



## Financial Sustainability of KCIC Whoosh in the Ramp-Up Phase: A Narrative Review Based on IDX and Global HSR Benchmarks

<sup>1</sup>Muhammad Rijal Alim Rahmat

<sup>1</sup>Universitas Negeri Makassar, Indonesia

<sup>1</sup>[muhammadrijalalim@unm.ac.id](mailto:muhammadrijalalim@unm.ac.id)

\*Correspondence Email: [muhammadrijalalim@unm.ac.id](mailto:muhammadrijalalim@unm.ac.id)

**Abstract:** The Jakarta Bandung High-Speed Rail (HSR), branded as Whoosh, entered commercial service in October 2023 as Indonesia's first high-speed line. As a capital-intensive megaproject financed predominantly by long-term debt and implemented through a binational consortium, Whoosh presents a salient test case for financial management in complex transport infrastructure. This narrative review synthesizes peer-reviewed literature, official financial reports, governmental communications, and credible industry sources from 2023 through June 2025 to appraise the project's evolving financial health through four core indicators: Debt Service Coverage Ratio (DSCR), Cash Flow Available for Debt Service (CFADS), Farebox Recovery Ratio (FRR), and Operating Ratio. The paper integrates conceptual frameworks from project finance and public private partnership (PPP) practice with empirical insights from global HSR benchmarks (Japan, China, the EU, and selected international cases) to interpret Whoosh's early operating performance and capital structure. We find that initial years are characterized by high leverage, debt service pressure, and operating deficits that keep DSCR below unity, consistent with international experience in new HSR corridors. Yet by 2025, operational EBITDA reportedly turns positive and FRR approaches the break-even threshold, while public policy instruments most notably cash deficiency support and ongoing debt restructuring are mobilized to stabilize liquidity and improve solvency. The review argues that long-run financial sustainability will depend on simultaneous progress in three domains: revenue optimization (dynamic pricing, intermodal integration, and non-fare income), disciplined operating efficiency (energy, maintenance, asset utilization), and liability management (tenor extension, interest-cost relief, and calibrated equity reinforcement). We conclude with managerial and policy recommendations for safeguarding DSCR trajectories, strengthening CFADS growth, and aligning social objectives with financial viability.

**Keywords:** High-Speed Rail, Financial Sustainability, DSCR, CFADS, FRR, Operating Ratio, KCIC Whoosh.

### INTRODUCTION

Whoosh the acronym for Waktu Hemat, Operasi Optimal, Sistem Hebat is Indonesia's inaugural high-speed railway, connecting Jakarta and Bandung with a scheduled travel time of roughly 40-45 minutes. The line commenced commercial operations in October 2023, capping nearly a decade of planning and construction under a joint venture structure led domestically by PT Kereta Api Indonesia (KAI) and its state-owned partners and internationally by a Chinese



consortium (Fortune Indonesia, 2025; Reuters, 2017). From its inception, the project has been framed as a business-to-business initiative that mobilizes foreign and domestic capital without requiring blanket budgetary guarantees. Over time, however, construction delays, exogenous shocks, and scope refinements generated cost overruns and financing stress that expanded debt exposure and tightened liquidity (Tirto, 2025).

The resulting financial profile is emblematic of early-stage HSR worldwide: demand ramp-up is gradual, capital charges are heavy, and operating processes are still moving down the learning curve. In such a setting, financial management operates on a knife-edge between short-run cash flow resilience and long-run viability. A sharp focus on first-principles indicators DSCR, CFADS, FRR, Operating Ratio offers decision-relevant visibility on whether the project can consistently service obligations while improving operating efficiency and growing patronage. The broader literature on HSR underscores that only a handful of corridors achieve full financial self-sufficiency; more commonly, governments support infrastructure costs or early-stage operations to realize substantial social and economic benefits that are not fully monetized through fares (Beria et al., 2024; WRI, 2024).

This article contributes to the Indonesian discourse in three ways. First, it consolidates a contemporary, finance-centered reading of Whoosh's initial operations (2023 June 2025) by triangulating public financial disclosures, credible media reporting, and peer-reviewed insights. Second, it situates Whoosh against global comparators, including Japan's Shinkansen, China's CRH network, and Europe's liberalized HSR markets, to draw practical lessons about demand, pricing, and efficiency (Chi & Lei, 2023; Beria et al., 2024). Third, it translates project finance guidance from PPP practice into a concrete managerial agenda for stabilizing DSCR, lifting CFADS, and steering FRR and Operating Ratio into sustainable ranges (PPPLRC/World Bank, 2024).

Large, debt-financed rail projects are typically structured via special purpose vehicles that segregate project cash flows from sponsors' balance sheets, with lenders relying on the project's internal capacity to service debt. In this context, DSCR defined as CFADS divided by total debt service in a period operates as a cornerstone covenant and solvency gauge. Lenders often require a minimum DSCR buffer (commonly 1.20× or higher) to withstand demand volatility and cost shocks (PPPLRC/World Bank, 2024). When DSCR falls below unity, the project's own cash flows



are insufficient to meet scheduled interest and principal, necessitating reserve drawdowns, sponsor support, or restructuring.

CFADS encapsulates the project's distributable operating cash after routine operations, maintenance, taxes, and working capital needs, but before financing flows. The metric is highly sensitive to fare revenues, service frequency, asset utilization, and the efficiency of O&M practices. Sustained CFADS growth typically reflects maturing demand, effective yield management, and disciplined cost control key preconditions for DSCR improvement.

On the operating side, FRR measures the share of operating costs covered by fare revenues. For intercity and HSR services, a FRR at or above 100 percent is often targeted to avoid recurring operating subsidies, though early years commonly see sub-100 percent levels during demand ramp-up (WRI, 2024; FTA, n.d.). Operating Ratio, the complement of FRR in practice, relates total operating expenses to operating revenues; values significantly below 100 percent indicate operating surpluses, while values above 100 percent signal operating deficits. In freight rail, world-class operators pursue Operating Ratios in the 60-70 percent range through rigorous efficiency programs, a useful albeit stricter benchmark reminding passenger operators of the gains possible through continuous improvement (Sprakman et al., 2024).

Taken together, these indicators translate strategic choices pricing, scheduling, maintenance regimes, and capital structure into quantitative trajectories observable across time. They also connect the microeconomics of operations to the macrostructure of finance: FRR and Operating Ratio shape CFADS; CFADS governs DSCR; DSCR constraints feed back into managerial possibilities for capex, refinancing, and service design.

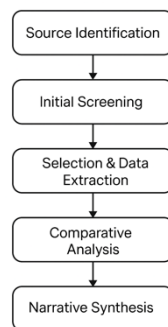
## **METHOD**

This study adopts a narrative review design that privileges interpretive synthesis over meta-analytic aggregation, appropriate to the heterogeneity of HSR institutional settings and reporting conventions. The review canvasses English- and Indonesian-language sources from 2023 through June 2025, focusing on four classes of evidence: (i) peer-reviewed studies on HSR finance, demand, and operations; (ii) project finance and PPP guidance relevant to DSCR/CFADS measurement and lender expectations; (iii) official communications and financial disclosures of Indonesian state-owned enterprises involved in Whoosh; and (iv) credible business and policy journalism with traceable primary references. Inclusion emphasizes quantitative content ratios,



flows, or parameters useful for benchmarking and scenario thinking. Key references include Beria et al. (2024) on European HSR competition and financial sustainability, Chi and Lei (2023) on macroeconomic effects of China's HSR, Spraakman et al. (2024) on operating ratio discipline in rail, WRI (2024) on FRR in public transport, PPPLRC/World Bank (2024) on DSCR/CFADS in PPP finance, and Indonesian-focused reporting on Whoosh's financing and policy responses (Fortune Indonesia, 2025; Tirto, 2025; IDNFinancials, 2025; The Diplomat, 2025; Reuters, 2017). While the design is qualitative in its synthesis, the argument is quantitative in orientation: we interpret Whoosh's performance primarily through the behavior of FRR/Operating Ratio, CFADS, and DSCR, and we compare those trajectories against international experience to appraise plausibility and risk. Given that audited, project-level statements for Whoosh are limited in the public domain during the period of interest, the analysis relies on triangulation comparing multiple independent sources for consistency and on transparent, conservative interpretations of the reported figures.

To enhance transparency, Figure 1 presents a simplified flowchart of the review process, from source identification to synthesis. The process involved: **(1)** identifying relevant literature and data (2023-2025) from academic, financial, and journalistic sources; **(2)** conducting an initial screening to select sources relevant to high-speed rail (HSR) financial sustainability and performance metrics; **(3)** final selection and extraction of financial indicators DSCR, CFADS, FRR, and Operating Ratio; **(4)** comparative analysis across international HSR benchmarks; and **(5)** synthesizing the findings into a structured narrative framework. These steps are outlined in Figure 1.



**Figure 1.** Simplified narrative review process from data collection to synthesis.



## **RESULT AND DISCUSSION**

### **Global Evidence and Lessons for Financial Management**

The international HSR record presents a clear pattern. A few corridors with extraordinary densities Tokyo Osaka's Tokaido Shinkansen being the canonical example have sustained robust operating surpluses for decades through high frequency, premium willingness-to-pay, and consistently high load factors. Elsewhere, operator performance varies widely and is contingent on corridor economics, regulatory constraints, competition, and the degree to which infrastructure costs are socialized. In China, the world's largest HSR network expanded rapidly to deliver extensive social benefits; many lines have required fiscal support or internal cross-subsidy, particularly outside the densest trunk corridors. Empirical work suggests that HSR openings have raised urban GDP and spatial integration across Chinese cities, reinforcing the social return case for state support in periods when financial returns are thin (Chi & Lei, 2023).

Europe's more liberalized context illustrates another dimension. The introduction of open-access competition in Italy and France reduced fares and stimulated demand, yet also compressed operator margins, with new entrants often recording losses in early years as they built brand and market presence (Beria et al., 2024). The Italian experience indicates that profitable equilibria are nonetheless possible when density is adequate and operators relentlessly optimize cost and utilization; Italo's eventual operating profitability before the pandemic attested to this pathway. The broader lesson for Indonesia is that demand scale is paramount, but disciplined operations and smart pricing are necessary complements.

North American railways, though predominantly freight, offer a sharp lens on operating discipline. Canadian Pacific's transformation under precision-scheduled railroading drove its Operating Ratio below 60 percent an historic efficiency milestone achieved through asset intensity, tighter train plans, and maintenance optimization (Sprackman et al., 2024). While freight and HSR contexts are not directly comparable, the managerial principle generalizes: operational excellence translates into persistent improvements in operating ratios and, ultimately, cash generation.

The global experience in high-speed rail (HSR) shows financial performance varies widely by corridor maturity and institutional arrangements. Table 1 summarizes key financial indicators DSCR, FRR, Operating Ratio, and CFADS for Indonesia's Whoosh and selected international



benchmarks (China, Japan, Italy), offering readers a side-by-side view of comparative performance and common early-stage challenges.

| Indicator              | Indonesia (Whoosh)   | China  | Japan                                | Europe (Italy)   |
|------------------------|--|--|--------------------------------------|--|
| <b>DSCR</b>            | < 1 in early years (debt service exceeds internal cash flow)               | < 1 on many new lines; state support required  | > 1 on mature corridors like Tokaido | < 1 at launch; improved to > 1 after restructuring (e.g., Italo) |
| <b>FRR</b>             | < 100% in first years; approaches ~100% by 2025 as EBITDA turns positive   | < 100% on many routes; positive on trunk lines | > 100% consistently on mature lines  | < 100% early; later exceeds 100% for profitable operators        |
| <b>Operating Ratio</b> | > 100% initially; declines toward 100% as efficiency improves              | > 100% in newer projects; efficiency varies    | < 100% on high-performing corridors  | > 100% early; drops below 100% with cost discipline              |
| <b>CFADS</b>           | Negative or thin in early years; turns positive by 2025 with demand growth | Positive in dense areas; thin elsewhere        | Strongly positive on flagship routes | Initially negative; improves with efficiency and scale           |

*Table 1. Comparative Financial Metrics of HSR Projects: Whoosh vs Global Benchmarks*

### The Whoosh Case: Capital Structure, Operating Trajectory, and Policy Interface

Whoosh’s financing architecture combines large-scale foreign currency debt with domestic equity commitments. Initial financing envisaged roughly three-quarters debt largely from China Development Bank and one-quarter equity from the state-owned consortium on the Indonesian side, with the Chinese consortium holding the remainder of shares in the project company (Reuters, 2017; Fortune Indonesia, 2025). Construction overruns and delays increased total investment requirements beyond early estimates, amplifying leverage and raising the salience of debt service in the project’s early operating years (Tirto, 2025).

As operations began, fare revenues accumulated under a dynamic pricing regime and promotional campaigns designed to seed demand. In parallel, the operator incurred substantial fixed and variable costs: traction power, maintenance of sophisticated rolling stock and infrastructure, station operations, and staffing. The combination of nascent revenues and substantial ongoing costs together with significant interest expense meant that early-year FRR fell below 100 percent and Operating Ratio exceeded 100 percent, with CFADS likely negative or thin.



Reported losses at the consolidated level of Indonesian stakeholders reflected this dynamic (Tirto, 2025; IDNFinancials, 2025).

By 2025, however, two encouraging developments emerged. First, ridership momentum strengthened as service reliability improved, network familiarity increased, and complementary access modes expanded. Second, management signals indicated that operating EBITDA had turned positive, implying that FRR approached the break-even zone even if financial charges still produced net losses (Tirto, 2025). These shifts support a common HSR ramp-up narrative: operating performance tends to improve materially over the first two to five years as utilization and process efficiency advance.

On the liability side, Indonesian authorities activated targeted policy instruments to stabilize liquidity and prepare for solvency improvements. Cash deficiency support was deployed to bridge early shortfalls, and negotiations with lenders aimed to extend tenors and adjust interest burdens to match realistic cash flow profiles. The state investor Danantara assumed a coordinating role in designing balance sheet solutions potentially including asset-light configurations that separate infrastructure ownership from operations, calibrated equity reinforcement, or other structural adjustments designed to bring DSCR above covenant thresholds in the medium term (IDNFinancials, 2025; Tirto, 2025). The Diplomat's reporting summarized the political salience of these efforts with the "time bomb" metaphor, underscoring the imperative for credible, timely financial engineering (The Diplomat, 2025).

### **Interpreting the Four Indicators in Context**

In Whoosh's first two operating years, the DSCR picture is dominated by debt service obligations that exceed internally generated cash flows. Absent extraordinary revenue growth or significant cost contraction, DSCR below unity is to be expected in such early phases. Debt restructuring by extending amortization schedules, smoothing repayment profiles, and reducing effective interest cost can quickly alter the trajectory of DSCR without compromising service quality. Crucially, however, structural relief on the liability side must be coupled with operating gains, lest moral hazard undermine performance incentives (PPPLRC/World Bank, 2024).

CFADS serves as the proximate lever for DSCR improvement. Three drivers are especially material. First, fare revenue growth through demand expansion and yield management directly increases CFADS, given that many operating costs are semi-fixed at the service level. Second, cost



efficiency programs energy management, predictive maintenance, staffing optimization, and tighter asset utilization reduce operating expenses, lifting CFADS dollar-for-dollar. Third, prudential capital budgeting that limits non-essential capex during the ramp-up years prevents CFADS from being diluted by maintenance or upgrade outlays that can be deferred without impairing safety or reliability.

FRR and Operating Ratio capture these operating dynamics. As load factors rise and pricing better reflects willingness-to-pay while preserving accessibility, FRR increases and Operating Ratio declines. Internationally, FRR above 100 percent is achievable in HSR when corridors are dense and operations tightly managed. Yet reaching such levels quickly is rare; more often, FRR climbs over several years. Consequently, temporary operating support whether explicit subsidies or internal cross-subsidy can be economically justified when social benefits are significant and the operating model is trending toward efficiency (WRI, 2024).

### **Managerial Agenda: Revenue, Efficiency, and Liability Management**

The review points to a coherent managerial agenda structured around three mutually reinforcing pillars. On the revenue front, Whoosh's pricing should evolve toward airline-like yield management: time-of-day and day-of-week differentiation, advance-purchase discounts, targeted loyalty products, and opportunistic capacity fills during shoulder periods. Integration with feeder modes and bundled products with tourism and business travel can strengthen network effects and reduce generalized travel costs for users, shifting demand from road and short-haul air to rail. Strategically curated non-fare revenues from station retail and advertising to transit-oriented development can provide diversified cash streams less correlated with short-term travel demand (WRI, 2024).

On efficiency, the analogies from freight rail are instructive even if imperfect. A programmatic push to optimize asset turns (more trainsets in productive service hours), refine maintenance to predictive regimes, and standardize operating procedures can cumulatively compress the Operating Ratio (Sprakman et al., 2024). Energy costs, a large line item in HSR OPEX, warrant special attention through eco-driving algorithms, regenerative braking optimization, and portfolio hedges where appropriate. Contracting strategies for maintenance and power should be periodically re-tendered or performance-benchmarked to prevent cost creep.



On liability management, restructuring options deserve careful sequencing. Extending tenors to align with asset lives, smoothing amortization to match realistic cash build-up, and negotiating rate relief where justified by risk reallocation are conventional, bankable measures in project finance (PPPLRC/World Bank, 2024). Where policy permits, calibrated equity injections can simultaneously delever and signal commitment, reducing refinancing risk and lowering the risk premium demanded by lenders. Asset-light options in which infrastructure is separated and financed on public balance sheet while operations lease access can also reduce financing frictions if governance is sound and access charges are set transparently.

#### Policy Interface and Social Value

Whoosh's financial arc cannot be evaluated solely through private metrics: social returns matter. International evidence documents travel time savings, safety gains from modal shift, emission reductions, and spatial integration as prominent benefits of HSR. In settings like China, these benefits have been linked to measurable increases in city-level GDP and productivity following HSR openings (Chi & Lei, 2023). In Europe, liberalization has generated consumer surplus via lower fares and greater frequency, albeit with uneven impacts on operator profitability (Beria et al., 2024). Indonesia's policy challenge is to calibrate transitional support to the magnitude and timing of social returns without entrenching inefficiency. Instruments such as transparent operating support, infrastructure grants, or access-charge designs can internalize public benefits while preserving incentives for operators to improve FRR, Operating Ratio, and CFADS over time (WRI, 2024).

#### Limitations and Directions for Further Research

This review is constrained by the public availability of granular, audited project-level financials for Whoosh during the 2023 June 2025 window. The analysis therefore relies on triangulation across credible sources and conservative interpretations grounded in standard project finance practice. Future research should assemble a structured panel of quarterly operating statistics and financial line items ridership, average yields, train-kilometers, energy consumption, O&M outlays, CFADS breakdowns, and debt service schedules to enable explicit DSCR modeling under alternative scenarios. Comparative studies with Taiwan's HSR restructuring and the HS1 concession in the UK would also deepen insight into transition pathways from early-stage fragility to stable operations. While the conclusions remain grounded in widely accepted project finance



frameworks, they should be viewed as indicative rather than definitive. Future access to detailed operational and financial datasets could further refine or challenge the interpretations presented here.

## CONCLUSION

The first two years of Whoosh illustrate the financial management challenges common to nascent HSR corridors. High leverage and front-loaded financing costs depress DSCR; initial FRR and Operating Ratios reflect learning-curve operations; CFADS is tight until demand scales and efficiency improves. Indonesia's policy response bridging liquidity, coordinating restructuring, and signaling a commitment to operational excellence has begun to shift the trajectory in 2025 as operating EBITDA turns positive. The international record suggests that with persistent revenue optimization, disciplined efficiency, and prudent liability management, HSR projects can converge toward sustainable operating performance even when pure private profitability remains elusive. The financial management task, then, is to choreograph these levers in a credible sequence that steadily lifts FRR, compresses the Operating Ratio, expands CFADS, and raises DSCR above covenant floors, while keeping social value central to design and evaluation.

## REFERENCE

- Beria, P., Crozet, Y., & Guihéry, L. (2024). Competition models and financial sustainability of high-speed open-access passenger rail operators in Europe. *Transport Policy*.
- Chi, J., & Lei, Y. (2023). High-speed rail and China's economic growth. *Journal of Transport Geography*.
- FTA. (n.d.). National Transit Database: Farebox Recovery Ratio. U.S. Federal Transit Administration.
- Fortune Indonesia. (2025). Kronologi utang kereta cepat Whoosh dan opsi dukungan.
- IDNFinancials. (2025). Danantara ready to step in to fix Whoosh's financial problems.
- PPPLRC/World Bank. (2024). PPP Reference Guide & Project Finance basics (DSCR/CFADS). Public Private Partnership Legal Resource Center.
- Reuters. (2017). Indonesia China consortium signs \$4.5bn loan for Jakarta Bandung HSR project.



Spraakman, G., et al. (2024). The Canadian Pacific Railway's diversification strategies: A financial performance story, 1883 2020. *Accounting History Review*.

The Diplomat. (2025). Indonesia's high-speed rail is a financial "time bomb," official says.

Tirto. (2025). Hitungan beban utang kereta cepat Whoosh; CDS; pernyataan Menkeu & Danantara.

WRI. (2024). *A Fare Look: Funding urban public transport operations*. World Resources Institute.