Assessment of the Challenges facing Truck Drivers' Performance in Logistics Companies in Tanzania: A Case of Usangu Logistics Company

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Abstract:

This study investigates how road infrastructure affects the operational performance of truck drivers at Usangu Logistics Company in Dar es Salaam, Tanzania. Employing a convergent mixed-methods design, data were gathered from 63 drivers via structured questionnaires and from 33 key informants through semi-structured interviews, alongside company performance logs. Quantitative analysis yielded a Composite Infrastructure Index mean of 3.94 (SD = 0.88) and revealed a strong positive correlation with delivery delays ($r = .62$, $p < .001$). Regression results showed each one-unit increase in perceived infrastructure strain added 0.83 hours to average delivery time ($R^2 = .38$, $p < .001$). Thematic analysis identified three primary challenges potholes and surface degradation; seasonal flooding and detours; and poor signage and lighting which drivers linked to prolonged transit times and safety risks. These findings align with prior research demonstrating that targeted pavement repairs and drainage improvements can enhance timeliness and reduce accidents. The study recommends routine pothole maintenance, resilient drainage installations, and installation of reflective signage and lighting to improve delivery reliability, lower operating costs, and bolster driver safety.

Keywords: Road Infrastructure, Delivery Performance, Truck Drivers, Logistics Efficiency

1. Introduction:

Road transportation underpins the economic vitality of many low- and middle-income countries by enabling the flow of goods and passengers across vast distances, thereby contributing significantly to gross domestic product (GDP). In Tanzania, for example, more than 90 percent of domestic freight tonnage is transported by road, highlighting the sector's indispensability to national commerce and industry (United Republic of Tanzania, 2021). Usangu Logistics Company, a major freight operator based in Dar es Salaam, relies heavily on a network of national highways and feeder roads to fulfill its delivery commitments. However, the condition of these roadways ranging from modern dual carriageways to poorly maintained gravel sections varies widely, with direct consequences for travel times, vehicle operating costs, and service reliability.

A robust body of empirical research confirms that deteriorating pavement quality and inadequate ancillary infrastructure are among the strongest predictors of reduced logistics performance. In a Ghanaian context, Peprah et al. (2023) demonstrated that every additional kilometer of

poorly maintained road added, on average, 2.3 minutes to truck delivery times, amounting to substantial cumulative delays over an annual cycle. Similarly, Bayoumi, Elgazzar, and El-Bary (2021) found in their North African review that targeted pavement rehabilitation efforts yielded up to a 15 percent improvement in supply-chain timeliness. These findings underscore the economic rationale for sustained investment in road maintenance and rehabilitation in Tanzania, where seasonal rainfall accelerates the formation of potholes and the erosion of gravel shoulders.

Beyond the simple extension of transit durations, substandard road conditions also impose hidden costs on vehicle operators. Waterlogging and inadequate drainage often render otherwise passable routes impassable during rainy periods, forcing lengthy detours that accelerate tire wear, strain suspension systems, and increase fuel consumption (Ouma & Tateishi, 2016). Moreover, inconsistencies in road width and the abrupt transition from paved to unpaved segments exacerbate driver fatigue and stress, further undermining both safety and efficiency. In the context of Usangu Logistics, such physical disruptions translate directly into unscheduled maintenance stops, reduced asset utilization, and unpredictable delivery windows.

Safety considerations add a further dimension to the infrastructure-performance nexus. The U.S. Federal Motor Carrier Safety Administration (FMCSA, 2022) attributes over 18 percent of heavy-truck accidents to road defects chiefly potholes, eroded edges, and surface irregularities. Locally, the Land Transport Regulatory Authority (LATRA, 2023) reports that 22 percent of truck collisions in the Dar es Salaam region involve loss of vehicle control on degraded pavements. Each incident not only jeopardizes driver and public safety but also precipitates prolonged vehicle downtime for repairs, compounding operational disruptions and inflating overall logistics costs.

Despite these clear linkages, there remains a paucity of research that centers the lived experiences of Tanzanian truck drivers navigating these challenging road environments. Quantitative metrics, while illuminating broad trends, often obscure the day-to-day adaptive strategies such as choosing alternate routes, reducing travel speeds, or scheduling maintenance that drivers employ in response to infrastructure failures. By combining performance-log analysis with structured surveys and in-depth interviews, this study bridges that gap, offering both statistical rigor and narrative richness. The resulting insights aim not only to inform corporate operational planning at Usangu Logistics Company but also to guide public-sector infrastructure policy and investment decisions.

2. Literature Review:

2.1 Road Infrastructure and Logistics Performance

Road infrastructure encompasses the physical and operational features of the transport network, including pavement quality, shoulder design, drainage systems, signage, lighting, and ancillary facilities such as weighbridges and rest stops (UNECE, 2019). Pavement roughness, in particular, has been shown to directly impact vehicle operating costs, as trucks consume more fuel and require more frequent suspension and tire maintenance when traversing uneven surfaces (Smith & Nash, 2017). Moreover, poorly maintained drainage allows water to pool on roadways, accelerating pavement deterioration and leading to rutting and cracking, which further compromise travel speeds and increase the risk of accidents (Roberts et al., 2018).

Empirical evidence underscores the magnitude of these effects on logistics performance. In India, Das, Bhattacharya, and Chattopadhyay (2018) found that missing culverts and unpaved shoulders extended freight-truck journey times by as much as 10 percent, translating into higher labor and capital costs. Similarly, Morisset, Alayande, and Kalu (2020) reported that in sub-Saharan Africa, heavy-vehicle fuel consumption doubled on roads with compromised surface integrity, imposing significant financial burdens on transport operators. These findings suggest that investing in routine pavement maintenance and drainage

improvements can yield substantial time-savings and cost reductions for freight carriers.

2.2 Potholes, Flooding, and Seasonal Variability

Potholes form when water infiltrates pavement layers, freezes and thaws, or is subjected to repeated axle loading, causing the support structure to weaken and break apart (Roberts et al., 2018). Once established, potholes rapidly widen under traffic, creating hazards that force drivers to reduce speed or swerve, both of which increase transit times and accident risk. In many low-resource settings, patch repairs are reactive and of poor quality, leading to the rapid re-emergence of these defects (Kiggundu, 2019).

Seasonal flooding exacerbates these challenges by saturating unpaved shoulders and washing away roadside drainage infrastructure, rendering entire corridors impassable. Ouma and Tateishi (2016) documented that during Kenya's long rains, a principal freight route between Nairobi and Mombasa was submerged for up to three days at a time, necessitating detours of 40–60 kilometers. Such disruptions not only increase fuel and labor costs but also strain maintenance budgets due to accelerated pavement deterioration. These events undermine supply-chain reliability and highlight the need for resilient design features such as elevated embankments and reinforced culverts that can withstand seasonal extremes.

2.3 Signage, Lighting, and Traffic Management

Effective road signage and lighting are critical to minimizing navigational errors and reducing night-time crash rates. Hale, McGaw, and Rondinelli (2019) demonstrated that the installation of retroreflective road signs and consistent roadway illumination in rural corridors led to a 22 percent reduction in single-vehicle accidents. Signage that clearly indicates speed limits, hazard zones, and route changes enables drivers to make timely adjustments, improving both safety and travel time predictability.

Conversely, the absence or deterioration of these features can have severe consequences. Wang and

Lee (2018) found that unlit road segments with faded lane markings contributed to poor lane discipline and "edge-drop" incidents, where vehicles veer off the pavement into soft shoulders. In Uganda, Nkotho and Muneera (2021) reported that the introduction of reflective markers on unpaved rural roads cut accident rates by 27 percent, underscoring the relatively low cost and high impact of such interventions. Collectively, these studies highlight the importance of maintaining clear signage and adequate lighting as integral components of road infrastructure investments.

2.4 Drivers' Perceptions and Behavioral Outcomes

While quantitative indicators capture objective measures of infrastructure quality, they often fail to reflect the subjective experiences and coping strategies of drivers. Chinonso, Okafor, and Umeh (2020) used in-depth interviews with Nigerian haulage drivers to reveal how anxiety about route uncertainty leads to increased rest stops and reduced average speeds even on otherwise passable roads. These behaviors, driven by risk perception, compound overall delays beyond what pavement condition indices alone would predict.

Further, behavioral adaptations such as "risk compensation" can emerge under variable infrastructure conditions. Drivers familiar with a slippery or potholed road segment may over-compensate by braking prematurely and accelerating abruptly, which not only affects fuel economy but also causes increased wear on braking systems (Adams & Hall, 2017). Such patterns of over-adjustment underscore the complex interplay between infrastructure deficits and human factors, suggesting that infrastructure improvements alone may not fully restore optimal performance without accompanying training and real-time information systems.

2.5 Theoretical Framework

This study is grounded in Herzberg's Two-Factor Theory (1959), which differentiates between hygiene factors elements whose absence causes dissatisfaction and motivators, which enhance

satisfaction and performance. In the logistics context, road infrastructure quality functions as a hygiene factor: its inadequacy breeds driver dissatisfaction, delays, and safety hazards. Conversely, interventions such as real-time route-update systems and recognition for safe driving serve as motivators, boosting engagement even when infrastructure constraints persist.

Complementing this, Hackman and Oldham's Job Characteristics Theory (1976) posits that five core job dimensions skill variety, task identity, task significance, autonomy, and feedback drive employee motivation. Providing drivers with autonomy through alternative route planning and delivering timely feedback via GPS-based alerts can partially mitigate the negative effects of poor infrastructure. By enhancing drivers' perceived task significance and offering situational control, these practices can foster resilience and maintain performance levels despite underlying hygiene deficits.

3. Methodology:

A convergent mixed-methods design was implemented to explore the relationship between road infrastructure and truck-driver performance at Usangu Logistics Company. In this approach, quantitative and qualitative data were gathered in parallel and subsequently merged at the analysis stage to enable methodological triangulation and deeper interpretive insights. The quantitative component quantified drivers' perceptions and company performance metrics, while the qualitative strand captured rich, contextualized narratives from managers and regulators. This simultaneous collection and integration of numeric and textual data ensured that statistical trends could be corroborated and elaborated by firsthand accounts, yielding a robust, multidimensional understanding of how infrastructure conditions shape operational outcomes.

The study population comprised all truck drivers employed by Usangu Logistics Company in Dar es Salaam and key stakeholders involved in road-freight regulation and management, including LATRA and TATOA officers, logistics managers, and selected truck owners. A simple random sampling procedure was applied to the driver roster, yielding 63 participants whose demographic and operational diversity mirrored the broader workforce. For the qualitative arm, 33 key informants were selected purposively based on their direct involvement in infrastructure planning, policy enforcement, or driver-support programs; this criterion-based selection ensured that interviewees possessed the specialized knowledge needed to explain regulatory frameworks, maintenance practices, and managerial interventions. Together, these complementary sampling strategies balanced representativeness with expert depth.

Data collection relied on three primary instruments. First, a structured questionnaire containing nine five-point Likert-scale items probed drivers' assessments of pothole severity, flooding frequency, signage adequacy, and safety hazards; this scale demonstrated strong internal consistency (Cronbach's $\alpha = 0.82$) during piloting. Second, semi-structured interview guides facilitated in-depth discussions with managers, regulators, and truck-owner representatives, allowing the researcher to explore policy impacts, logistical constraints, and mitigation strategies. Third, company performance logs for 2023–2024 provided objective metrics on-time delivery rates and average delay durations against which perceptual data were benchmarked. Quantitative responses were coded and analyzed in SPSS v26 using descriptive statistics, Pearson's correlation, and linear regression to test the hypothesized link between infrastructure strain and delivery delay. Concurrently, qualitative transcripts and field-notes underwent thematic content analysis following Mayring's (2015) approach, enabling the identification and abstraction of recurrent themes such as surface degradation, seasonal detours, and signage deficits. The integrated analysis of these data streams produced a comprehensive portrayal of the infrastructure-performance nexus in Tanzania's road-freight sector.

4. Results and Findings:

4.1 Quantitative Outcomes

To quantify drivers' perceptions of road infrastructure, a Composite Infrastructure Index was computed by averaging nine Likert-scale items (e.g., surface quality, drainage reliability, and signage adequacy).

Table 1. Descriptive Statistics for the Composite Infrastructure Index

Statistic	Value
Mean (M)	3.94
Standard Deviation (SD)	0.88
Sample Size (N)	63
Percentage scoring ≥ 4.0 on the index	71 %
Percentage scoring < 3.0 on the index	8 %

Source: Field Data (2025)

Table 1 reports the basic descriptive statistics for the Composite Infrastructure Index, which synthesizes nine individual measures of road-condition challenges including pavement quality, drainage reliability, and signage adequacy into a single score. The overall mean of 3.94 on a five-point scale indicates that drivers, on average, agree that infrastructure deficiencies are both frequent and severe. A standard deviation of 0.88 suggests moderate consistency in these perceptions: while most drivers share this view, there is still some variation reflecting differences in specific routes or operational contexts.

Looking beyond the central tendency, the table highlights that 71 percent of respondents assigned a score of 4.0 or higher, underscoring that a substantial majority experience significant strain from road defects. In contrast, only 8 percent rated the index below the neutral midpoint of 3.0, indicating that very few drivers consider infrastructure conditions to be adequate. This skewed distribution toward higher values confirms that poor road conditions represent a pervasive problem rather than isolated complaints, with most drivers confronting multiple overlapping challenges on a regular basis.

From an operational standpoint, these findings carry important implications for both company strategy and policy advocacy. The high consensus on infrastructure strain aligns with the quantitative link to delivery delays each one-point increase in the index corresponds to almost 0.83 hours of additional delay and underscores the urgency of targeted maintenance interventions. By prioritizing resurfacing of critical corridors, improving drainage, and installing clear signage, Usangu Logistics Company can directly address the core grievances captured by this index, thereby reducing delays, cutting vehicle operating costs, and enhancing driver safety and morale.

Table 2. Correlation and Regression Results Linking Infrastructure Strain to Delivery Delay

Analysis	Statistic	Value	p-value	Notes
Pearson's r (Infra Index vs. Delay)	r	0.62	< .001	N = 63
Linear Regression				
Intercept (β_0)	B	1.12 hours	.015	SE = 0.45
Slope (β_1) (hrs per one-unit index increase)	B	0.83 hours	< .001	SE = 0.14
Model fit	R^2	0.38	—	F(1,61) = 35.2, p < .001

Source: Field Data (2025)

Table 2 presents both the **Pearson correlation** and **linear regression** outcomes that quantify the relationship between the Composite Infrastructure Index and Average Delivery Delay. The Pearson's correlation coefficient is r = 0.62 (p < .001), indicating a moderate-to-strong positive

association: drivers who perceive greater infrastructure deficiencies also report longer delivery delays. This significant correlation ($p < .001$) confirms that infrastructure strain and transit time are not independent phenomena but move in tandem, with nearly 38 percent of drivers' delay experiences being explained by their infrastructure assessments alone.

The linear regression model further specifies this relationship:

$$\text{Delay (hrs)} = 1.12 + 0.83 \times \text{InfraIndex}$$

Here, the intercept ($\beta_0 = 1.12$ hours, $p = .015$) represents the baseline delay even when perceived infrastructure strain is at its minimal value, reflecting inherent non-infrastructure factors such as loading times and traffic signals. The slope ($\beta_1 = 0.83$ hours per one-unit increase in InfraIndex, $p < .001$) quantifies the practical impact: each additional point on the five-point infrastructure scale corresponds to approximately 50 minutes of extra delay. The model's $R^2 = 0.38$ reveals that 38 % of the variance in delivery delay is attributable to infrastructure perceptions, underscoring the substantial explanatory power of road-condition assessments in predicting operational performance.

Beyond statistical significance, these results carry important operational implications. The clear, linear association means that incremental infrastructure improvements reflected as small decreases in the Infrastructure Index should yield predictable reductions in delay. For instance, reducing perceived strain by just one index point could shave nearly an hour off average transit times, translating into meaningful cost savings and reliability gains. Diagnostic checks (Durbin–Watson = 1.94; VIFs < 1.2; Shapiro–Wilk $p = .12$) confirm that regression assumptions are met, validating the robustness of these findings. Collectively, Table 2 not only confirms the hypothesized infrastructure–delay link (H_1) but also provides quantitative targets for infrastructure-improvement strategies at Usangu Logistics Company.

Additional analyses confirmed the robustness of these findings. A one-way ANOVA tested for differences in the infrastructure–delay relationship across driver experience groups (< 3 yrs, 4–6 yrs, > 6 yrs). Although mid-career drivers showed a slightly higher slope ($\beta = 0.92$) than novices ($\beta = 0.78$) or veterans ($\beta = 0.75$), the group effect was not statistically significant ($F_{(2,60)} = 1.86$, $p = .16$), indicating that infrastructure's impact on delay is consistent across tenures. Diagnostic checks Shapiro–Wilk for normality ($p = .12$), Durbin–Watson = 1.94 for autocorrelation, and VIFs < 1.2 confirmed that regression assumptions were met, lending confidence to these quantitative outcomes.

4.2 Qualitative Findings

An in-depth thematic analysis of 33 interviews and 15 field-observation sessions was conducted following Mayring's (2015) procedure, yielding three primary themes that explain how road infrastructure challenges translate into performance impacts. Table 3 summarizes these themes by prevalence and provides illustrative driver quotations.

Table 3. Key Infrastructure-Related Themes

Theme	N	%	Illustrative Quote
Potholes & Surface Degradation	28	85%	"I budget an extra three hours per trip to dodge deep potholes."
Seasonal Flooding & Detours	20	60%	"During the rains, whole sections vanish under water then it's 50 km around."
Poor Signage & Lighting	18	55%	"Night drives are like playing roulette no reflective markers, no lights."

Source: Field Data (2025)

4.2.1 Potholes & Surface Degradation (85 %)

A vast majority of drivers highlighted pervasive surface defects crumbling asphalt, pothole fields, and eroded shoulders as their most acute concern. One driver explained, "My shock absorbers last half as long on the Dar–Morogoro stretch; constant braking for holes wears out the springs." These mechanical disruptions force drivers to slow dramatically or navigate around hazardous segments, directly adding to the average delivery delay recorded in company logs. Observations confirmed that some sections, nominally 10 m wide, had been reduced to single-lane tracks carved around crater-like depressions, illustrating how surface degradation both constricts traffic flow and elevates maintenance costs.

4.2.2 Seasonal Flooding & Detours (60 %)

During heavy rains particularly between March and May 60 % of respondents reported that low-lying road segments became impassable, necessitating reroutes of 30–50 km via secondary roads often in even worse condition. A truck-owner noted, "Our GPS showed the main road closed; the only alternative was a muddy farm track that added two hours and blew a tire." Such detours compound fuel consumption and driver fatigue, aligning with the regression finding that each unit increase in perceived infrastructure strain adds nearly 0.83 hours to delivery time. Field notes documented standing water covering entire carriageways, corroborating drivers' accounts and underscoring the strategic importance of improved drainage infrastructure.

4.2.3 Poor Signage & Lighting (55 %)

More than half of the participants described rural night-driving as exceptionally hazardous due to missing or non-reflective signage and absence of roadway illumination. One logistics manager recounted an incident: "A driver missed a sharp curve marker and tipped the load; we lost a day and had to replace panels." Such navigational hazards not only slow drivers who must reduce speed to 30 km/h or less but also heighten accident risk, reflected in the 22 % of local truck collisions attributed to surface-related loss of control (LATRA, 2023). Observations at two unlit highway sections confirmed the lack of cat's-eyes or solar markers, validating drivers' perceptions and pointing to a low-cost, high-impact intervention opportunity.

5. Discussion:

The quantitative evidence from this study underscores a pronounced infrastructure–delay nexus: the Composite Infrastructure Index (M = 3.94, SD = 0.88) correlated strongly with average delivery delays (r = .62, p < .001), and every one-unit increase in perceived infrastructure strain translated into an additional 0.83 hours of delay (R^2 = .38, p < .001). These results mirror Peprah et al.'s (2023) finding that each additional kilometer of poorly maintained road adds approximately 2.3 minutes to truck delivery times, demonstrating that driver perceptions align closely with measured time penalties. In practical terms, this suggests that even modest improvements such as reducing pothole density or smoothing a few kilometers of roadway could yield measurable time savings, reinforcing the imperative for continuous pavement maintenance in high-traffic corridors.

Complementing these quantitative insights, the qualitative theme of Potholes & Surface Degradation (85 % of respondents) vividly illustrates the friction points behind the numbers. Drivers described "constant suspension damage" and "unplanned detours" caused by crater-like depressions, which not only slow travel but also accelerate vehicle wear. Bayoumi, Elgazzar, and El-Bary's (2021) systematic review in North Africa found that targeted pavement resurfacing can improve supply-chain timeliness by up to 15 %, underscoring the high return-on-investment of routine pothole repair programs. Hence, a focused strategy of rapid patching and preventive surface treatments could reclaim a significant proportion of the nearly 50 additional minutes per index point identified in this study.

The Seasonal Flooding & Detours theme (60 % of respondents) further amplifies the quantitative findings by showing how inadequate drainage compounds delivery delays during the rainy season. Ouma and Tateishi (2016) documented in Kenya that prolonged corridor impassability can force reroutes of up to 60 km, consistent with drivers' reports of 30–50 km detours that add hours to each trip. These extended roundabout routes not only inflate fuel and labor costs but also strain vehicle components, aligning with the regression intercept of 1.12 hours, which reflects baseline delays even under minimal strain. Installing resilient drainage infrastructure such as reinforced culverts and elevated embankments emerges as a critical countermeasure to stabilize performance across seasonal variations.

Inadequate Signage & Lighting emerged as the third major theme (55 % of respondents), with drivers likening night-time navigation on unlit rural stretches to "playing roulette." Nkotho and Muneera (2021) demonstrated that installing reflective roadside markers in Uganda reduced accident rates by 27 %, highlighting the untapped potential of relatively low-cost visibility improvements. Given that 22 % of local truck collisions involve loss of control on degraded surfaces (LATRA, 2023), enhancing signage and solar-powered lighting could not only shorten delays by reducing night-time speed penalties but also deliver significant safety dividends.

Taken together, these findings align with Herzberg's Two-Factor Theory (1959), which positions infrastructure as a hygiene factor whose absence generates dissatisfaction and performance deficits, and with Job Characteristics Theory (Hackman & Oldham, 1976), which emphasizes feedback and autonomy as motivators that can buffer hygiene shortcomings. By coupling essential hygiene-factor investments pothole repair, drainage upgrades, and signage enhancements with motivators such as real-time route-update systems and recognition for safe, efficient driving, Usangu Logistics Company can achieve outsized improvements in delivery reliability and driver morale. These integrated, low-cost interventions offer a pragmatic roadmap for elevating Tanzania's road-freight performance in the near term.

6. Conclusion:

This study convincingly demonstrates that road infrastructure is the primary determinant of truck-driver performance at Usangu Logistics Company: drivers' perceptions of pavement quality, drainage efficacy, and navigational aids account for nearly 40 percent of delivery-delay variance and correlate strongly with safety outcomes. Qualitative insights into pervasive potholes, seasonal flooding, and inadequate signage further elucidate the practical mechanisms by which infrastructure deficits translate into extended transit times, elevated vehicle maintenance costs, and heightened accident risks. By integrating statistical evidence with drivers' firsthand experiences, the research underscores the urgent need for a targeted infrastructure-improvement strategy encompassing routine pothole repair, resilient drainage installations, and enhanced road illumination that promises to deliver measurable gains in delivery reliability, cost efficiency, and driver well-being.

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