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Assessment of road infrastructure performance and urban development projects in Burkina Faso: the case of the Ouagadougou Bypass roads

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ABSTRACT

Background: The intersection of HIV infection and malnutrition presents a persistent clinical challenge in sub-Saharan Africa, where food insecurity amplifies the metabolic demands of chronic infection. Chad, with an adult HIV prevalence of approximately 1.1%, maintains therapeutic nutrition units (TNUs) in N'Djamena that serve both HIV-positive and HIV-negative malnourished patients. However, the differential impact of antiretroviral therapy (ART) on nutritional recovery outcomes within these units remains poorly characterized. Objective: This study aimed to evaluate the association between ART use and nutritional recovery among malnourished patients admitted to therapeutic nutrition units in N'Djamena, Chad. Methods: A retrospective cohort analysis was conducted using medical records from three TNUs in N'Djamena, covering admissions between January 2019 and December 2023. A total of 384 adult patients (≥18 years) with documented malnutrition (BMI <18.5 kg/m² or MUAC <210 mm) were included. Patients were stratified into three groups: HIV-positive on ART (n=142), HIV-negative (n=242), and a small subset of HIV-positive not on ART (n=18, excluded from primary analysis due to sample size). Nutritional recovery was defined as achieving BMI ≥18.5 kg/m² sustained for at least two consecutive monthly assessments. Kaplan-Meier survival analysis and Cox proportional hazards regression were used to identify predictors of recovery. Results: The overall nutritional recovery rate was 51.3% (197/384). Median recovery time was 3.2 months (IQR: 2.1–4.8). HIV-positive patients on ART demonstrated a recovery rate of 46.5%, compared to 54.1% among HIV-negative patients. In multivariate analysis, independent predictors of poor recovery included: severe acute malnutrition at admission (AHR 0.34, 95% CI: 0.22–0.52), CD4 count <200 cells/mm³ (AHR 0.52, 95% CI: 0.31–0.87), presence of opportunistic infections (AHR 0.48, 95% CI: 0.33–0.70), and food insecurity (AHR 0.61, 95% CI: 0.42–0.89). ART use itself was not independently associated with recovery after adjustment for clinical severity (AHR 1.12, 95% CI: 0.78–1.61, p=0.54). Conclusion: In this cohort of malnourished patients in N'Djamena, ART use did not independently predict nutritional recovery after accounting for disease severity. The findings underscore that malnutrition in HIV-positive patients on ART reflects advanced disease and comorbidities rather than ART failure per se. Integrated nutritional and HIV care, with early detection of malnutrition before severe immune compromise, is essential.

Keywords: antiretroviral therapy, malnutrition, therapeutic nutrition units, N'Djamena, Chad, nutritional recovery, HIV

RESUME

Contexte : Ouagadougou, capitale du Burkina Faso, a connu une croissance démographique rapide et une expansion spatiale générant de graves problèmes de congestion, de mobilité et de sécurité routière. La construction de voies de contournement constitue une réponse phare dans les stratégies nationales de développement urbain et d'infrastructures de transport. Cependant, l'évaluation systématique de la performance de ces infrastructures et de leur articulation avec les objectifs de développement urbain reste limitée. Objectif : Cette étude évalue la performance du réseau routier de contournement de Ouagadougou et évalue sa contribution

au développement urbain, en identifiant les réalisations, les contraintes et les implications pour la planification future des infrastructures au Burkina Faso. Méthodes : Une approche mixte a été employée, combinant l'analyse de données secondaires des bulletins statistiques du Ministère des Infrastructures (MID) et des évaluations ex-post de l'Agence Japonaise de Coopération Internationale (JICA), ainsi qu'une analyse documentaire des études de faisabilité technique. Les indicateurs de performance examinés comprennent les taux d'exécution des projets, le linéaire de routes bitumées, les indicateurs de décongestion du trafic et les résultats en matière de sécurité. Résultats : Le projet de contournement de 125 km de Ouagadougou a atteint un taux d'exécution de 87,1 % au premier trimestre 2024, représentant la meilleure performance parmi les projets routiers en cours au Burkina Faso. Le contournement comprend des branches nord et sud reliant les principales routes nationales (RN1, RN2, RN3, RN4, RN5 et RN6), conçu pour détourner le trafic de transit—notamment les poids lourds destinés aux pays voisins—du centre-ville. Cependant, l'évaluation a révélé des lacunes importantes : les indicateurs quantitatifs de mesure des effets de décongestion n'ont pas été systématiquement suivis, et les résultats en matière de sécurité routière se sont détériorés malgré les nouvelles infrastructures, les carrefours dangereux se multipliant aux échangeurs et sur les axes périphériques. Conclusion: Les voies de contournement de Ouagadougou représentent un investissement stratégique en infrastructure aligné sur les plans de développement nationaux, atteignant une performance d'exécution louable. Cependant, leur contribution au développement urbain est contrainte par une intégration inadéquate avec les politiques de sécurité routière, un suivi insuffisant des indicateurs d'efficacité et l'absence de prise en compte des activités informelles en bordure de route qui génèrent de nouveaux points de conflit. Un changement de paradigme vers une planification des infrastructures intégrant la sécurité et fondée sur les données est essentiel pour une mobilité urbaine durable au Burkina Faso..

Mots-clés : performance des infrastructures routières, voies de contournement, développement urbain, Ouagadougou, Burkina Faso, mobilité, sécurité routière

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1. INTRODUCTION

Ouagadougou, the capital of Burkina Faso, embodies the urban dynamics characteristic of many West African metropolises: rapid demographic growth, spatial expansion beyond administrative boundaries, and the persistent challenge of accommodating mobility demands within constrained infrastructure networks. The city's population, estimated at over 2.6 million in 2015, is projected to exceed 7.7 million by 2040. This growth has generated intense pressure on road infrastructure, manifested in chronic traffic congestion, extended journey times, and deteriorating road safety conditions.

Burkina Faso's national development strategies have consistently identified transport infrastructure as a cornerstone of economic development and regional integration. The Transport Sector Development Strategy (2011–2025) prioritized "improvement of traffic conditions in major cities through the development of bypass roads." The National Road Development Program (2016–2020) positioned urban transport improvement, particularly in Ouagadougou, as a sectoral priority. More recently, the Second National

Economic and Social Development Plan (PNDES-II, 2021–2025) articulated "development of high-quality and resilient infrastructure" as a strategic objective.

Within this policy framework, the Ouagadougou bypass roads project (voies de contournement) represents a flagship investment. Spanning approximately 125 km, the bypass is designed to encircle the capital, connecting major national roads and creating fast lanes for transit traffic particularly heavy goods vehicles destined for neighboring countries while alleviating congestion in the city centre. The project's rationale extends beyond traffic management to encompass safety improvement, urban spatial restructuring, and regional economic integration.

Despite the strategic importance of this infrastructure, systematic assessment of its performance and contribution to urban development remains limited. Available data are fragmented across ministry statistical bulletins, donor evaluation reports, and technical feasibility studies, with no comprehensive synthesis examining whether the bypass roads are achieving their intended objectives. This gap is particularly significant given the substantial financial investments involved and the persistent security and resource constraints affecting Burkina Faso's development trajectory.

This study addresses this gap through a systematic assessment of the Ouagadougou bypass road infrastructure, examining execution performance, functional outcomes, and implications for urban development. The research contributes to the evidence base for infrastructure planning in Burkina Faso and comparable West African contexts, where bypass roads have become a dominant urban mobility intervention.

2. LITERATURE REVIEW

2.1 Urban Mobility Challenges in West African Cities

West African capitals face a common set of mobility challenges driven by rapid urbanization, limited public transport capacity, and infrastructure deficits. Ouagadougou exemplifies these dynamics, with a city structure characterized by radial roads converging on the centre, generating congestion at entry points and along central axes. The dominance of two-wheeled motorized vehicles, motorcycles and mopeds, adds distinctive safety and traffic management dimensions, as these modes exhibit different flow characteristics and vulnerability profiles compared to automobiles.

The response to these challenges has increasingly centred on bypass roads as a spatial strategy to redirect transit traffic and create alternative circulation routes. This approach reflects international planning paradigms emphasizing hierarchical road networks and separation of through-traffic from local circulation. However, the effectiveness of bypass strategies in African contexts remains contested, with concerns about induced demand, spatial fragmentation, and inadequate integration with public transport systems.

2.2 Bypass Roads as Urban Development Instruments

Bypass roads serve multiple functions within urban development frameworks. Primary among these is traffic decongestion: by diverting transit traffic particularly heavy goods vehicles from city centres, bypasses aim to reduce congestion, improve air quality, and enhance road safety in densely populated areas. Secondary functions include structuring urban expansion by providing development corridors and facilitating regional connectivity by linking national and international road networks.

In Ouagadougou, the bypass project is explicitly framed within these multiple objectives. Technical studies describe the project's purpose as "solving the problems of safety, security and space, as well as the problems of mobility in the city center," while also "creating fast lanes for the flow of trucks carrying goods destined for other regions and neighboring countries passing through the city." The bypass is thus conceived as both an urban mobility intervention and a regional integration infrastructure.

The JICA-funded Outer Ring Road project documentation elaborates this dual rationale, describing the bypass as providing "a large spatial framework for future urban expansion" while also serving as "a large bypass road for the central area of Ouagadougou." This articulation of spatial structuring and traffic management objectives reflects contemporary planning thinking that positions infrastructure as a driver of urban form.

2.3 Performance Assessment Frameworks for Road Infrastructure

Assessing road infrastructure performance requires multidimensional frameworks encompassing construction execution, functional outcomes, and developmental impacts. Common indicators include physical progress rates, traffic volumes and speeds, travel time savings, accident rates, and economic benefits such as vehicle operating cost reductions.

However, the application of such frameworks in African contexts faces significant data constraints. The JICA ex-post evaluation of a Ouagadougou road project explicitly notes that "none of the four quantitative indicators established at the time of the ex-ante evaluation were monitored by the executing agency," forcing reliance on qualitative information and imposing "certain limitations on the objectivity of the evaluation." This data deficit is not unique to Burkina Faso but reflects broader capacity constraints in monitoring and evaluation systems across the region.

Road safety outcomes represent a particularly critical dimension of infrastructure performance. Research on road traffic injuries in Ouagadougou documents that "the new road developments have resulted in the extension of the circular boulevard to the south of the city, the widening of the axes connecting the national roads and the opening of new roads, in particular a bypass of the capital that extends beyond the municipal boundaries." However, analysis of crash-prone zones reveals that "a large number of hazardous

junctions" persist, corresponding to "relative non-compliance with traffic lights." This suggests that infrastructure development alone does not resolve safety challenges rooted in behavioral and regulatory factors.

2.4 The Burkinabè Institutional Context

Burkina Faso's road infrastructure governance involves multiple institutional actors. The Ministry of Infrastructure (Ministère des Infrastructures et du Désenclavement, MID) oversees planning, execution, and maintenance of the classified road network. The National Road Development Program and subsequent strategies provide policy frameworks, while technical agencies including the National Public Works Laboratory (LNBTP) ensure quality control.

Financing for major road projects comes from diverse sources: national budget allocations, donor loans and grants (including JICA, the World Bank, and the African Development Bank), and increasingly, public-private partnership mechanisms. The Ouagadougou bypass project has benefited from multiple funding streams across its implementation phases.

The institutional environment is significantly shaped by Burkina Faso's security crisis, which has affected infrastructure implementation in various regions. The MID's 2024 statistical bulletin notes that certain projects face "enormous difficulties linked to insecurity in the project intervention zone." While the Ouagadougou bypass, located in the relatively secure central region, has not been directly impacted, the broader security context influences resource allocation and implementation capacity.

3. RESEARCH QUESTIONS

This study addresses the following research questions:

1. What is the execution performance of the Ouagadougou bypass road project relative to planned objectives and timelines, and how does it compare with other road infrastructure projects in Burkina Faso?
2. What functional outcomes in terms of traffic decongestion, connectivity, and road safety are associated with the bypass infrastructure, and how are these outcomes monitored?
3. How does the bypass project articulate with broader urban development objectives in Ouagadougou, and what gaps exist in this integration?
4. What implications do the findings have for future road infrastructure planning and performance assessment in Burkina Faso?

4. METHODOLOGY

4.1 Research Design

This study employs a mixed-methods case study design, combining quantitative analysis of infrastructure performance indicators with qualitative assessment of policy articulation and implementation processes. The case study approach is appropriate for examining complex infrastructure interventions within their specific urban and institutional contexts.

4.2 Data Sources

Data were collected from three principal sources:

Primary documentary sources: Ministry of Infrastructure (MID) statistical bulletins from 2023–2024, providing project execution rates, network statistics, and sector performance indicators. These sources represent the most authoritative available data on road infrastructure performance in Burkina Faso.

Donor evaluation reports: Japan International Cooperation Agency (JICA) ex-post evaluation reports and project documentation, providing independent assessment of project outcomes and implementation challenges.

Technical feasibility studies: Engineering and technical assessment documents detailing project design, objectives, and physical specifications.

Academic literature on road traffic injuries in Ouagadougou provided complementary data on safety outcomes.

4.3 Analytical Framework

The analytical framework encompasses three dimensions of infrastructure performance:

Execution performance: Physical progress rates, adherence to timelines, and comparison with peer projects. Indicators include project execution percentages, linear kilometres completed, and budget disbursement rates where available.

Functional performance: Infrastructure utilization and outcomes, including traffic decongestion proxies, connectivity enhancement, and road safety indicators. Given data limitations, this dimension relies on available proxies and qualitative assessments.

Development contribution: Articulation with urban development objectives, alignment with policy frameworks, and spatial structuring effects. This dimension draws on policy document analysis and spatial planning literature.

4.4 Limitations of Method

The assessment faces inherent limitations stemming from data availability. As the JICA evaluation explicitly acknowledged, quantitative indicators for project effects were not systematically monitored. Traffic volume counts, travel time measurements, and before-after safety data specific to the bypass are not available in accessible sources. Consequently, functional performance assessment relies on indirect evidence and inference from available data. This limitation is itself a finding of the study, highlighting deficiencies in infrastructure monitoring systems.

5. RESULTS

5.1 Execution Performance

The Ouagadougou bypass roads project demonstrates the highest execution performance among ongoing road infrastructure projects in Burkina Faso. According to MID data for the first quarter of 2024, the 125 km bypass project achieved an execution rate of 87.1%, representing an improvement of 4.3 percentage points from the previous quarter's 82.8%. This performance significantly exceeds the average execution rate of 32.6% for all road development and paving projects in progress during the same period.

Table 1: Execution Rates of Major Road Projects, Q4 2023–Q1 2024

Project	Length (km)	Q3 2023 (%)	Q4 2023 (%)	Q1 2024 (%)
Ouagadougou bypass roads	125	79.5	82.8	87.1
Rocade Nord Boulevard des Tansoba	10.2	41.0	48.0	56.0
RN23 Ouahigouya–Djibo	115	3.0	6.0	8.1
RN11 Gaoua–Batié	68	6.5	11.6	22.3
RR11 Kolinka–Fara–Poura	92	11.7	13.9	21.0
RN12 Pâ–Dano–Diébougou	93	1.4	3.4	17.1
RN08 Bobo–Orodara	21.5	16.7	19.4	35.9
Urban roads, Ouagadougou	26.6	5.3	21.3	—

Source: MID Statistical Bulletin, Q1 2024

The bypass project's superior performance reflects multiple factors: its strategic priority within national development plans, its location in the relatively secure central region (unlike projects in northern and western zones affected by insecurity), and sustained financing from donor partners.

The project comprises northern and southern branches designed to encircle the city. The southern section, connecting National Roads N1 and N4 and passing through N5 and N6, is explicitly designed to allow "a route out of the four national roads... without going through the central area of Ouagadougou." A multi-modal dry port is planned near the western end of the southern section, with the bypass facilitating truck access without central city transit.

5.2 Functional Performance: Traffic and Connectivity

The bypass infrastructure's functional performance must be assessed against its stated objectives: decongestion of central Ouagadougou, improvement of traffic flow on national roads, and creation of fast transit lanes for commercial vehicles.

Available evidence on traffic outcomes is limited. The JICA ex-post evaluation of a related Ouagadougou road project candidly acknowledged that "the evaluation of Effectiveness could not be supported by quantitative evidence and had to rely solely on qualitative information." The "improvement in average travel speed" indicator, while measured through on-site data collection during evaluation, was "deemed inappropriate as an indicator for measuring the project's effects."

This monitoring deficiency reflects systemic weaknesses in Burkina Faso's infrastructure evaluation capacity. The absence of systematic before-after traffic assessments, origin-destination surveys, or travel time monitoring means that the bypass's decongestion effects remain unquantified. Qualitative observations suggest that the new infrastructure has extended the circular boulevard system and created alternative circulation routes, but the magnitude of traffic diversion from central axes is unknown.

Connectivity enhancement is more directly evidenced. The bypass connects major national roads (RN1, RN2, RN3, RN4, RN5, and RN6), creating a network alternative to radial routes through the city centre. This connectivity has particular significance for international transit traffic, as Burkina Faso functions as a strategic hub for regional economic integration, with corridors extending to Ghana, Benin, Togo, and Niger.

5.3 Functional Performance: Road Safety Outcomes

Road safety represents a critical dimension of infrastructure performance, particularly given the life-critical nature of mobility. Available evidence indicates that the bypass infrastructure has not resolved and may have exacerbated road safety challenges in Ouagadougou.

Research on road traffic injuries in Ouagadougou documents that "the high densities of casualties at the interchanges as well as the peripheral axes" represent significant risk concentrations. The analysis identifies "a large number of hazardous junctions" corresponding to "relative non-compliance with traffic lights." This pattern suggests that new interchanges and peripheral axes created by bypass development have generated new conflict points between vehicles, pedestrians, and informal roadside activities.

A distinctive risk factor in the Burkinabè context is the interaction between road infrastructure and informal economic activities. As the research notes, "the particularity of asphalt roads in Burkina Faso is to exert a strong attraction on informal trade." This dynamic "requires pedestrians to walk on the roadway used by road users and vehicles to occupy part of the same roadway for parking," creating "conflicts and potential crashes." The bypass roads, with their high design speeds and heavy vehicle traffic, may present particularly acute risks where informal activities encroach on the roadway.

The research further observes that "roads are often designed with no consideration of traffic and road occupation practices by populations," and that "the road infrastructure environment can contribute to driver failure." This finding suggests a fundamental disjuncture between infrastructure design assumptions and actual usage patterns, with safety consequences.

Table 2: Road Safety Risk Factors Associated with Bypass Infrastructure

Risk Factor	Mechanism	Evidence
Interchange conflicts	High-density casualty zones at interchanges	Crash-prone zone analysis
Traffic signal non-compliance	Relative non-compliance at hazardous junctions	Observed in 2015 and persistent
Informal trade encroachment	Pedestrians and parked vehicles on roadway	Structural attraction of asphalt roads
Design-usage mismatch	Infrastructure designed without consideration of actual practices	Research finding
Driver behavior	Lack of licence, ignorance of traffic rules among young users	Recurrent factor

5.4 Development Contribution: Policy Alignment

The bypass project demonstrates strong alignment with Burkina Faso's national development policy frameworks. At the time of project design and throughout implementation, the project has been positioned within successive strategic documents.

The Transport Sector Development Strategy (2011–2025) identified "improvement of traffic conditions in major cities through the development of bypass roads" as a priority. The National Road Development Program (2016–2020) positioned "improvement of urban transport, including in Ouagadougou" as a priority initiative. The PNDES-II (2021–2025) identified "development of high-quality and resilient infrastructure" as a strategic objective, with expected outcomes including improvements in transport infrastructure quality, safety, and convenience.

The project also aligns with regional integration objectives. Burkina Faso's position as a landlocked country dependent on corridors to coastal states gives particular significance to infrastructure facilitating international transit. The bypass contributes to this objective by providing efficient routing for trucks carrying goods to and from neighboring countries, reducing transit times and costs.

5.5 Development Contribution: Spatial Structuring

The bypass project's spatial structuring effects represent a longer-term development contribution. The JICA documentation describes the Outer Ring Road as providing "a large spatial framework for future urban expansion," running "through a radius of 18 km." This framing positions the bypass not merely as a traffic management intervention but as a structuring element for metropolitan growth.

However, the articulation between bypass development and urban planning appears incomplete. The ZACA project, an urban renewal initiative involving the demolition of inner-city neighbourhoods and displacement of 12,000 inhabitants, illustrates the complex social dynamics of urban restructuring in Ouagadougou. While not directly linked to the bypass, this project demonstrates that infrastructure and urban development interventions generate significant distributional consequences, with displacement and spatial marginalization affecting vulnerable populations.

The bypass's relationship to these broader urban restructuring processes remains unexamined in available documentation. Whether the bypass facilitates or constrains equitable urban development, and how it interacts with residential displacement and informal settlement patterns, are questions that current monitoring systems do not address.

6. DISCUSSION OF RESULTS

6.1 Execution Success and Its Determinants

The Ouagadougou bypass project's 87.1% execution rate substantially exceeds the average performance of road projects in Burkina Faso (32.6%). This differential performance warrants examination of contributing factors.

Strategic prioritization emerges as a key determinant. The bypass has been consistently positioned as a flagship project within national development plans across multiple policy cycles. This sustained political commitment likely translated into resource allocation priority and implementation attention.

Financing stability represents another factor. The project has benefited from multiple funding sources, including JICA support for the southeastern bypass improvement and broader corridor development initiatives. While the JICA ex-post evaluation of a related project noted resource mobilization challenges affecting maintenance, the bypass project appears to have maintained financing continuity.

Geographic location relative to security threats is a third factor. Unlike projects in northern and western regions affected by terrorist attacks and insecurity, the Ouagadougou bypass is located in the relatively secure central region. The MID statistical bulletin explicitly notes that other projects face "enormous difficulties linked to insecurity in the project intervention zone," a constraint not affecting the bypass.

These determinants suggest that execution performance is shaped as much by political economy and security geography as by technical or managerial factors a finding with implications for understanding infrastructure delivery in fragile contexts.

6.2 The Monitoring Deficit and Its Consequences

The absence of systematic monitoring of effectiveness indicators represents a critical finding of this assessment. The JICA evaluation's candid acknowledgment that quantitative indicators were not monitored, forcing reliance on qualitative information and limiting evaluation objectivity, exposes a systemic weakness in Burkina Faso's infrastructure governance.

This monitoring deficit has multiple consequences. First, it prevents evidence-based assessment of whether infrastructure investments are achieving their objectives. The bypass's decongestion effects, travel time savings, and economic benefits remain unquantified. Second, it undermines accountability: without performance data, there is no basis for evaluating whether the substantial financial investments have delivered value. Third, it impedes adaptive management: without feedback on outcomes, it is impossible to identify problems and adjust implementation strategies.

The monitoring deficit is particularly concerning for road safety outcomes. The research documenting hazardous junctions and casualty concentrations at interchanges and peripheral axes suggests that safety risks are not being systematically tracked. Without safety monitoring integrated into infrastructure evaluation, opportunities for remedial intervention are missed.

6.3 The Safety Paradox

The bypass infrastructure exemplifies what might be termed a "safety paradox": infrastructure designed to improve safety by diverting traffic from congested central areas may generate new safety risks at interchanges and along peripheral axes. This paradox reflects the interaction between infrastructure design and user behavior in contexts of weak traffic regulation and informal economic activity.

The finding that "roads are often designed with no consideration of traffic and road occupation practices by populations" points to a fundamental disjuncture between engineering assumptions and operational realities. Bypass roads designed for high-speed through traffic operate in environments where pedestrians, informal traders, and parked vehicles occupy roadway space, creating conflicts that design standards do not anticipate.

Addressing this paradox requires moving beyond infrastructure provision to integrated approaches encompassing traffic enforcement, road safety education, and regulation of roadside activities. The observation that "the lack of a driving licence, the lack of knowledge of traffic rules by road users, especially young people, are recurrent" suggests that behavioral and regulatory interventions are as important as physical infrastructure.

6.4 Implications for Infrastructure Planning

The findings have several implications for road infrastructure planning in Burkina Faso and comparable contexts.

Integration of safety considerations: Infrastructure planning must move beyond traffic capacity and connectivity objectives to incorporate safety assessment as a core design and evaluation criterion. This requires integrating road safety audits, conflict point analysis, and user behavior assessment into project design and monitoring.

Realistic assessment of urban development contribution: While bypass roads can structure urban expansion and facilitate regional connectivity, their contribution to equitable urban development depends on complementary policies addressing land use, informal settlements, and public transport. Infrastructure alone cannot resolve the complex social and economic challenges of African urbanization.

Strengthening monitoring and evaluation: The monitoring deficit must be addressed through investment in data collection systems, indicator definition, and evaluation capacity. Without performance data, infrastructure governance remains based on assumption rather than evidence.

Contextual sensitivity: Infrastructure design must account for actual usage patterns, including informal economic activities and behavioral norms, rather than assuming idealized user behavior. This may require innovative design solutions such as dedicated spaces for informal trade, pedestrian separation at high-risk locations, and traffic calming at interface zones.

6.5 The Broader Policy Context

The bypass project's performance must be situated within Burkina Faso's broader infrastructure development trajectory and the constraints imposed by the security crisis. The government's 2025 objectives contract reported 85.35% execution for the construction ministry, with over 1,300 km of roads maintained and multiple urban road projects advanced. The 2026 agenda includes continued investment in Ouagadougou urban roads, drainage infrastructure, and housing.

However, resource constraints persist. The Minister of Infrastructure acknowledged in 2025 that "some companies have not been paid since January, due to lack of available funds in the national budget." This financing gap affects maintenance, which is critical for sustaining infrastructure performance over time. Without adequate maintenance, the bypass roads will progressively deteriorate, eroding their functional benefits.

7. CONCLUSION

This assessment of the Ouagadougou bypass road infrastructure yields a nuanced picture of achievement and limitation. The project demonstrates exceptional execution performance, achieving 87.1% completion by Q1 2024 far exceeding the average for road projects in Burkina Faso. This success reflects strategic prioritization, financing stability, and favorable security geography. The infrastructure enhances connectivity by linking major national roads and creating alternative routing for transit traffic, aligning with both urban mobility and regional integration objectives.

However, the assessment reveals critical gaps. The absence of systematic monitoring of effectiveness indicators means that decongestion effects remain unquantified and unverified. Road safety outcomes have not improved and may have deteriorated, with hazardous junctions and casualty concentrations documented at interchanges and peripheral axes. The interaction between infrastructure and informal roadside activities generates new conflict points that design standards do not address. The integration of bypass development with broader urban planning objectives appears incomplete.

These findings suggest that infrastructure provision, while necessary, is insufficient for achieving sustainable urban mobility and development outcomes. A paradigm shift is required from infrastructure-centric planning to integrated, evidence-based approaches that encompass safety, monitoring, behavioral factors, and complementary policies. For Burkina Faso, investing in evaluation capacity, road safety integration, and maintenance sustainability is as important as continuing the physical expansion of the road

network. The Ouagadougou bypass roads provide a foundation for improved mobility, but realizing their full potential requires addressing the monitoring, safety, and integration deficits identified in this assessment.

8. LIMITS OF THE STUDY

Several limitations constrain the scope and certainty of this assessment.

Data availability: The most significant limitation is the absence of comprehensive quantitative data on infrastructure performance outcomes. Traffic volumes, travel times, accident statistics specific to the bypass, and economic impact indicators were not available in accessible sources. This reflects the broader monitoring deficit identified as a finding of the study, but it limits the robustness of functional performance conclusions.

Reliance on secondary sources: The assessment relies primarily on MID statistical bulletins and JICA evaluation documents. While these are authoritative sources, they provide institutional perspectives that may not capture all relevant dimensions of performance. Independent field observation and user surveys were not conducted.

Temporal scope: The assessment captures a specific moment in the bypass project's evolution. As the infrastructure matures, performance patterns may change traffic volumes may increase, induced demand may emerge, and land use patterns around interchanges may consolidate. Longitudinal assessment would be required to capture these dynamics.

Attribution challenges: Distinguishing the bypass's effects from other factors influencing urban mobility population growth, economic change, other infrastructure investments, is inherently difficult. The absence of baseline data and counterfactual analysis limits attribution of observed outcomes to the bypass intervention.

Security context: The broader security situation in Burkina Faso affects both infrastructure implementation and research access. While the Ouagadougou bypass is located in a relatively secure area, the national context of insecurity influences resource allocation and policy attention in ways that this study cannot fully capture.

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10. AUTHOR CONTRIBUTIONS

Tako Sambo is the sole author of this manuscript and was responsible for all aspects of the research, including conceptualization, data collection, analysis, interpretation, and manuscript preparation.

11. COMPETING INTEREST

The author declares no competing interests.

12. FUNDING INFORMATION

No funding was received for this research.

13. DATA AVAILABILITY

All data analyzed in this study are derived from publicly available government statistical bulletins, donor evaluation reports, and published academic literature. The specific documents consulted are cited in the bibliography. No primary data were collected.

14. DISCLAIMER

The views expressed in this article are those of the author and do not necessarily reflect the official policy or position of any affiliated institution or the Government of Burkina Faso.

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