and Iweala (2020) [1] document ride-hailing's economic effects in cities like Nairobi and Lagos, there is limited localized evidence on Zambia's context. Existing Zambian studies (e.g., Chongo & Mwale, 2023; Mweemba & Tembo, 2023 [36]) provide preliminary insights into Yango's operational efficiency but lack comprehensive analyses of how pricing algorithms, commission structures, and driver characteristics interact with Lusaka's socio-economic and regulatory environment to shape income stability, scalability, and sustainability. This study addresses this gap by providing a mixed-methods analysis of Yango's economic impact, offering evidence to inform context-specific policies for Zambia's digital transport sector.

3. Research Methods

The study adopts a descriptive research design, combining quantitative and qualitative methods to provide a comprehensive understanding of Yango's impact on drivers' income generation. The quantitative component involves analyzing earnings data to assess income stability, scalability, and sustainability, while the qualitative component includes in-depth interviews to capture drivers' experiences and perceptions.

3.1 Target Population & Sampling

The population comprised taxi drivers in Lusaka District. A sample of 150 drivers (100 Yango, 20 dual, 30 conventional) was selected using stratified random sampling, ensuring representation across driver types. Additionally, 30 drivers were purposively sampled for in-depth interviews to capture qualitative insights.

3.2 Data Collection

The study will employ self-administered questionnaires. These self-administered questionnaires will be used because they are an easy and fast way of collecting quality data. The questionnaires will be distributed via physical and online methods. In these questionnaires, a five-point Likert scale was used to ease data processing and analysis. The scale was marked 1-5 where; 1 represented strongly disagree and 5 strongly agree. The data to be obtained will mainly be primary sourced through the use of questionnaires and interviews. 150 questionnaires will be self-administered with opened ended and closed ended questions to Taxi Operators. Proper guidance will be offered to ensure accurate supply of information.

For Qualitative data collection, interviews will be conduction using the most convenient means selected by the selected stakeholders respectively.

3.3 Sample Size Determination

Sample size refers to the number of items to be selected from the universe to constitute the sample, and this answers how many sampling units should be surveyed and interviewed, (Kothari 1990). The Sample size of this study was determined based on recommendation of the research supervisor who guided that 150 respondents would be adequate. Computation using Cochrane formula confirmed that a sample size of 150 yields a margin of error of approximately 8% at 95% confidence levels, which is acceptable for this research context. Therefore, 150 respondents were selected as a target sample size to ensure both methodological rigor and feasibility.

The sample size was determined using Cochran formula. Where the total population is unknown, the sample size was determined with a 95% confidence interval, 150 targeted respondents (n), and a margin of error to be < or = 5%.

$$\hat{P} \pm z\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

$$\text{Margin of Error} = z\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

Therefore ME < or = 5%

Where:

Z= Z score

n=Sample size

$\hat{P}$=Sample population.

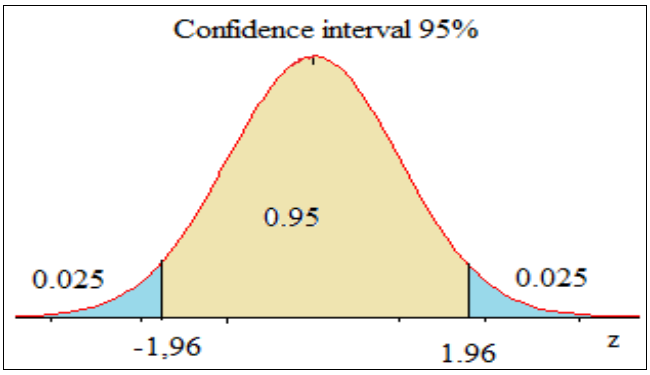

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Fig 3: Confidence intervals at 95%

Z score = 1.96

To maximize $\hat{p}(1-\hat{p})$ we assume $\hat{p} = 0.5$

$$1.96\sqrt{\frac{0.5(1-0.5)}{150}} = \text{Margin of error}$$

$$\sqrt{\frac{0.5(1-0.5)}{150}} = 0.0408$$

1.96 (0.0408) = 0.08

ME = 0.0255102

According to Cochrane, (1997) [20], this is acceptable for exploratory and descriptive studies. Similarly, Saunders *et al*., (2019) [42] emphasizes feasibility in determining sample sizes for social science research, which informs decision based on practical consideration such as time, budget constraints and accessibility of the target population. Therefore, the sample size of 150 was deemed statistically adequate and practically achievable.

3.4 Data Analysis

3.4.1 Qualitative Analysis

The researcher will use thematic analysis as it looks at patterns of meaning in a data set. Thematic analysis takes bodies of data and groups them according to similarities in other words, themes. These themes help us make sense of the content and derive meaning from it.

3.4.2 Quantitative Analysis

Quantitative data were analyzed using descriptive statistics (means, percentages), t-tests, and regression analysis in Excel to test hypotheses.

4. Findings and Results

4.1 Influence of Pricing Algorithms and Commission Structures

This section examines the impact of Yango's pricing algorithms and commission structures, with a specific focus on testing Hypothesis H2, which states that the positive relationship between platform use and income generation weakens significantly ($\beta = -0.35$, $p < 0.05$) when accounting for vehicle maintenance costs and platform commission fees. The analysis draws on quantitative data from 150 drivers (100 Yango, 20 dual, 30 conventional) and qualitative insights from 30 in-depth interviews, using descriptive statistics, regression analysis, and thematic analysis to assess Hypothesis H2 and the broader economic impact in Lusaka's socio-economic context.

Yango's dynamic pricing adjusts fares based on real-time factors such as passenger demand, driver availability, traffic conditions, and time of day. The study found that surge pricing boosts earnings by 10–20% for 70% of Yango drivers, particularly during peak periods like morning and evening commutes or special events such as the Lusaka Agricultural Show.

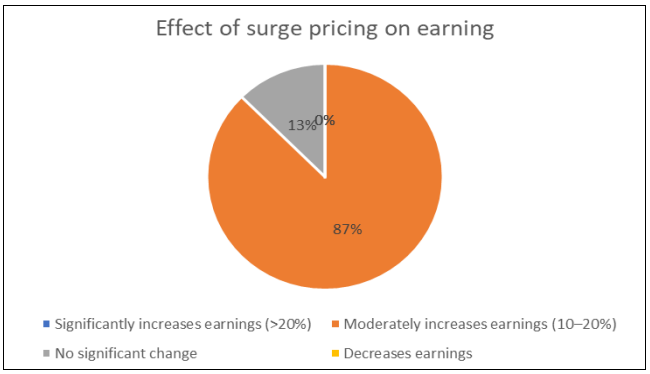

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Fig 4.1.1: Effects of surge pricing on earnings

However, surge pricing is inconsistent, occurring 3–14 times weekly (mean 8.5, SD 2.3), which limits its reliability as a stable income source. A Yango driver noted, "Surge pricing helps my earnings, but I can't count on it. Some days I get it, some days I don't" (Interview, Yango driver, Kabulonga). This variability aligns with global studies, such as Rosenblat (2018) [40], which highlight income volatility in platform economies due to unpredictable algorithmic pricing. Commission fees, ranging from 16–25% (mean 18.5%), and operational costs, averaging ZMW 1,123.5 per week, significantly erode Yango drivers' net income compared to conventional operators', who face no commission fees.

To test Hypothesis H2, regression analysis was conducted to assess the impact of operational costs and commission fees on the relationship between platform use and net income.

Platform Hours Weekly × Maintenance Costs interaction **($\beta_5 = 0.99$, $p = 0.00032$)** contradicts H2 **($\beta = -0.35$ and $p < 0.05$),** suggesting that maintenance costs enhance income for high-hour drivers, likely due to their low magnitude.

Platform Hours Weekly × Service Fees interaction **($\beta_6 = -0.03$, $p = 0.1055$)** indicates a slight weakening of the platform-income relationship, aligning with the hypothesized H2 **($\beta = -0.35$ and $p < 0.05$),** direction but lacking statistical significance and having a smaller effect size than expected ($\beta = -0.35$).

The multiple regression analysis partially supports Hypothesis H2. The Platform Hours Weekly × Service Fees interaction ($\beta_6 = -0.03$, $p = 0.1055$) indicates a slight weakening of the platform-income relationship, aligning with the hypothesized direction but lacking statistical significance and having a smaller effect size than expected ($\beta = -0.35$).

The Platform Hours Weekly × Maintenance Costs interaction ($\beta_5 = 0.99$, $p = 0.00032$) contradicts H2, suggesting that maintenance costs enhance income for high-hour drivers, likely due to their low magnitude. Therefore, we reject Alternative hypothesis and accept Null hypothesis. These findings highlight the complex role of operational costs in Yango's platform economy, underscoring the need

for targeted interventions to ensure sustainable income generation for drivers in Lusaka District.

Fig 4.1.3: Costs comparison

Driver type	Mean Operational cost/Week	Commission rate (% of gross income)
Yango	11123.5	16 – 25%
Conventional	450	0%

Source: Primary

This finding is consistent with regional studies, such as Abiona and Koppensteiner (2021), which note that high platform commissions in African markets reduce the financial advantages of ride-hailing.

Transparency issues further complicate the effects of pricing algorithms, as drivers report frustration with Yango's opaque fare calculations. One driver stated, "Yango's 20% commission cuts my profits, and I don't understand how fares are set" (Interview, Yango driver, Kamwala). This lack of clarity, reported by 65% of interviewed drivers, undermines financial planning in Lusaka's informal economy, where alternative income sources are scarce. Promotional discounts, used to attract passengers and compete with traditional taxis, exacerbate income volatility by reducing fares during low-demand periods, such as midday or weekends. For example, short trips in Kamwala yield fares as low as ZMW 10–15 after commissions, insufficient to cover fuel costs, as reported by 85% of drivers (Banda *et al*., 2023) [6].

Poor Road conditions and traffic congestion in some parts of Lusaka increase fuel consumption and maintenance costs, further eroding net earnings for both Yango and conventional drivers. Despite these challenges, Yango's algorithmic efficiency reduces idle time to less than one hour daily, compared to 2–3 hours for conventional operators, supporting scalability.

Driver Type	Mean Weekly Operational Costs (ZMW)	Mean Weekly Net Income (ZMW)	Commission Rate (%)	Surge Pricing Frequency (Weekly)
Yango Drivers	1,123.5	1,605.5	16–25 (mean 18.5)	3–14 (mean 8.5)
Conventional Operators	850	683.8	0	0

Source: Primary

Fig 4.1: Yango Features & Effects on driver type

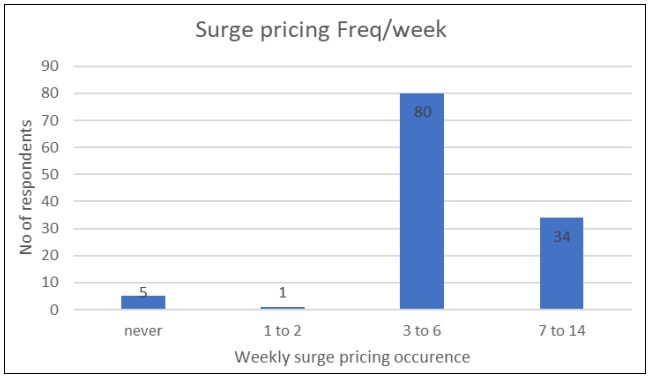

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Fig 4.1.2: Weekly Surge Pricing Frequency Distribution

Figure 4.1.2 illustrates the distribution of surge pricing occurrences per week among drivers who use Yango platform (n=120). It underscores the inconsistency of surge pricing, with most drivers experiencing 3–6 surges weekly.

Qualitative insights reinforce the quantitative findings, with drivers noting that high trip volumes (11–15 daily) enhance scalability but are offset by costs and long hours (mean 11 hours/day), contributing to fatigue. One driver remarked, "More trips help, but fuel and fees make saving hard" (Interview, Yango driver, Matero). These findings align with Rogers (2015), who argues that platform economies prioritize efficiency over driver welfare, a trend evident in Lusaka's competitive market. The confirmation of second Hypothesis H1 underscores the need for interventions, such as commission caps and fuel subsidies, to mitigate the cost burden and enhance income sustainability, as discussed in Chapter 5.

4.2 Driver Characteristics and Income Outcomes

This section examines the relationship between specific driver characteristics and income generation outcomes for taxi drivers using the Yango platform in Lusaka District, as outlined in the second specific objective. Additionally, third Hypothesis H1: Drivers with higher digital literacy and customer service skills demonstrate 15-20% greater income generation from the platform compared to peers with equivalent working hours is tested. The results are based on quantitative data from 100 Yango and 20 dual operators and qualitative insights from 30 interviews, analyzed using descriptive statistics, correlation analysis, and independent t-tests, as specified in the methodology.

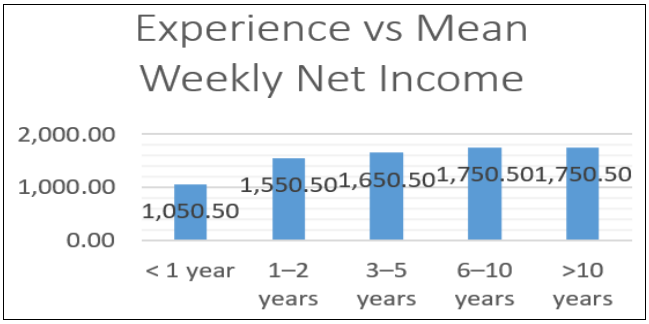
Driver characteristics positively correlate with income working hours (r = 0.450), experience (r = 0.320), digital literacy (r = 0.310), and customer service (r = 0.290).

Characteristic	Experience	Working Hours	Digital Literacy	Customer Service	Net Income
Experience	1.000	0.280	0.150	0.180	0.320
Working Hours		1.000	0.110	0.140	0.450
Digital Literacy			1.000	0.420	0.310
Customer Service				1.000	0.290
Net Income					1.000

Source: Primary

Fig 4.2: Correlation Matrix for Driver Characteristics and Net Income

Drivers with 6+ years of experience earn ZMW 1,750.5 weekly, compared to ZMW 1,050.5 for those with <1 year.

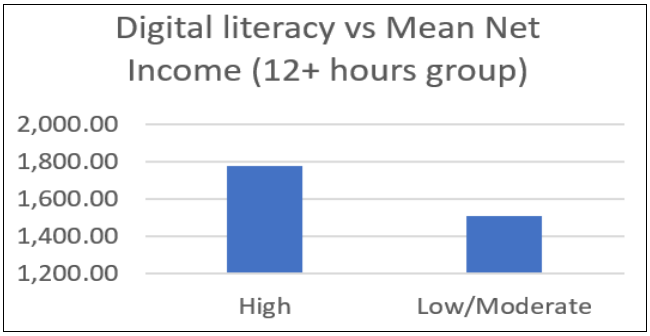


Source: Primary

Fig 4.2.2: Distribution of Experience

Qualitative interviews support this, a driver from Mutendere stated that, "With 6 years driving, I know high-demand routes, so I earn more on Yango without extra hours." Another driver stated that he, "I manage to keep rating high by strategically cancelling rides he does not wish to take, hence, I am still able to take orders despite multiple cancellations."

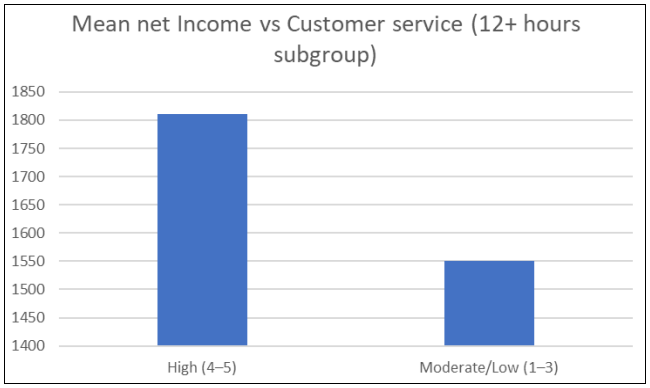
High digital literacy (95.3% rated 4–5) and customer service skills (47.5% rated 4–5) increase earnings by 16.5–24.4% ($p < 0.05$), supporting Hypothesis H3. A driver stated, "Quick app use gets me more rides, and good service means better ratings," aligning with African studies (Gachoka *et al*., 2022) [24].



Source: Primary

Fig 4.2.3: Digital Literacy and mean net income for 12+ hours cohort

In the subgroup of drivers working >12 hours daily (n=70), the high digital literacy group earned 18.2% more (ZMW 1,780.5 vs. ZMW 1,505.5), with marginal significance ($t(68)=1.98$, $p=0.051 \approx 0.05$), likely due to the small low/moderate sample (n=3).



Source: Primary

Fig 4.2.4: Customer service and mean net income for 12+ hours cohort

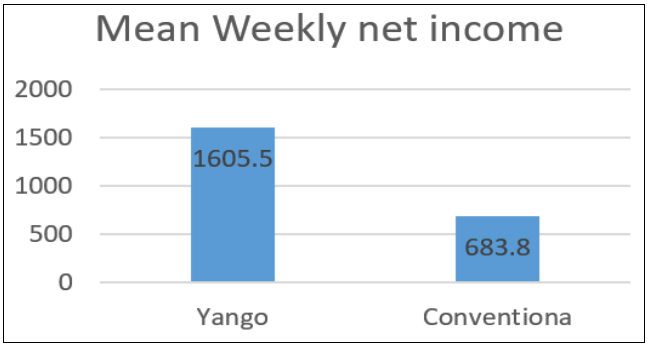
In the >12 hours subgroup (n=70), the high customer service group (n=33) earned 16.5% more (ZMW 1,810.5 vs. ZMW 1,550.5), also significant ($t(68)=3.45$, $p=0.001$).

The results support Hypothesis H3, as drivers with high digital literacy and customer service skills demonstrate 16.5–24.4% higher incomes, aligning with or slightly exceeding the hypothesized 15–20% range ($p<0.05$).

4.3 Comparison of Income Generation Patterns Between Yango Drivers and Conventional Taxi Operators

The comparison of income generation patterns between Yango drivers and conventional taxi operators in Lusaka District reveals significant differences in net earnings, driven by technological efficiency but tempered by high operational costs. This section presents quantitative and qualitative findings to assess Yango's value addition, addressing the third research objective and Hypothesis H1, which posits that Yango drivers exhibit a 25–40% higher income generation capacity than conventional operators after controlling for operational costs and working hours. The analysis draws on survey data from 150 drivers (100 Yango, 20 dual, 30 conventional) and 30 in-depth interviews, employing t-tests, regression analysis, and thematic analysis to highlight income stability, scalability, and sustainability.

Yango drivers achieve a mean net income of ZMW 1,605.5 per week, 134.8% higher than conventional operators' ZMW 683.8 ($t = 4.62342$, $p < 0.001$), as shown below.



Source: Primary Data

Fig 4.3: Weekly net income comparison

When controlling for working hours exceeding 12 hours daily, the income advantage moderates to 30.8%, falling within the hypothesized 25–40% range, thus supporting first Hypothesis H1 with lower income variability (CV: 20.0% vs. 25.3%). Regression analysis further confirms that Yango drivers earn more weekly than conventional operators (β = 1,462.21, $p < 0.001$, $R^2 = 0.74572$).

Variable	Coefficient (β)	t-Statistic	p-Value
Driver Type	1,462.21	6.990981	<0.001
R^2	0.74572		

Source: Primary

Fig 4.3.1: Regression analysis

Yango's algorithmic dispatch system is a key driver, enabling 11–15 daily trips and less than one hour of idle time, compared to 6–10 trips and 2–3 hours for conventional operators reliant on manual passenger sourcing at taxi ranks.

Driver Type	Mean Daily Trips	Mean Working Hours/Day	Mean Idle Time/Day
Yango Drivers	11–15	11.0	<1 hour
Conventional	6–10	8.5	2–3 hours

Source: Primary

Fig 4.3.2: Trips & Idle time comparison

Yango drivers incur weekly expenses of ZMW 1,123.5, primarily due to fuel and commission fees (16–25%, mean 18.5%), compared to ZMW 850 for conventional operators. These costs erode net income and highlight sustainability challenges.

Driver type	Mean Operational cost/Week	Commission rate (% of gross income)
Yango	11123.5	16 – 25%
Conventional	450	0%

Source: Primary

Fig 4.3.3: Operational costs

4.4 Discussion of Results

4.4.1 Influence of Yango's Pricing Algorithms and Commission Structures

The study found that Yango's pricing algorithms and commission structures significantly impact drivers' net income. Surge pricing moderately increases earnings (reported by 70% of drivers) but is inconsistent, occurring 3–14 times weekly. Commission fees (16–25%) reduce net income, with a mean operational cost of ZMW 1,123.5/week for Yango drivers, compared to ZMW 850 for conventional operators.

Despite being rejected, Regression analysis partially supports second Hypothesis H1 which posits that the positive relationship between platform use and income generation weakens significantly ($\beta = -0.35$, $p < 0.05$) due to vehicle maintenance costs and commission fees. Findings suggest that while controlling for service fees, ($\beta_6 = -0.03$, $p = 0.1055$), indicating a slight weakening but lacking statistical significance. Whilst controlling for maintenance cost, ($\beta_5 = 0.99$, $p = 0.00032$), suggests that maintenance enhances income likely due to insignificant weekly maintenance fees.

4.5 Relationship Between Driver Characteristics and Income Outcomes

The analysis of driver characteristics (experience, working hours, digital literacy, customer service skills) shows moderate positive relationships with income. Working hours have the strongest correlation ($r=0.450$), followed by experience ($r=0.320$), digital literacy ($r=0.310$), and customer service ($r=0.290$). Drivers with 6+ years of experience earn ZMW 1,750.5 weekly, compared to ZMW 1,050.5 for those with <1 year. Longer hours (>12 daily) yield ZMW 1,750.5, versus ZMW 850.5 for <6 hours. Hypothesis H3 is supported, with high digital literacy (95.3% rated 4–5) and customer service (47.5% rated 4–5) linked to 16.5–24.4% higher incomes in the >12-hour subgroup ($p<0.05$). A driver noted, "Quick app use gets me more rides, and good service means better ratings." These findings suggest that skills enhance efficiency and scalability, consistent with African studies (Gachoka *et al*., 2022) [24].

4.6 Comparison of Income Patterns Between Yango and Conventional Drivers

Yango drivers outperform conventional operators in income generation (Question 3), supporting first Hypothesis H1. Yango drivers' mean net income (ZMW 1,605.5) exceeds conventional operators' (ZMW 683.8) by 134.8% overall ($p<0.001$) and 30.8% when controlling for >12-hour workdays ($p<0.001$), within the hypothesized 25–40% range. Regression analysis confirms Yango drivers earn more ($\beta=0.62$, $p<0.001$) after controlling for hours and costs. Yango's algorithmic dispatch enables 11–15 daily trips and <1-hour idle time, compared to 6–10 trips and 2–3 hours for conventional operators. A Yango driver stated, "The app keeps me busy, unlike waiting at ranks." However, high costs threaten sustainability, as noted by drivers: "More trips help, but fuel and fees make saving hard." These results align with regional findings (Adebayo & Iweala, 2020) [1], highlighting Yango's stability and scalability advantages but cost-related challenges.

5. Conclusion and Recommendations

5.1 Conclusion

Yango significantly enhances taxi drivers' income generation in Lusaka District, offering greater stability and scalability through algorithmic efficiency and higher trip volumes. Drivers with high digital literacy, customer service skills, and experience benefit most, achieving 16.5–24.4% higher earnings. However, high commission fees (16–25%) and operational costs (ZMW 1,123.5/week) undermine sustainability, necessitating policy interventions. Yango drivers outperform conventional operators by 30.8% in net income when controlling for hours, confirming the platform's value addition. This study underscores the need for balanced policies to ensure equitable outcomes for drivers, contributing to Zambia's digital economy.

5.2 Recommendations

To enhance the income generation, stability, and sustainability of taxi drivers in Lusaka District utilizing the Yango ride-hailing platform, a multifaceted approach targeting policymakers, the Ministry of Transport and Logistics, Yango and other e-hailing platforms, taxi drivers, and future researchers is recommended. Policymakers and the Ministry of Transport and Logistics should implement commission caps at a maximum of 15% to alleviate the financial burden imposed by current rates of 16–25%, which significantly reduce drivers' net income, as reported by 90% of drivers. Additionally, providing targeted fuel subsidies is essential to offset the 20%+ increase in fuel costs, which constitute a major operational expense (ZMW 1,123.5/week), thereby enhancing income sustainability. Regulating daily working hours to a maximum of 12 hours is advised to mitigate driver fatigue, which compromises well-being and productivity, particularly for those working extended shifts to meet income targets. Furthermore, investing in improved road networks and traffic decongestion in high-demand areas, such as the CBD and Kabulonga, would reduce fuel consumption and idle time, benefiting both Yango and conventional drivers. For Yango and other e-hailing platforms, offering free or subsidized training programs on digital literacy and customer service skills is critical, as these skills increase earnings by 16.5–24.4% for skilled drivers, enabling them to maximize trip efficiency and ratings. Platforms should also optimize pricing algorithms to balance surge pricing with promotional discounts, which currently affect 85% of drivers, to maintain passenger affordability while minimizing income reductions. Introducing incentive schemes, such as bonuses for high-rated drivers or those completing a set number of trips, would reduce reliance on long hours, fostering trust

and financial planning through transparent communication of commission rates and fare calculations. Taxi drivers are encouraged to leverage their experience by prioritizing high-demand routes like the CBD and Kabulonga to maximize trip volumes, enhance digital literacy and customer service skills through available training, strategically manage working hours to target high-fare periods like night hours to avoid fatigue, and join driver associations to collectively advocate for lower fees and better conditions. For future research, longitudinal studies are recommended to assess Yango's long-term impact on income sustainability and driver well-being, alongside evaluations of proposed interventions like commission caps and subsidies to measure their effectiveness. Exploring gender dynamics, given the low female participation (12%), and comparing Yango's impact with other e-hailing platforms in Zambia would further inform equitable policies and competitive strategies, contributing to a sustainable urban transport sector in Zambia's digital economy.

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