



Operational Efficiency of Infrastructure Projects in an International Environment: The Role of Local Integration, Joint Venture Structures, Strategic Partnerships, and Transparent Financial Management

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Abstract

Infrastructure delivery in international markets continues to combine large capital flows with weak cost and schedule discipline. This article examines how four management levers, namely local integration, joint venture structures, strategic partnerships, and transparent financial management, shape the operational efficiency of cross border infrastructure projects. The aim is to explain the mechanisms that connect these levers to project performance and to propose an integrated operating model for contractors that work across jurisdictions. The study uses a qualitative synthesis design that combines a structured review of peer reviewed construction management research with quantitative data from multilateral institutions and a reflective practitioner case drawn from microfinance and infrastructure consultancy. Results indicate that the four levers reinforce one another: local integration lowers input risk, joint ventures share capacity, partnerships align incentives, and transparency converts disclosure into financing access and lower bid prices. The article offers an original four pillar framework and a lifecycle support model, together with practical recommendations. Findings are relevant to contractors, project financiers, and policymakers working on internationally financed infrastructure.

Keywords: Operational Efficiency, International Infrastructure, Joint Ventures, Local Content Integration, Strategic Partnerships, Financial Transparency, Project Governance, Multilateral Development Banks, Construction Management, Cross Border Project Delivery.

INTRODUCTION

Private investment in infrastructure in low and middle income countries reached US\$100.7 billion in 2024, a rise of 16 percent from US\$87.1 billion in 2023 and the first annual total above US\$100 billion since the start of the pandemic [7]. This recovery sits against a long horizon financing requirement that the Global Infrastructure Outlook places near US\$94 trillion to 2040, with about one fifth of that amount unfunded under current spending trends [12]. The shortfall is not only financial. Even where money is committed, delivery quality stays uneven. Flyvbjerg [1] reports that roughly nine out of ten large projects run over budget, a pattern that has held across decades and continents and that he attributes in part to optimism bias and to strategic misrepresentation during planning. In an international setting these problems compound, because contractors work across unfamiliar regulatory regimes, fragmented supply chains, and partners with different financial reporting habits.

The financial environment around projects has also shifted. Global account ownership rose from 51 percent in 2011 to

76 percent in 2021 [10], and reached about 79 percent by 2025, while the share of adults in developing economies saving through a formal account climbed by 16 percentage points after 2021 [11]. Wider financial access changes how local suppliers and subcontractors connect to a project, and it raises expectations about traceable money flows. A contractor that enters a market today meets counterparties who increasingly expect digital records, formal contracts, and disclosed terms. These expectations move financial transparency from a compliance afterthought into a condition for winning work and securing funding.

Research on the four levers has grown, yet it remains fragmented. Studies on international construction joint ventures concentrate on formation risk and partner selection [2-4]. Work on relationship management treats trust and coordination mostly within single country settings [5]. Transparency research measures procurement savings at the level of the public buyer [6]. Few studies examine how these levers operate together at the level of an internationally active contractor, or how one firm can fold them into a single operating system. That is the gap this article addresses.

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The aim of the study is to explain the mechanisms that link local integration, joint venture structures, strategic partnerships, and transparent financial management to the operational efficiency of internationally financed infrastructure projects, and to propose an integrated model for managing them. The guiding **hypothesis** is that these four levers are complementary rather than independent, so that their combined effect on cost control, schedule reliability, and stakeholder trust is greater than the sum of their separate contributions. **The scientific novelty** of the work lies in the consolidation of four separately studied management levers into a single, practitioner grounded operating framework for internationally active infrastructure contractors.

The study has boundaries that readers should keep in mind. It relies on a qualitative synthesis rather than a new statistical dataset, so the proposed framework is analytical and illustrative rather than tested through large sample estimation. Part of the practical evidence comes from one practitioner case, which informs the model but does not, on its own, establish generalizable effect sizes. These limits narrow the strength of the claims without weakening the logic that connects the four levers, and they point to a clear path for later empirical testing.

The work is useful for several audiences. Contractors and consultancies gain a structured way to combine market entry, financing coordination, and execution support. Financiers gain a clearer view of which firm level practices reduce delivery risk. Policymakers gain language for linking transparency rules to value for money. For the United States, where the single country infrastructure investment need is substantial in the Outlook data [12] and where public programs increasingly draw on private and international capital, the relevance is practical. A practitioner who has built audit ready financial management in a regulated microfinance setting and applied the same discipline to infrastructure consultancy across more than forty markets brings a transferable approach. That experience connects to United States priorities in delivery oversight, local supplier participation, and credible reporting, which together support steadier national infrastructure renewal.

MATERIALS AND METHODS

The study follows a qualitative synthesis design. It does not develop a new product or algorithm. Instead it integrates existing evidence and professional practice to build a coherent analytical model. Four methods work together. The first is a structured review of peer reviewed literature in construction management, project management, and governance. The second is the analysis of quantitative data from multilateral and development institutions. The third is a reflective practitioner case study based on the author's documented experience in microfinance and international infrastructure consultancy. The fourth is conceptual modeling, used to turn the synthesized evidence into visual frameworks.

The source base falls into three groups. The first group is peer reviewed journal articles that cover joint venture performance and risk [1-4], relationship management [5], and procurement transparency [6]. The second group is institutional data and research from the World Bank, the Center for Global Development, and the Global Infrastructure Hub [7-12]. The third group is the practitioner case, which supplies operational detail that published statistics rarely capture, such as audit arrangements, reporting standards, and internal control design.

Analysis proceeded by thematic coding around the four levers, followed by triangulation between literature, institutional data, and practice. Where the three sources agreed, the finding was treated as well supported. Where they diverged, the divergence is reported in the discussion. The conceptual modeling stage produced two original artifacts, an integrated operating model and a four pillar efficiency framework, and one process model that maps the levers across the project lifecycle. The practitioner case is interpretive evidence rather than a controlled study, so its figures are presented as documented experience, not as independently audited public statistics.

RESULTS AND DISCUSSION

Two facts frame the analysis. Money is flowing back into infrastructure, and delivery still falters. The first fact is visible in the recovery of private participation. The second is visible in persistent cost overruns. The investment recovery matters because it widens the field of internationally financed work that contractors can pursue, and because it brings lenders who demand discipline. To show the recovery clearly, the following chart traces private participation in infrastructure across recent years.

Figure 1 presents private investment commitments in infrastructure in low and middle income countries from 2019 to 2024. The series shows the pandemic trough in 2020 and the climb back above the pre pandemic level by 2024.

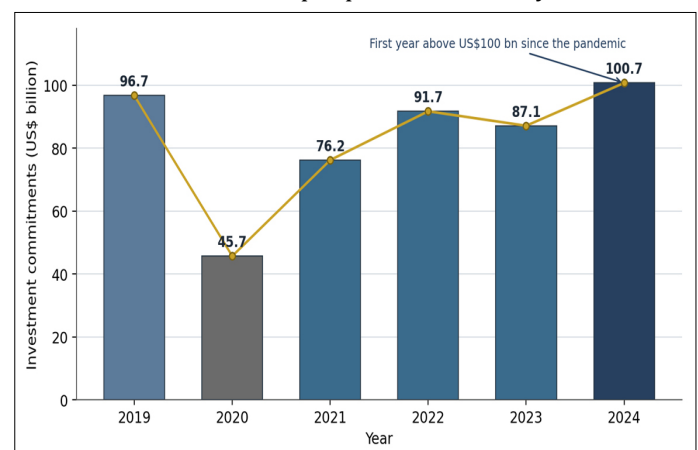


Figure 1. Private participation in infrastructure, investment commitments, 2019 to 2024 (US\$ billion) (compiled by the author based on [7, 8, 13, 14]).

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The figure tells a recovery story, from US\$96.7 billion in 2019 down to US\$45.7 billion in 2020 and back to US\$100.7 billion in 2024 [7, 8]. For an internationally active contractor, the practical reading is simple. There is more financed work, and most of it carries oversight conditions attached by development banks, export agencies, and private lenders. Winning and delivering that work depends less on price alone and more on the ability to integrate locally, partner credibly, and report transparently. Against this backdrop, the cost overrun pattern documented by Flyvbjerg [1] is the problem to solve. The four levers studied here are the firm level instruments available to a contractor for solving it.

Table 1 summarizes the four levers, the main mechanism behind each one, the efficiency effect it produces, and the evidence that supports it. The table sets up the detailed discussion that follows.

Table 1. Four management levers and their efficiency mechanisms (compiled by the author based on [2, 5, 6, 9, 15, 18]).

Lever	Primary mechanism	Main efficiency effect
Local integration	Local sourcing, local subcontracting, regulatory familiarity	Lower logistics and currency exposure, faster permits, social license
Joint venture structures	Pooling of capacity, capital, and market knowledge with shared risk	Access to larger contracts, distributed exposure, knowledge transfer
Strategic partnerships	Aligned incentives, relational and contractual governance, trust	Fewer disputes, smoother coordination, time and cost gains
Transparent financial management	Standardized disclosure, external audit, digital records	Lower bid prices, financing access, investor confidence

Local integration is the practice of building a project around local suppliers, subcontractors, labor, and regulatory knowledge rather than importing most inputs. It matters for efficiency because it removes cost and time that foreign only delivery quietly adds. Data on multilateral procurement shows how large the local channel already is. Across the World Bank, the Inter American Development Bank, the African Development Bank, and the Asian Development Bank over a five year period, about US\$147 billion of US\$208 billion in project procurement went to firms based in the borrowing country [9]. The same analysis estimates that increased local contracting under bank financed projects represents a market of roughly US\$10 billion a year across those four institutions [9]. Local participation is therefore the default channel, not a marginal one.

The efficiency logic is concrete. Local sourcing shortens supply lines and lowers freight and storage costs. Local labor reduces mobilization expense and eases the social acceptance that keeps sites open. Familiarity with permits and inspections shortens the approval steps that often sit on the critical path. A design consideration runs alongside these gains. Local capability can be uneven, so a contractor that integrates locally has to assess supplier quality, support weaker subcontractors, and prepare realistic cost estimates instead of assuming that local always means cheaper. In the author's consultancy practice, this is exactly the support offered to contractors entering new markets: identifying suppliers and subcontractors, calculating cost estimates, and

monitoring early delivery so that local integration produces cost realism rather than hidden risk [16, 17].

A joint venture lets two or more firms act as one for a project, pooling capital, equipment, and market knowledge while sharing the exposure. For international work, this structure is often the practical route into a market that a single firm could not enter alone. The research literature is clear that joint ventures help with risk sharing, market entry, and the transfer of know-how among partners, while also exposing those partners to instability when interests diverge [2]. A systematic review of the field identifies partner selection, cultural alignment, control mechanisms, and clear objectives as the conditions that separate workable ventures from troubled ones [2]. Risk profiling work adds that fair allocation of risk among partners has to be written into the agreement before work begins, so that disputes do not surface mid project [3].

Empirical evidence from outside the usual study regions points the same way. A survey of construction stakeholders found that ventures fail less from technical causes and more from differences in partners' work values, undefined goals, clashes in organizational culture, and weak regulatory frameworks [4]. The reading for an international contractor is that the hard part of a venture is governance, not engineering. Table 2 places the joint venture next to the other two collaboration forms so that the differences in duration, ownership, risk, and governance are easy to compare.

Table 2. Comparison of collaboration and integration structures (compiled by the author based on [2, 3, 4, 5]).

Dimension	Local integration	Joint venture	Strategic partnership
Typical duration	Project and post project	Project specific, temporary	Multi project, longer term
Equity or ownership	None required	Shared equity or pooled contract	Usually none, contract based

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Primary risk shared	Supply and compliance	Delivery, financial, market	Coordination and reputation
Governance emphasis	Compliance and procurement rules	Control mechanisms and exit terms	Relational norms and trust
Main efficiency contribution	Cost realism	Capacity and risk distribution	Incentive alignment
Failure mode to manage	Local capability gaps	Partner misalignment	Erosion of trust

Strategic partnerships extend beyond the single project. Where a joint venture is usually temporary, a partnership is a longer relationship that lets firms align incentives and coordinate across several engagements. The empirical case for partnerships rests on relationship management research. A study that combined a literature review with expert interviews found that relationship management significantly affects construction project performance in terms of time, cost, quality, and safety [5]. The same work argues that contractual control and relational quality operate together, since contracts are always incomplete and trust fills the gaps that clauses cannot anticipate [5].

The efficiency mechanism is incentive alignment. When partners expect to work together again, they invest in coordination, share information earlier, and resolve problems without escalating to claims. This reduces the dispute cost that erodes margins on internationally financed work. A design consideration is that trust can decline as easily as it builds, so partnerships need regular performance review and clear escalation paths rather than goodwill alone. In the author's practice, partnership building took practical forms, from helping contractors establish stakeholder relationships and expand into new markets to supporting communication from the pre bid stage through completion. The same logic appeared in microfinance, where repeat lending and ongoing borrower support produced steadier repayment than one off transactions did.

Transparency is often treated as an ethical requirement. The evidence shows that it is also an efficient instrument. A study

of Thailand's Infrastructure Transparency Initiative found that adopting a standardized disclosure approach produced budget savings of about 5 percent in public construction procurement, with the deterrent effect of disclosure reducing bid prices [6]. The mechanism is straightforward. Open data on projects and procurement narrows the room for misconduct, strengthens competition among bidders, and turns scattered records into information that lenders and oversight bodies can act on [6]. For an internationally financed project, where development banks and export agencies set reporting conditions, this is the difference between a financeable project and a stalled one.

The practitioner case shows what transparency looks like at the firm level. In the microfinance organization the author led, transparency was built through international reporting standards on the MIX Market platform, where the company earned a four star transparency recognition, and through external audits by international firms such as RSM International and PKF International. The same period saw the introduction of enterprise resource planning and electronic payment systems, the removal of cash based office operations, and internally developed audit procedures, credit policies, and operational manuals aligned with international financial reporting practice. Borrowing of about US\$1 million equivalent in local terms from banks, government linked programs, and the central bank was repaid ahead of schedule, which is the kind of outcome that disciplined reporting and control support. Table 3 maps these instruments to their efficiency outcomes.

Table 3. Transparency instruments and their efficiency outcomes (compiled by the author based on [6] and the practitioner case).

Instrument	What it does	Efficiency outcome
Standardized disclosure	Publishes project and procurement data	Lower bid prices, deterrence, about 5 percent savings
Independent external audit	Validates statements and controls	Investor confidence, lower financing cost
International reporting standards	Comparable performance reporting	Funding access and benchmarking
ERP and electronic payments	Removes cash, creates an audit trail	Stronger control, faster reconciliation
Internal audit and credit policy	Codifies controls and approval	Fewer errors, repayment discipline

The four levers are usually studied in isolation. The contribution of this article is to treat them as one system. In the author's consultancy practice, three industry functions that are normally split across separate providers were combined into one structure: business development, financing support, and project management. Rather than working inside a single segment, the model joins strategic advisory, financial coordination, and operational execution. Figure 2 sets out this integrated operating model and shows how the three functions feed a single support platform that, in turn, activates the four levers.

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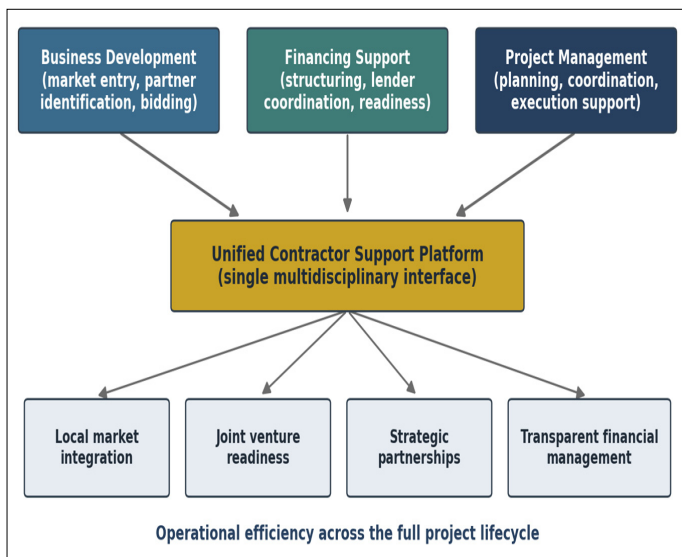


Figure 2. Integrated three component operating model for internationally active contractors (original development).

The model addresses a practical failure that single function support cannot fix. When business development, financing, and project management sit in different hands, the contractor carries the cost of stitching them together, and gaps appear at the seams, in the form of bids that ignore financing constraints or schedules that ignore local sourcing realities. A unified platform closes those seams. It lets market entry decisions reflect financing structure, lets financing structure reflect delivery risk, and lets delivery planning reflect local integration from the first day. The experience that supports this model spans more than forty markets and includes work connected to projects financed by the Asian Development Bank, the United States Agency for International Development, and the European Bank for Reconstruction and Development, as well as work with contractors associated with large global construction firms.

Each of the three functions carries a defined task inside the platform. Business development opens and qualifies opportunities, maps the local supplier and subcontractor base, and builds the stakeholder relationships that later become partnership and joint venture options. Financing support translates those opportunities into a fundable structure, aligning lender conditions, payment milestones, and currency exposure with the realities of the site. Project management converts the structure into delivery, coordinating planning, procurement, and execution from the pre bid stage through completion. The value of the platform comes from the handoffs between these functions rather than from any one of them. When the same team that scoped local sourcing also shapes the financing milestones and then supervises mobilization, the assumptions made at the start survive into delivery instead of being lost at each transfer. The author refers to this retained continuity as the coordination dividend, and it is the practical return that a fragmented set of advisers cannot produce.

Figure 3 turns the model into a mechanism map. It connects each lever to the operational effect it produces and then to the combined efficiency outcome. The figure is the visual statement of the article's hypothesis, that the levers are complementary and that their joint effect is larger than their separate effects.

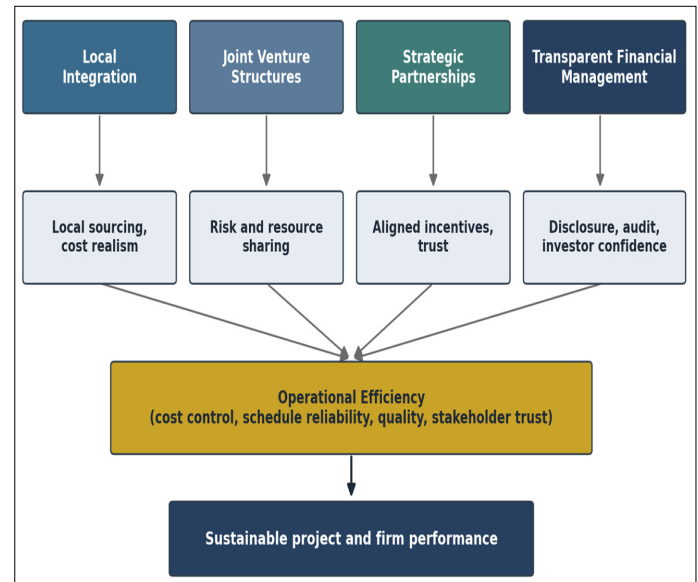


Figure 3. Four pillar framework linking management levers to operational efficiency (original development).

Read across the framework, the complementarity is visible. Local integration produces cost realism, which makes a joint venture's shared budget credible. The joint venture distributes risk, which makes partners more willing to align incentives. Aligned partners cooperate, which makes transparent reporting easier to sustain. Transparent reporting lowers financing cost and bid prices, which improves the economics that local integration started with. The loop is reinforcing. A contractor that runs only one lever captures part of the gain. A contractor that runs all four, through a single platform, captures the interaction effects as well.

The cost of not integrating is easy to underestimate. A contractor that treats the four levers as separate workstreams tends to discover their dependencies late, when a financing covenant rules out a local supplier already written into the bid, or when a partner dispute surfaces a reporting gap that lenders will not accept. Each of these is a rework loop, and rework on an internationally financed project is expensive in both time and credibility. The integrated platform front loads these dependencies into the pre bid stage, where a change of plan costs a revised spreadsheet rather than a renegotiated contract. In the author's practice the same principle held in microfinance, where bringing underwriting, monitoring, and restructuring under one disciplined process prevented the small inconsistencies that otherwise grew into non performing loans. The mechanism differs by sector, but the logic of resolving dependencies early rather than late carries across both.

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A framework is only useful if it maps onto the stages of real work. Figure 4 places the levers along the project lifecycle, from pre bid intelligence through bidding and joint venture structuring, financial structuring, mobilization and local sourcing, execution and monitoring, and closeout. Beneath the stages runs a continuous transparency layer that records disclosure, audit, digital payments, and internal controls at every step.

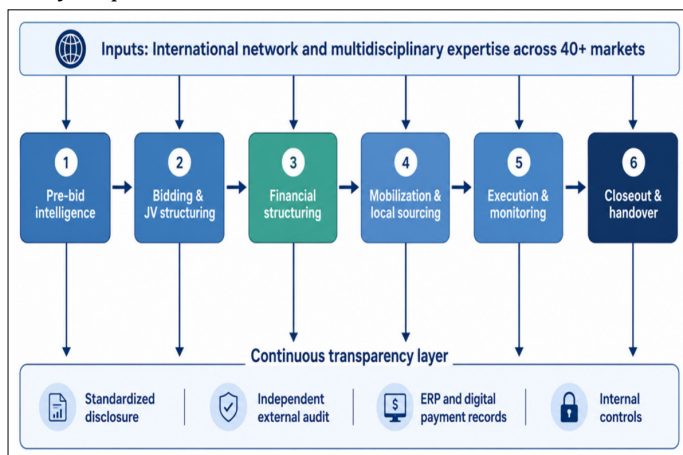


Figure 4. Lifecycle support flow with a continuous transparency layer (original development).

The lifecycle view shows that the levers do not act at a single moment. Local integration begins at pre-bid intelligence, when the contractor maps suppliers and regulatory conditions, and continues through mobilization. Joint venture structuring happens at bidding, when partner roles and risk sharing are fixed. Financial structuring follows, aligning lender conditions with the venture's economics. Partnerships operate throughout, since the relationships formed at pre bid carry through to closeout. Transparency is the one layer that never switches off. By recording every stage, it provides the audit trail that turns a finished project into a credible reference for the next bid. This is where the microfinance discipline transfers directly, since the same continuous control that produced early loan repayment also produces financeable, repeatable project delivery.

The synthesis points to several practical recommendations, and to one proposal that the sector does not yet apply in a structured way. The recommendations are addressed to contractors and the consultancies that support them.

First, build a unified pre bid data room. Before committing to a bid, assemble local market intelligence, joint venture partner due diligence, an outline financing structure, and a written disclosure commitment in one place. This forces the four levers to be considered together at the moment when decisions are cheapest to change.

Second, treat transparency as a financing asset rather than a compliance cost. Adopt standardized disclosure and independent external audit early, then present that record to lenders. The Thailand evidence [6] and the practitioner case

both indicate that disclosure lowers prices and improves access to funding, so the cost of audit returns as cheaper capital and stronger bids.

Third, extend free advisory support to local subcontractors. In microfinance, free financial consultations and literacy support improved borrower stability and repayment. The same logic applies on site. A contractor that helps weaker local subcontractors with basic financial and operational guidance raises the quality of its own supply chain and reduces the delivery risk that local integration would otherwise carry.

The proposal is a voluntary integration readiness and transparency profile that a contractor maintains and shares with financiers. The profile would combine four scores, one for local integration depth, one for joint venture governance maturity, one for partnership track record, and one for financial transparency, each backed by documented evidence. Lenders already assess these qualities informally and inconsistently. A standardized, contractor owned profile would shorten due diligence, reward firms that run the four levers well, and create a market signal that pulls the rest of the sector toward the same practices. The idea borrows from microfinance transparency ratings, where comparable reporting changed institutional behavior, and adapts it to the contractor side of infrastructure finance.

The profile would work in practice through a simple structure. Each of the four scores would sit on a graded scale, for example from an entry level that records basic compliance to an advanced level that demonstrates a sustained track record across several financed projects. Evidence would be attached to each score, such as local content reports, joint venture governance documents, partnership performance records, and audited financial statements, so that a reviewer reads claims and proof together. The contractor would own and maintain the profile, updating it after each project, while an independent reviewer would periodically confirm that the evidence supports the stated levels. Lenders and sponsors would consume the profile early in due diligence, which would shorten the assessment they currently repeat from the start for every borrower. A realistic path to adoption would begin with a small pilot, in which one development institution and a handful of contractors agree on the scoring scales and test them on live projects, then refine the instrument before any wider use. Nothing here requires new regulation, which is part of its appeal. The profile would spread through the financing relationship rather than through a mandate, rewarding the contractors that already run the four levers well and giving the rest a concrete model to follow.

For the United States, these recommendations connect to current priorities. Programs that rely on private and international capital benefit from contractors who can integrate local suppliers, govern partnerships, and report credibly. A transparency profile of the kind proposed here

would give public sponsors a faster way to identify reliable delivery partners, which supports the steadier renewal of national infrastructure without adding heavy new regulation.

The findings should be read with their boundaries in view. The study rests on a qualitative synthesis rather than a new statistical dataset, so the integrated framework is analytical and illustrative rather than estimated from a sample. The institutional figures it draws on, such as procurement volumes and private participation totals, describe sector level patterns and were not collected to test the specific interactions proposed here. The practitioner case adds operational depth that published statistics rarely capture, yet it remains a single case, shaped by particular markets and a particular period, and it cannot on its own establish how far the framework generalizes. The reliance on documented professional experience also means that some of the practical detail is reported rather than independently audited within this article.

These boundaries point to a clear research agenda. A natural next step is to test the complementarity hypothesis with project level data, comparing cost and schedule outcomes for contractors that operate the four levers together against those that operate them separately. The proposed integration readiness and transparency profile could be developed and validated through pilots with development institutions, which would show whether a standardized profile measurably shortens due diligence and lowers financing cost. Comparative case studies across regions and contract types would help separate the parts of the framework that travel well from those that depend on local conditions. Work of this kind would move the framework from a structured argument toward tested practice, and it would give financiers and contractors firmer evidence on which combinations of levers matter most for operational efficiency.

CONCLUSION

This article set out to explain how local integration, joint venture structures, strategic partnerships, and transparent financial management shape the operational efficiency of internationally financed infrastructure projects, and to propose an integrated way to manage them. That aim has been met. The review and the data show that each lever has a distinct efficiency mechanism: local integration delivers cost realism, joint ventures distribute capacity and risk, partnerships align incentives, and transparency lowers bid prices and opens financing. The analysis also supports the guiding hypothesis. The four levers are complementary, and their combined effect on cost control, schedule reliability, and stakeholder trust is greater than the effect of any one of them used alone.

The practical significance is concrete. With private participation in infrastructure passing US\$100 billion in 2024

and a long horizon financing gap still open, contractors that can run the four levers as one system are positioned to win and deliver financed work more reliably than those that cannot. The integrated operating model, the four pillar framework, and the lifecycle process model give such contractors a usable structure, and the recommendations, including the proposed integration readiness and transparency profile, offer concrete next steps. The findings are relevant to contractors and consultancies, to project financiers and development institutions, and to policymakers, including those in the United States, who depend on private and international capital for infrastructure renewal. Future work can test the framework with large sample data and refine the proposed profile through pilots with lenders and contractors.

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