

Strengthening the Capacity of Local Governments in Developing Countries to *Effectively Manage Infrastructure Assets*

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Our team



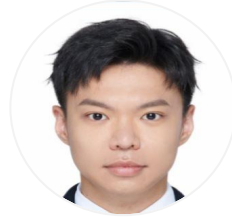
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1. Overview

2. Hypothesis

3. Case Studies

4. Prospects for the Projects

5. Conclusions and Recommendations

Context: Local governments in emerging and developing countries can benefit from tailored Public Private Partnership (PPP) arrangements to improve Infrastructure Asset Management (IAM) to deliver public goods sustainably. Challenges include:

Limited financial resources

Potential moral hazard

Interoperability of new technology

Sustainable revenue

Objective: Identify innovative and sustainable financing solutions for municipalities to support IAM throughout its entire lifecycle

Theoretical approach: The research examined four infrastructure projects based on the following:

Notable financing and/or technological components

Potential for replicability in diverse national contexts

Capacity to enhance the provision of essential services

Understanding how the adoption of technology, notable financing mechanisms, and procurement mitigates moral hazard, and increases social and financial returns of existing Public-Private Partnerships at the subnational level, in alignment with the Sustainable Development Goals (SDGs)

How guarantees from government finance institutions can facilitate the issuance of "infrastructure-backed" debentures, attracting international Qualified Institutional Buyers (QIBs) and contributing to the financing of IAM in the context of Public-Private Partnerships (PPP)

— **Rio case**

Responsible use of Artificial Intelligence (AI) Tech in traffic management systems reduces operational and maintenance costs, along with traffic accidents

— **Pune Case**

Establishment of clear revenue/risk management mechanism mitigates risks for stakeholders, resulting in increased operational efficiency and decreased government funding liability

— **Beijing case**

Strong due diligence and risk hedging based on demand estimation to structure stable and profitable projects to attract private and technology investment

— **Haikou case**

Rio de Janeiro, Brazil - Leveraging Blended Finance for Smart Cities



Funding parties	Public partner: Rio Luz, the state-owned concessionaire. Private partner: The Smart Luz Consortium
Type of funding	Municipalities with COSIP revenue, the Public Lighting Contribution collected on electricity bills by the local energy distribution company Lights S.A.
Budget	The Smart Luz Consortium through 925 million BRL (USD 165.5 MN) in resources obtained from the Capital markets USD 256 MN for operation and maintenance over a 20-year period
Revenue	Combination of COSIP (Contribuição para o Custeio do Serviço de Iluminação Pública), Equity and Ancillary revenues
Innovation component	Internet of Things (IoT) network connecting 300,000 LED luminaires and 25,000+ others including cameras, wireless sensors, and WiFi access points
Agency development	Efficient provisioning of services leading to energy conservation. Innovation in ancillary revenue streams to maximise shared profits



National PPP Framework

Provides institutional and consistency across projects, creating an appetite for the asset class

PPP risk assignment mechanism

Certainty of COSIP Revenue

COSIP (Contribuição para o Custeio do Serviço de Iluminação Pública) is earmarked only for project purpose

Structured revenue waterfall and escrow account reduces uncertainty

DFC Guarantee

Efficiently hedged project risk, by increasing risk rating above that of the Sovereign

Conditional Guarantee

Covers minimal risk of BRL appreciating vs. USD

Lessons Learned

1. Combining certainty in revenue generation with strong project structuring enhances private capacity to access financing for a new asset class
2. DFC (United States International Development Finance Corporation) guarantee enables first of its kind repackaging of debentures to be purchased by international Qualified Institutional Buyers, making the asset class investable

Conditions for Replicability

1. Standardised PPP framework increases potential for viability
2. Sufficient guarantee reduces project risk
3. earmarked asset revenue is allocated to the Special Purpose Vehicle (SPV) fostering bankability
4. Up-front clear impact demonstrates potential to unlock funding



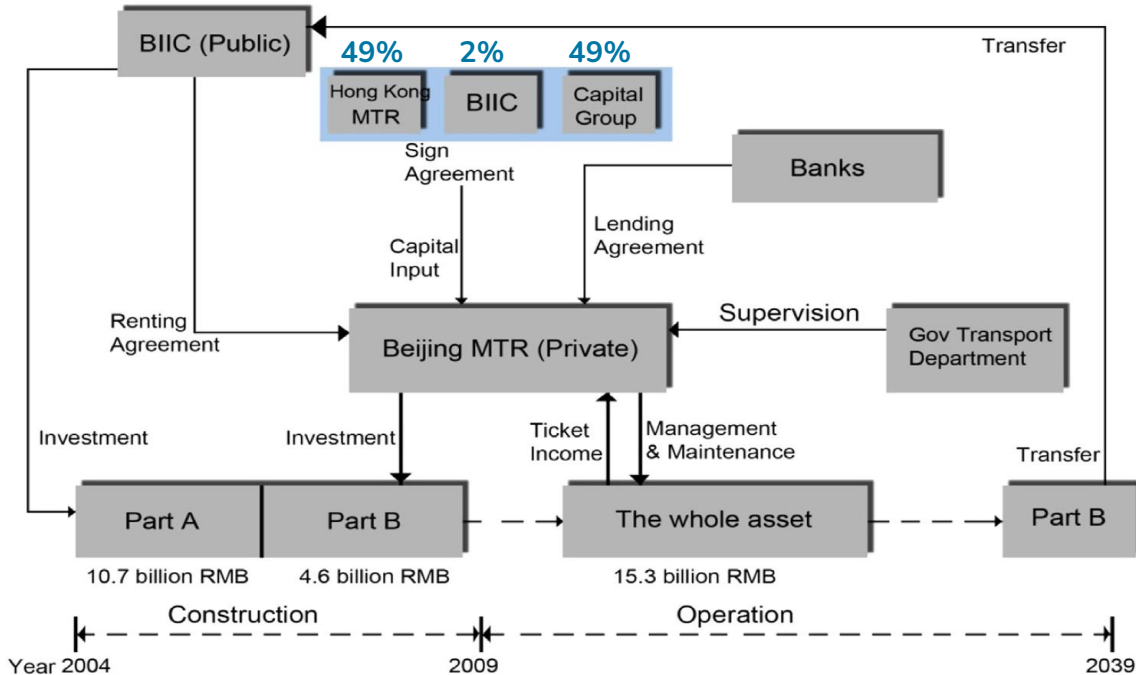
Beijing, China - Risk Mitigation Structures In Public Transportation



Funding parties	<p>Public Partner: A subnational government owned entity, Beijing Infrastructure Investment Company (BIIC)</p> <p>Private Partner: A joint venture company, BJ MTR, formed by Hong Kong MTR (HK MTR), Beijing Capital Group (BCG) and BIIC</p>
Type of funding	<p>Mix of Public and Private funds</p> <p>Public Partner (70%): BIIC provides funding for the construction process of the asset</p> <p>Private Partner (30%): BJ MTR focuses on the acquisition of rolling stock and other equipments</p>
Budget	<p>15.3 B CNY (Equivalent to 2.2B USD) for the completion of the project</p>
Revenue	<p>Ticket Sales & Advertising Revenue</p>
Innovation component	<p>Exclusive 30-year operation rights / Exit Option for Private Partner in case of poor financial management or unforeseen events</p>
Agency development	<p>Private party (HK MTR) trains the high-competent local talent to ensure seamless transition at the end of the exclusive period</p>



Beijing, China - Risk Mitigation



Graph1 . Funding, Asset Share & Revenue Stream

Clear Funding, Asset Share & Revenue Streams

- Funding:**
 - Part A (Construction)** solely funded by the BIIC with a total investment of 10.7 billion RMB (1.55 billion USD)
 - Part B (Rolling stock)** financed by the joint venture Beijing MTR, with an investment of 4.6 billion RMB (0.67 billion USD)
- Ownership of the Assets:**

At the end of the 30-year exclusive period, BIIC will acquire Part B, at no extra cost, resulting in full ownership of the entire metro system
- Revenue Streams:**
 - Private:** Entitled revenues from ticket sales and advertisements
 - Public:** Annual rental fee for Part A & Corporate Taxes. In 2010, the rental fee was 42.5 M CNY (6.17 M USD)

Lessons Learned

1. **Transparent Contractual Agreements:** Clear terms, conditions and responsibilities resulted in smoother project execution and collaboration among stakeholders
2. **Comprehensive Risk Mitigation:** Identification of potential risks, development of contingency plans and reassessment of risks throughout the project
3. **Cost Control:** Robust cost control mechanisms contributed to minimizing government intervention and subsidies

Conditions for Replicability

1. **Adaptable Frameworks:** Contractual and flexible risk frameworks enable private partners to accept the risk of losses while retaining exit rights
2. **Continuous Monitoring:** Frequent evaluation of the use and performance of assets in relation to their ability to meet or exceed projected expectations
3. **Separation between government and enterprises:** Independent operation of enterprises, enhancing stability while improving the management of public transportation



Pune, India - Integrating New Technologies into IAM



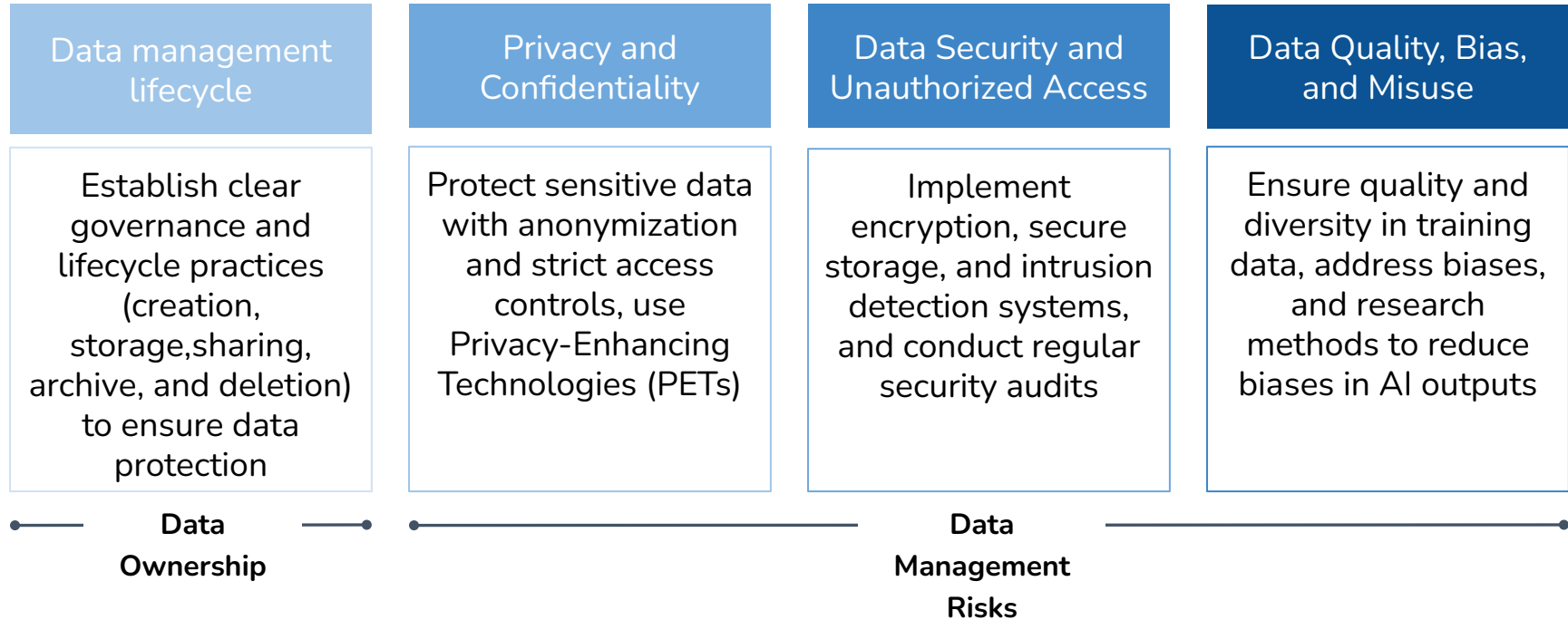
Funding parties	Consortium of private companies, banks, and financial institutions
Type of funding	Equity from a consortium of private companies and financial institutions loans
Budget	178 Million INR (25 Million USD) for the operation and maintenance over 10 year period
Revenue	The estimated revenue-to-cost ratio for the next 10 years is projected to be significant - 87:1
Innovation component	AI applications linked with traffic management systems are used efficiently to reduce costs
Agency development	Gov't avoids upfront payments & pressure with 10-year PPP; private parties cover maintenance, then gov't assumes ownership



Pune, India - Risk Mitigation



Empirically Effective Framework



Lessons Learned/Areas of improvement

1. **Strong project governance:** To establish robust governance framework: transparency, accountability, dispute resolution, regular monitoring, and reporting
2. **Competitive bidding process:** To ensure the best-qualified bidder is selected, providing value for money
3. **Clear roles & responsibilities:** To align stakeholders and promotes a common goal

Conditions for Replicability

1. **Political support:** In the absence of regulation, robust, enforceable contracts, and legal frameworks regulating PPPs across national and subnational levels
2. **Financial viability:** Financing plan and revenue-sharing mechanism, including dispute resolution mechanisms
3. **Technical expertise:** Procurement based on expertise (vs. relationship-driven) to design, install, and maintain the infrastructure
4. **Robust governance framework:** Budgetary sufficiency to meet the financial requirements, the project demands, and standards



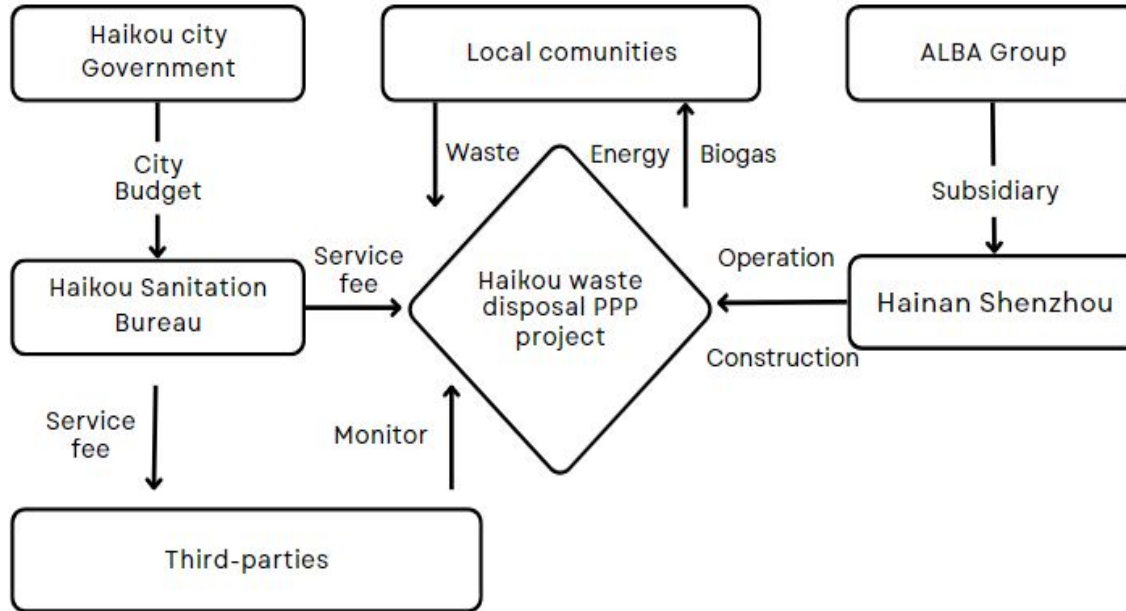
Haikou, China - Outsourcing Eco-friendly Infrastructure



Funding parties	ALBA Group (German company), the funder, builder, and operator, through open bidding process
Type of funding	100% funding by the company, BOO (Build-Own-Operate) mechanism
Budget	Construction cost the company \$10 million USD Government pays \$6 million US a year on average, price resets in every 3 years
Innovation component	Strong due diligence, Multilateral risk mitigation, and new techs that improve waste recycling
Agency development	Government designed a stable and profitable municipal project attracting private investment, contributing to SDGs, reducing costs and pollution, and increases recycling level



Haikou, China - Risk Mitigation



Graph 2. Decision Flows of the Haikou Waste Disposal PPP Project

- **Upside for the company:**
 - Revenue from waste processing is guarantee by government using subsidy
- **Upside for the government:**
 - Reducing cost
 - Quality of the treatment is monitoring by Independent third-parties
 - Power to fine or suspend the facility if the treatment don't meet contract standards

Lessons Learned

1. **Strong due diligence**

The government can implement due diligence to ensure project efficiency and profitability, with outside experts if in need

2. **Multilateral risk mitigation**

The government can set up third-party environmental audit to monitor the operation, and enforce regulation with preset dispute mitigation mechanism

Conditions for Replicability

1. **Beneficiary relationship with private entities**

- The concept of equal placement has enabled both entities to collaborate effectively to achieve greater good for the public

2. **Population size and density**

- Centralized waste disposal facilities are cost-effective and can accommodate large amounts of waste, making them suitable for a densely populated city like Haikou



Prospects of the Projects



Rio de Janeiro

Exclusivity and the potential for expandability of shared-ancillary revenue incentivize innovation. As does moving towards 100% renewable energy

Beijing

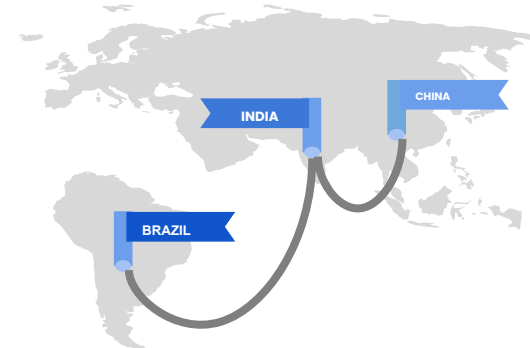
Potential for replication in other cities, ultimately enhancing urban sustainability by promoting growth in connectivity and reducing congestion and air pollution

Pune

Leverage adaptive traffic control and integrated technologies from global systems

Haikou

Expanding treatment capacity and service areas reducing harm to citizens and the city environment



Conclusions and Recommendations



Rio de Janeiro

Predictability of revenue stream supported by the legal framework and technical structure can foster financial innovation

Beijing

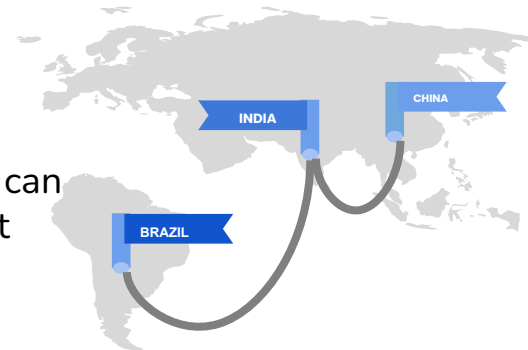
Contractual agreements which clearly define the responsibility of each party and their respective risk/revenue trade-offs can increase efficiency and minimize disputes

Pune

Open and accessible information fosters transparency to improve decision-making and constituents' trust

Haikou

Strong due diligence and risk hedging based on demand estimation to structure predictable and profitable projects can attract private interest and foster technological investment



Bibliography

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Graph 2. Decision Flows of the Haikou Waste Disposal PPP Project

Planning document, 2015. Haikou food waste disposal PPP project

Abbreviations

AI	Artificial Intelligence
BCG	Beijing Capital Group
BIIC	Beijing Infrastructure Investment Company
BOO	Build-Own-Operate
COSIP	Contribuição para o Custeio do Serviço de Iluminação Pública
DFC	Development Finance Corporation
HK MTR	Hong Kong Mass Transit Railway
IAM	Infrastructure Asset Management
PPP	Public Private Partnership
PET	Privacy-Enhancing Technology
QIB	Qualified Institutional Buyer
SDG	Sustainable Development Goals
SPV	Special Purpose Vehicle