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Implementation performance and resilience under different governance arrangements in Russian regional airport public-private partnerships

 Boris A. Lodiagin^{1*},  Victor E. Petrov¹

¹Department of Finance, St Petersburg School of Economics and Management, HSE University, St. Petersburg, Russian Federation.

Corresponding author: Boris A. Lodiagin (Email: blodyagin@hse.ru)

Abstract

This study compares seven Russian regional airport public-private partnership projects to examine how governance arrangements relate to implementation performance and adaptation under uncertainty. The analysis draws on public documents, project-participant materials, industry reports, and business media available by May 2026. A qualitative multiple-case design combines thematic analysis with cross-case synthesis. The cases range from comparatively favorable completed delivery to projects with documented cost, schedule, quality, or compliance problems; three remain at an early or intermediate investment stage. Projects involving specialized airport operators more often include bank financing, long-term commitments, and demand- or payment-adjustment mechanisms, although their implementation records vary. Traffic-linked payments, phased delivery, grants, minimum-income mechanisms, and compensation clauses redistribute demand and financing risk and provide room for contractual adjustment. Formal concession status conceals substantial differences in responsibilities, financing, and public exposure. Realized public-value and resilience outcomes require longitudinal evidence across construction and operation. Public authorities and investors should assess project preparation, risk allocation, contingent liabilities, and tariff predictability rather than legal form alone.

Keywords: Airport infrastructure, Concession, Implementation performance, Multiple-case study, Public-private partnership, Regional airports, Resilience, Risk allocation.

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1. Introduction

Transport infrastructure shapes access to markets and public services. In Russia, where distances are large and settlement is uneven, regional airports often provide the only practical link between remote territories and major economic

centers. Their capacity and technical condition influence passenger mobility, business activity, and access to essential services [1]. Airport modernization, however, requires capital expenditure that regional budgets cannot finance in full. Public-private partnership (PPP) arrangements have consequently become an important mechanism for combining public infrastructure objectives with private finance and managerial expertise.

In the Russian airport sector, the projects considered in this study are implemented through concession agreements. The infrastructure remains publicly owned, while a private partner assumes specified obligations related to investment, construction, reconstruction, and, in some cases, subsequent operation [2, 3]. This legal structure is common to all seven projects, but the practical content of the agreements differs considerably.

The practical relevance of the issue has increased because airport modernization is now embedded in national policy rather than limited to sector forecasts. Presidential Decree No. 309 sets a target of increasing aviation mobility by at least 50% by 2030 relative to 2023 [4]. To support this target, the federal project "Development of the Core Aerodrome Network" within the national project "Efficient Transport System" provides for the modernization of at least 75 aerodromes by 2030, including 28 concession projects. Official estimates envisage more than RUB 124 billion of off-budget financing for the reconstruction of these 28 aerodromes [5]. Industry reports provide additional project-level detail on the planned use of concessions and the financing mechanisms applied in the sector [6, 7]. Such projects must reconcile regional connectivity and other public objectives with the requirements of lenders and private investors. They also operate under difficult conditions: construction costs are volatile, imported equipment may be constrained, passenger demand is uneven, and tariff decisions affect both project revenue and the affordability of air transport. The same concession form can therefore conceal very different combinations of public support, commercial risk, and private responsibility.

Existing research explains several parts of this problem separately. Studies classify airport ownership and management models and distinguish concessions from privatization [2, 3, 8] others evaluate operational efficiency after commissioning [9, 10] and a third group examines PPP feasibility through Value for Money, financing structure, managerial flexibility, and demand risk [11-14]. These streams clarify legal form, operating performance, and project feasibility, but offer less integrated analysis of how project preparation, partner capabilities, financing, and risk allocation interact during implementation.

The gap is especially visible in the Russian regional context. Domestic research has described airport management forms, passenger-traffic determinants, infrastructure-development priorities, and the benefits and risks of PPP arrangements [1, 3, 8, 15]. Individual projects and recent sector developments have also been documented [16]. Available studies nevertheless remain fragmented across individual cases, making it difficult to separate formal similarity from substantive differences in preparation, partner capabilities, financing, demand exposure, and regulation.

Against this background, the study asks: How do governance arrangements, private-partner capabilities, and risk-allocation mechanisms differ across Russian regional airport PPP projects, and how are these differences associated with their observed implementation performance? Case maturity is separated from both governance characteristics and outcomes. Governance characteristics include partner profile, financing and planned public support, demand conditions, contractual adjustment mechanisms, and tariff rules. Observed implementation performance is assessed through progress against the available schedule, documented cost and quality outcomes, audit or compliance findings, and contingent or unplanned public exposure. Operational efficiency, calculated VfM, and long-term resilience remain separate questions.

A qualitative multiple-case design is applied to seven regional airport concessions: Novy Urengoy, Blagoveshchensk, Omsk, Arkhyz, Salekhard, Grozny, and Gorno-Altaysk. The cases span completed and ongoing projects and therefore provide different types of information: completed projects allow a fuller assessment of delivery, while investment-stage cases reveal financing choices, contractual arrangements, and emerging risks. The comparison connects institutional adoption of the concession form with partner capacity and stakeholder risk allocation. Adaptive mechanisms are examined as potential sources of resilience during implementation.

2. Literature Review and Analytical Framework

2.1. Airport PPPs and Implementation Performance

Airport infrastructure may be managed through direct public provision, corporatized public ownership, management contracts, concessions, mixed ownership, or full privatization. The models differ in asset ownership, the duration of private participation, responsibility for capital expenditure, and the allocation of commercial and construction risk. Cruz and Marques [2] stress that a concession is not equivalent to privatization: the airport remains a public asset and is returned to the public authority at the end of the agreement. Russian classifications describe a similar range of organizational forms and note the growing role of private airport holdings [3, 8]. Such typologies are useful, but the legal category alone says little about how a particular project is financed or managed.

A separate set of research links ownership and management models to airport efficiency. Oum, et al. [9] compare major international airports and find weaker performance in several state-dominated structures. Ferreira, et al. [10] using data envelopment analysis and the Malmquist index, examine the productivity of holding and individual management models. These studies concern airports already in operation. Their dependent variables reflect the use of labor, capital, and traffic capacity after commissioning, rather than the quality of project preparation and construction.

For concession projects, the implementation stage raises a different set of questions. The project must be designed, financed, constructed, and integrated into an existing transport system before operational productivity can be observed. At this stage, incomplete documentation, cost inflation, lender conditions, demand forecasts, and regulatory approvals may be more important than the formal ownership structure. Cross-case research in transport PPPs also shows that project

outcomes are shaped by configurations of conditions rather than by one isolated factor [17]. Accordingly, implementation performance is treated in this article as an independent analytical construct.

Regional airports make this distinction particularly important. Their commercial base is often narrower than that of metropolitan hubs, while their public-service role is stronger. Nemchinov and Ivanov [1] associate airport sustainability with regional economic scale, household income, passenger traffic, and infrastructure condition. Nemchinov [15] identifies demand uncertainty, capital intensity, security requirements, and payment risk among the recurring constraints on airport PPPs. Under these conditions, public support may be economically justified, but its form and scale affect the real distribution of risk between the parties.

The comparative question is therefore how responsibilities for preparation, financing, construction, demand, and regulation are organized within each concession. This shift from ownership labels to the structure of implementation provides the basis for the analysis.

2.2. Value for Money and the Theoretical Framework

Value for Money is the conventional framework for assessing whether a PPP provides a preferable combination of cost, quality, timing, and risk allocation relative to traditional public procurement. Public Sector Comparator models, cost-benefit analysis, and risk-adjusted whole-life costing are among the tools used for this purpose [11, 14]. In airport infrastructure, cost-benefit analysis may include generalized user costs and wider transport benefits [18]. Real-options approaches add the value of managerial flexibility under uncertain demand [12] while research on hybrid financing shows why low-traffic airports often combine user payments with government support [13].

Recent work broadens this interpretation. Zhao, et al. [14] show that established VfM procedures measure cost more easily than broader value. Zhao [19] distinguishes traditional VfM dimensions - cost, time, quality, and risk transfer - from public-value dimensions such as accessibility, resilience, environmental effects, and social inclusion. For regional airports, a project may have limited commercial profitability and still create value through territorial connectivity and access to essential services. Research on airport resilience points in the same direction, although it mainly concerns continuity and recovery of airport operations after disruption [20]. In this study, implementation resilience is used more narrowly to describe the capacity of a delivery arrangement to adapt to cost, demand, financing, or regulatory disturbances while maintaining project progress and limiting unplanned public exposure.

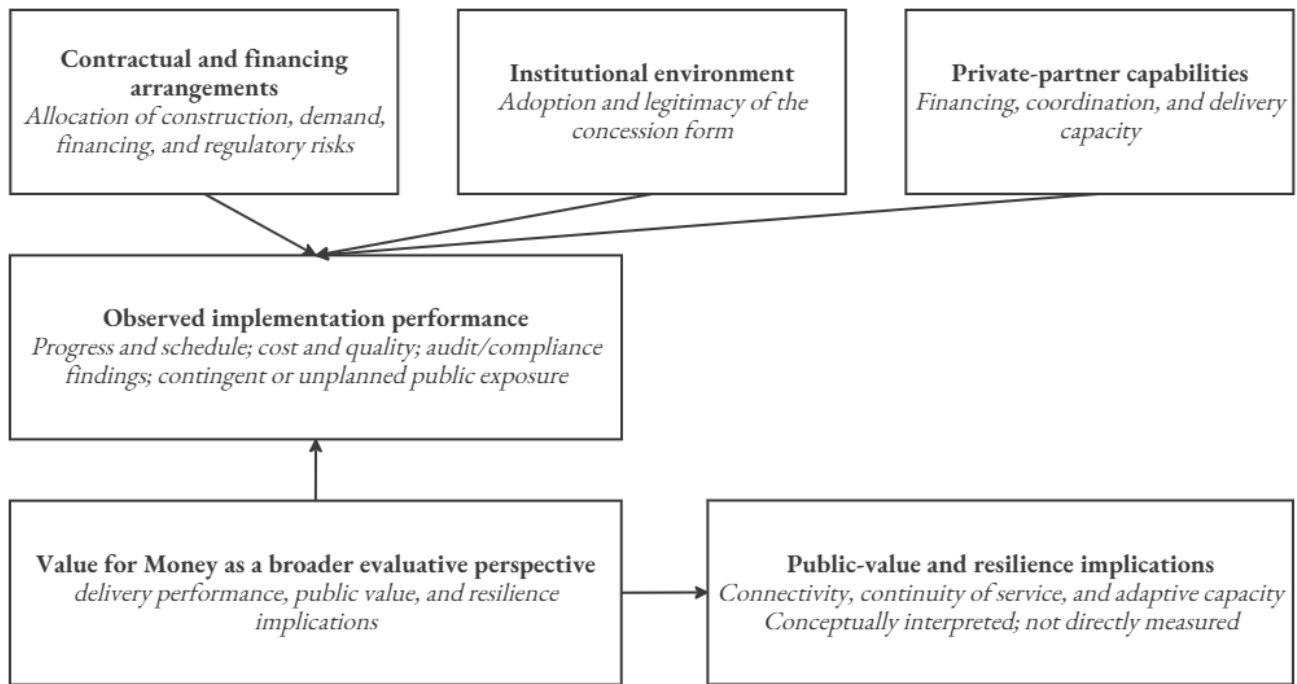
VfM serves here as an interpretive framework rather than a calculated indicator. The documentation permits comparison of delivery-related outcomes, but does not provide the inputs needed for a complete Public Sector Comparator, risk-adjusted whole-life cost estimate, or counterfactual procurement model. Implementation performance is therefore assessed separately, while public value and resilience are considered through the mechanisms and vulnerabilities visible in the cases.

Institutional theory provides a starting point for explaining why formally similar arrangements spread across an organizational field. DiMaggio and Powell [21] identify coercive, mimetic, and normative pressures, while Meyer and Rowan [22] show that formal structures may become decoupled from actual activity. In airport concessions, this lens draws attention to the gap between adoption of a recognized form and the economic content of individual projects.

Differences between private partners require a second lens. Airport PPP implementation involves demand forecasting, financial structuring, regulatory coordination, construction management, and subsequent operation. From a resource-based perspective, specialized operators may accumulate routines and relationships that support these tasks. Barney [23] framework describes the role of valuable, rare, inimitable, and non-substitutable resources. The project materials allow discussion of implementation capacity, although they do not support a formal assessment against all VRIN criteria.

The contractual side of the problem is captured by stakeholder theory, which focuses on public authorities, concessionaires, lenders, airlines, passengers, regulators, and regional communities [24, 25]. Traffic-linked rent, capital grants, minimum-income commitments, compensation clauses, and user charges determine which parties bear the consequences of demand and regulatory changes. These arrangements reveal the allocation of risks and benefits, even when the balance between stakeholders cannot be evaluated directly.

Institutional conditions shape the adoption and legitimacy of the concession form. Private-partner capabilities affect the ability to structure finance and coordinate delivery, while contractual and financing arrangements distribute construction, demand, financing, and regulatory risks. These dimensions are compared with observed implementation performance (see Fig.1). VfM provides the broader evaluative perspective within which delivery outcomes, public value, and resilience implications can be considered together.

**Figure 1.**

Analytical framework for implementation performance and resilience implications in airport PPPs

Note: PPP = public-private partnership. The dashed arrows organize the qualitative comparison and do not represent estimated causal paths. Resilience-related implications are interpreted conceptually and are not assessed as a separate project outcome. Source: compiled by authors.

3. Materials and Methods

3.1. Research Design and Case Selection

The research uses a qualitative multiple-case design. This strategy is suitable for examining a contemporary phenomenon that cannot be separated from its institutional context, particularly when the events under study cannot be experimentally controlled [26]. The purpose is analytical rather than statistical generalization: the cases are compared to identify recurring patterns and meaningful contrasts, not to estimate the frequency of those patterns in a larger population [26, 27]. The unit of analysis is an individual concession project for the construction or substantial reconstruction of a Russian regional airport. Two inclusion criteria were applied. First, the project had to use a concession agreement in the airport sector. Second, it had to concern a regional airport rather than a major metropolitan hub. Sheremetyevo and Pulkovo were excluded because their traffic scale, commercial structure, access to finance, and governance arrangements differ substantially from those of regional airports.

The final sample comprises Novy Urengoy, Blagoveshchensk (Ignatievo), Omsk (Omsk-Fedorovka), Arkhyz, Salekhard, Grozny, and Gorno-Altaysk. These projects were identified in the reviewed industry sources and had sufficient project-level documentation for comparison under a common template [6,7]. Sector reports also record other airport concession agreements, including simplified arrangements involving existing operators. The study therefore does not claim coverage of every agreement included in aggregate sector counts. The selected cases provide variation in maturity, financing structure, and the depth of private participation.

Project maturity is treated as a design condition rather than as a performance measure. Completed cases allow a fuller assessment of schedule, cost, quality, compliance, and post-construction regulation. Ongoing cases reveal partner selection, financing, risk allocation, and emerging implementation problems, but are not ranked as if their final outcomes were already known.

3.2. Documentary Sources and Analytical Procedure

The empirical base consists of publicly available documents. The material was assembled at the case level and updated through May 2026. It was not collected as a formal systematic review with a registered protocol, and the total number of screened publications was not used as an analytical parameter. The aim was to reconstruct each project from the most relevant project-level material.

Four groups of sources were used. The first includes legislation, government decisions, reports from public authorities, regulators, audit bodies, and development institutions. These sources establish the formal parameters of the agreements, public commitments, and identified violations. The second group consists of publications by concessionaires, airport operators, investors, and lenders, which describe the structure of financing and the role of the private partner. The third group comprises industry reports prepared by the Association of Infrastructure Investors and Creditors (AIIC), Sherpa Group, Kept, and other professional organizations. Business media form the fourth group and are used mainly for implementation events - cost revisions, delays, inspections, and regulatory disputes - that are not fully described in project materials.

Source priority depended on the type of fact. Formal project parameters were taken primarily from official documents and the most recent project-specific materials (see the description of each project in Table 1). Operator and lender publications were used for financing and governance structures, but were read as stakeholder communications. Industry reports and business media provided comparison and implementation detail. Where figures differed, the discrepancy was retained and explained instead of being averaged. The Omsk estimate, for example, varies according to whether the source refers to the concession perimeter or to the wider project.

The thematic analysis followed the six-phase logic of Braun and Clarke [28]. The analysis began with repeated review of the available documents and the preparation of a structured summary for each case. Relevant fragments were then assigned initial codes covering stakeholders, partner resources, financing, planned public support, management arrangements, external conditions, risks, and observed outcomes. Related codes were grouped into broader themes, including project preparation, private-partner capabilities, regulatory risk, demand conditions, adaptive contractual mechanisms, and forms of government participation. The themes were reviewed across the cases, checked against the source material, and then defined and named. The final phase translated them into the case descriptions and comparative tables.

The coding scheme connected the descriptive material with theoretical interpretation. Themes concerning partner resources were interpreted through the resource-based view; regulatory and interest-balancing issues through stakeholder theory; and the adoption and legitimacy of the concession model through institutional theory. The theoretical lenses were introduced after descriptive coding to preserve distinctions that emerged from the cases rather than forcing the material into predefined categories.

Cross-case analysis followed the within-case thematic work [26, 27]. The common matrix separated case maturity, governance characteristics, observed implementation outcomes, and interpretive boundaries. Governance characteristics covered partner profile, financing and planned public support, demand conditions, and contractual adjustment mechanisms. Outcomes covered progress against available baselines, cost and quality, audit or compliance findings, and contingent or unplanned public exposure. Mechanisms that allowed adjustment to demand, cost, financing, or regulatory change were coded as resilience-related, but no resilience score was assigned. The comparison searched for recurring combinations and contrasting cases rather than a universal success factor.

3.3. Assessment Criteria and Research Quality

Implementation performance is assessed through four observable dimensions: progress and schedule, cost and quality, audit or compliance findings, and contingent or unplanned public exposure. Project maturity is reported separately because early-stage and completed projects provide different bases for assessment. Financing structure, planned public support, demand-risk clauses, and tariff rules are treated as governance characteristics rather than components of the performance assessment.

The assessment is qualitative. Comparatively favorable delivery requires completed implementation without major documented schedule, cost, quality, or compliance problems. A mixed assessment applies where completion or substantial progress coexists with material limitations but not with several major adverse outcomes. A project is described as problematic to date when the record contains multiple material adverse outcomes or one major disruption affecting delivery. The category "ongoing; assessment provisional" is used when the evidence is sufficient to discuss governance and emerging risks but not to reach an overall delivery judgement. These categories describe the position at the cut-off date and are not a numerical ranking. Several procedures support the credibility of the comparison. The same case template was applied to all projects; evidence was triangulated across source categories where possible; conflicting figures were reported explicitly; and the cross-case synthesis included both recurring and contradictory observations.

Table 1.

Characteristics of the seven regional airport PPP projects included in the study.

Project	Region	Agreement year	Project scope	Stage at May 2026	Concessionaire	Partner profile	Announced investment	Main financing and planned public support
Novy Urengoy	Yamalo-Nenets Autonomous Okrug	2018	Terminal and airfield	Operational	Urengoyaeroinvest LLC (Airports of Regions)	Specialized airport operator	RUB 11.3 bn	User-pays model; syndicated lending involving VEB.RF and Gazprombank; delivery reported without regional-budget financing
Blagoveshchensk (Ignatievo)	Amur Oblast	2021	Terminal	Operational	ABS Blagoveshchensk LLC (Airports of Regions-Novaport joint venture)	Joint venture of specialized airport operators	Approx. RUB 7 bn	Private investment and bank financing; Gazprombank identified; traffic-linked rent and concession payments
Omsk (Omsk-Fedorovka)	Omsk Oblast	2024	Terminal and airfield	Investment stage	Omskaeroinvest LLC (Airports of Regions)	Specialized airport operator	RUB 43 bn concession perimeter; RUB 51 bn wider project estimate	VEB.RF Project Finance Factory; regional co-financing of external infrastructure; minimum-income mechanism
Arkhyz	Karachay-Cherkess Republic	2024	New terminal and airfield	Investment stage	Arkhyzaeroinvest LLC (Airports of Regions)	Specialized airport operator	Approx. RUB 28 bn initial estimate	VEB.RF and Sberbank financing with significant public-budget participation
Salekhard	Yamalo-Nenets Autonomous Okrug	2023	Terminal with phased airfield reconstruction	Investment stage	Novaport-Project LLC (Novaport)	Specialized airport operator	Approx. RUB 19.1 bn	Capital grant and private funding; phased delivery; conditional payment linked to passenger traffic
Grozny	Chechen Republic	2022	Airfield reconstruction	Operational	Smart Construction LLC	Construction-oriented private partner with limited operating role	Approx. RUB 18.1 bn	Predominantly federal-budget financing; limited private-capital role
Gorno-Altaysk	Altai Republic	2025	Airfield reconstruction	Investment stage	Gorno-Altaysk Airport JSC (Sber Group)	Existing airport operator backed by a non-specialized financial sponsor	Approx. RUB 10.2 bn	RUB 7.9 bn federal financing (approximately 77-80%); private contribution approximately 20%

Note: PPP = public-private partnership; VEB.RF = Russia's national development finance institution. Data reflect publicly available information as of May 2026. Investment amounts are announced project values and may refer to different project perimeters or include both public and private financing. Planned public support is treated as a governance characteristic, not as an adverse implementation outcome. Source: compiled by authors based on and project-participant materials summarized in Table A1.

Source: Association of Infrastructure Investors and Creditors [6]; Sherpa Group [7]; Association of Infrastructure Investors and Creditors (AIK) [29]; Kept [30]; RBC [31] and RBC [32].

4. Results

4.1. Variation in Implementation Outcomes

The seven projects share a concession form but differ in the allocation of financing, construction, and operating responsibilities. By May 2026, Novy Urengoy, Blagoveshchensk, and Grozny had entered operation, while Omsk, Arkhyz, Salekhard, and Gorno-Altaysk remained at the investment stage. Novy Urengoy has the strongest documented delivery record in the sample. The terminal and airfield were commissioned in December 2022, delivery was reported as on time, and the available sources do not report a material increase in the announced project cost. The project combined a user-pays structure with syndicated financing involving VEB.RF and Gazprombank [6, 7]. Later FAS-related claims concerned additional charges after commissioning. These claims form part of the post-commissioning regulatory record, while the construction assessment remains comparatively favorable.

Blagoveshchensk presents a less uniform result. The new terminal was completed, but public-audit and media materials report cost growth, inefficient expenditure, substandard work, and a regulatory warning. Completion therefore coexists with material cost, quality, and compliance limitations, and the case is classified as mixed [6, 7, 32].

Grozny shows the clearest problematic outcome among the operational projects. The airfield reconstruction was completed approximately one year later than expected, while additional works, cost growth, documentation weaknesses, and public-audit findings were reported. Financing was predominantly federal, and the private partner performed mainly a construction role. Planned public financing is not itself treated as a negative outcome; the assessment rests on the documented delay, additional works, and weaknesses in implementation [6, 7, 31].

Among the investment-stage projects, Arkhyz had already accumulated a delay, schedule revision, and cost increase and is therefore assessed as problematic to date. Omsk faced price pressure and differing estimates, but its final schedule and cost outcomes were unavailable. Salekhard was proceeding through a phased model, while Gorno-Altaysk had only recently entered implementation. These three cases remain provisional and are used mainly to compare governance arrangements, contingent commitments, and emerging risks (Table 2).

4.2. Partner Capabilities, Financing, and Adaptive Risk Mechanisms

Five projects involve Airports of Regions, Novaport, or their joint venture: Novy Urengoy, Blagoveshchensk, Omsk, Arkhyz, and Salekhard. Repeated participation suggests accumulated sector experience and established relationships with banks and development institutions. These projects generally contain more developed combinations of bank finance, long-term obligations, and explicit demand or payment mechanisms [6, 7].

Projects involving specialized operators did not show a common implementation trajectory. Novy Urengoy pairs sector-specific experience with the strongest delivery record, while Blagoveshchensk and Arkhyz encountered material problems. Omsk and Salekhard remain too early for a final judgement. The recurring participation of specialized operators points to structuring and coordination capacity, but the observed outcomes depend on the wider project setting.

VEB.RF participates in Novy Urengoy, Omsk, and Arkhyz, while commercial banks are involved in several other projects. It mobilizes long-term finance for assets with extended payback periods, although its independent effect on delivery cannot be isolated. Public support ranges from external-infrastructure expenditure and capital grants to minimum-income commitments, compensation mechanisms, and direct budget investment. The projects consequently form a continuum rather than a simple division between public and private finance [6, 7, 29].

Table 2.

Cross-case matrix of observed implementation performance.

Project	Maturity	Progress / schedule	Cost / quality record	Audit / compliance record	Contingent or unplanned public exposure	Interpretive boundary	Implementation assessment
Novy Urengoy	Operational	Commissioned in December 2022; reported as delivered on time	Reviewed sources report a stable announced cost; no material quality issue identified	Later FAS-related claims concerned additional fees after commissioning	No material unplanned public exposure identified in the reviewed record	Strong documented delivery record; long-term VfM and operational resilience outside the assessment	Comparatively favorable
Blagoveshchensk (Ignatievo)	Operational	Terminal completed; full schedule baseline unavailable	Cost growth, inefficient expenditure, and substandard work reported	Public-audit findings and FAS warning	Direct public exposure is not fully disclosed	Completed case with material limitations across cost, quality, and compliance	Mixed
Omsk (Omsk-Fedorovka)	Investment stage	Project remained under preparation and implementation at the cut-off date	Price pressure and differing estimates; final outcome unavailable	No material case-specific audit finding identified at the cut-off date	Minimum-income mechanism and regional infrastructure commitments create contingent or planned exposure; no realized overrun established	Available material concerns governance and emerging risks	Ongoing; assessment provisional
Arkhyz	Investment stage	Start and delivery schedule revised; delay reported	Cost increase reported	Administrative barriers and sanctions-related equipment constraints reported; no audit finding established	No unplanned exposure established; significant public financing is planned	Multiple adverse implementation signals already documented	Problematic to date
Salekhard	Investment stage	Phased project reported as proceeding within the current schedule	Final cost and quality outcomes unavailable	No material case-specific audit or compliance finding identified	Capital grant and conditional payment are planned support, not adverse outcomes	Available information mainly concerns design and current progress	Ongoing; assessment provisional
Grozny	Operational	Completed with an approximately one-year delay	Cost growth, additional works, and documentation weaknesses	Public-audit findings	Additional works and cost growth under predominantly	Completed case with several material adverse outcomes	Problematic

			reported		public financing indicate increased public burden		
Gorno-Altaysk	Investment stage	Project began in 2025 and remained at an early stage	Final cost and quality outcomes unavailable	Antitrust risk identified in industry analysis; no realized violation established	Federal financing is planned; no unplanned exposure established at the cut-off date	Too early for a delivery assessment	Ongoing; assessment provisional

Note: FAS = Federal Antimonopoly Service. The matrix separates maturity, implementation outcomes, and public exposure. Categories describe the position at the May 2026 cut-off date; calculated VfM and long-term resilience fall outside this assessment. Source: compiled by authors based on.

Source: Association of Infrastructure Investors and Creditors [6]; Sherpa Group [7]; Association of Infrastructure Investors and Creditors (AIIC) [29]; Kept [30]; RBC [31] and RBC [32]

Planned grants and external-infrastructure contributions belong to the original financing structure; cost overruns, additional works, or activated guarantees create a different type of public exposure during implementation. Table 2 separates these categories.

The contractual differences partly correspond to the underlying demand base. Novy Urengoy benefits from industrial traffic associated with the gas sector. Arkhyz and Gorno-Altaysk depend more strongly on tourism growth and seasonality, while Omsk and Salekhard require continued passenger growth to support long-term assumptions. Blagoveshchensk combines regional and cross-border demand, and Grozny experienced a reported traffic decline [6, 7, 29, 30].

The agreements respond through traffic-linked rent, minimum-income arrangements, phased delivery, conditional payments, and compensation clauses. In Salekhard, for example, the conditional payment is linked to traffic above 700,000 passengers. These mechanisms redistribute the financial effects of demand uncertainty and provide contractual room for adjustment. Their operation after the relevant triggers are activated is not yet observable in the ongoing cases.

4.3. Project Preparation, Compliance, and Tariff Risk

Recurring problems relate to documentation, cost revision, construction delays, additional works, quality control, and audit findings. Blagoveshchensk, Arkhyz, and Grozny display different combinations of these problems. Omsk also faced price pressure and divergent cost estimates, although its final outcome was unavailable. Taken together, the cases show that concession status alone does not prevent conventional problems of project preparation and construction delivery [6, 7, 31, 32].

A separate issue concerns the revenue framework during and after construction. Airport investment may be recovered through charges imposed on airlines or passengers, while regulators must also protect competition and transport affordability. FAS-related issues were reported for Novy Urengoy and Blagoveshchensk, and antitrust risk was discussed for Gorno-Altaysk. The infrastructure fee introduced in 2025 can reach RUB 150 per passenger, and sector estimates suggest that its relative burden is greatest at low-traffic airports [6, 7, 29-32].

Construction delivery and tariff regulation operate at different stages of the project life cycle. Novy Urengoy, for example, combined timely commissioning with later disputes over charges, while documentation or capital-cost problems emerged before completion in other cases. The analysis therefore treats tariff risk separately from construction performance.

4.4. Cross-Case Synthesis

The common concession form is compatible with different financing structures, partner roles, and levels of public exposure. Among the completed projects, Novy Urengoy shows comparatively favorable delivery, Blagoveshchensk combines completion with substantial limitations, and Grozny is problematic. Arkhyz already has multiple adverse signals, while the remaining investment-stage cases are still too early for an overall judgement.

Several characteristics cross the performance categories: specialized operators participate in both stronger and weaker cases; development finance appears across different trajectories; and traffic-linked clauses operate under dissimilar demand conditions. This pattern directs attention to combinations of preparation, partner capabilities, finance, risk allocation, and regulation (Table 3).

Table 3.
Analytical themes and representative cross-case observations.

Analytical dimension	Theme	Representative observations	Cases in which observed
Institutional form and economic structure	Common concession form	All seven projects were implemented through concession agreements.	All seven cases
Institutional form and economic structure	Different economic content	The sample ranges from a user-pays structure to projects dominated by federal capital funding.	Novy Urengoy; Grozny; Gorno-Altaysk; visible across the wider sample
Private-partner capabilities	Specialized operating and structuring experience	Airports of Regions, Novaport, or their joint venture participate in five projects; outcomes still vary.	Novy Urengoy; Blagoveshchensk; Omsk; Arkhyz; Salekhard
Financing and planned public support	Development finance and hybrid support	The projects combine VEB.RF participation, bank debt, capital grants, external-infrastructure funding, and direct federal financing.	All seven cases in different forms
Demand risk and adaptation	Traffic-linked and phased mechanisms	Traffic-linked rent, minimum-income arrangements, phased delivery, conditional payments, and compensation clauses redistribute uncertainty and have resilience implications.	Blagoveshchensk; Omsk; Salekhard; Gorno-Altaysk

Analytical dimension	Theme	Representative observations	Cases in which observed
Demand conditions	Different traffic bases and volatility	Industrial traffic is relatively stable; tourism projects face seasonality and target-traffic uncertainty.	Novy Urengoy; Arkhyz; Gorno-Altaysk; relevant to other cases
Observed implementation outcomes	Schedule, cost, quality, and compliance issues	Cost revisions, delays, additional works, substandard work, and audit findings recur in several cases.	Blagoveshchensk; Omsk; Arkhyz; Grozny
Regulatory environment	Tariff and antitrust risk	Additional charges may conflict with airline costs, passenger affordability, and competition regulation.	Novy Urengoy; Blagoveshchensk; Gorno-Altaysk; sector-level evidence

Note: The table summarizes the revised thematic framework; detailed case material is provided in Appendix, Tables A1 and A2.

5. Discussion

The seven concessions share a legal form, but their financing, responsibilities, and risk allocation differ substantially. Institutional theory offers one explanation for the spread of recognizable concession structures: budget constraints, federal infrastructure priorities, and standardized financing instruments create pressures for organizational similarity, while earlier airport projects provide models for later arrangements [21]. Formal convergence is therefore stronger than convergence in the underlying economic structure.

This formal-substantive divergence is consistent with the decoupling mechanism described by Meyer and Rowan [22]. Grozny and Gorno-Altaysk show how a concession can retain extensive budget financing or a narrow private role. Such arrangements are not necessarily inefficient, especially where regional connectivity requires public support. Their appraisal instead depends on the responsibilities assigned to each party and on the delivery or service conditions attached to that support.

Projects involving specialized airport operators generally contained more elaborate financing and coordination arrangements, although their delivery records differed. From a resource-based perspective, repeated participation suggests accumulated experience in construction coordination, financing, and operation, together with established relationships with lenders and authorities [23]. Blagoveshchensk and Arkhyz also show that sector experience cannot offset weak documentation, changing cost assumptions, or regulatory uncertainty. The cases therefore support implementation capacity as a narrower interpretation than a verified VRIN advantage.

Traffic-linked rent, minimum-income commitments, phased investment, capital grants, and compensation clauses expose the stakeholder tensions created by uncertainty. Public authorities seek infrastructure delivery and connectivity; concessionaires require returns; lenders need predictable cash flows; airlines and passengers are sensitive to charges; and regulators protect competition and affordability [24, 25]. Stakeholder theory interprets these instruments as attempts to distribute financial consequences across the parties. Their practical value depends on the clarity of triggers and compensation rules, a question that remains open for the ongoing cases.

Cost, time, quality, and risk transfer remain the core VfM dimensions [11, 14] making delays, cost growth, audit findings, and quality problems relevant to appraisal. The broader VfM literature also recognizes connectivity, accessibility, continuity of service, and resilience as sources of public value [19, 20]. For regional airports with a weak commercial base, these benefits may provide a rationale for public support.

These two levels of assessment should remain distinct. A favorable construction record does not demonstrate that a concession outperforms public procurement over its full life cycle, and public value does not substitute for sound preparation or cost control. A full VfM comparison would require complete risk-adjusted costs, a credible procurement counterfactual, and longer operational data. In this article, resilience is considered through adaptive governance mechanisms and exposure to disruption; recovery performance is left for longitudinal research.

The theoretical contribution is the combined interpretation of three mechanisms: institutional adoption of the concession form, the implementation capacity of the private partner, and contractual allocation of stakeholder risks. The cases show how formally similar concessions contain different combinations of finance, capabilities, adaptive mechanisms, and public exposure. This moves the analysis from ownership labels to the governance configuration through which infrastructure is prepared and delivered.

The comparison also identifies three questions for subsequent research: how to measure substantive private risk assumption independently of legal status; whether sector experience improves delivery when preparation and regulatory procedures are stable; and how demand-linked or phased mechanisms operate once contractual triggers are activated.

Public appraisal should document the source of capital, the risks that remain public, and the conditions under which grants, minimum-income commitments, or compensation become payable. Passenger forecasts, documentation quality, and the regulatory feasibility of user charges require particular attention. Linking public support to explicit connectivity or service objectives and transparent performance requirements would make its purpose easier to evaluate. For private partners and lenders, the financial model should be assessed alongside change mechanisms, construction-cost uncertainty, traffic assumptions, and procedures for approving tariffs or compensation. Development-finance institutions can strengthen structuring capacity, but financial close should be followed by continued monitoring of schedule, cost, and changes in risk allocation.

The study relies on public documents and cannot observe informal coordination or non-public negotiations. Disclosure differs across projects, and heavily scrutinized cases may appear more problematic because more information is available. The sample is small and country-specific, four projects were still at the investment stage. The conclusions are therefore limited to the evidence available by May 2026.

Further research can revisit the unfinished projects after commissioning, add interviews and contractual material, and calculate risk-adjusted VfM where the data permit. Longitudinal observation after shocks would show how the adaptive mechanisms identified here operate in practice and whether they support implementation or operational resilience. Comparison with regional airport PPPs in other institutional settings would help distinguish Russia-specific patterns from more general ones.

6. Conclusion

Across the seven cases, the common concession form corresponds to markedly different financing structures and delivery records. Completed projects range from comparatively favorable implementation to cases with material cost, quality, compliance, or schedule problems. Arkhyz has several adverse signals at the investment stage, while Omsk, Salekhard, and Gorno-Altaysk remain too early for an overall judgement.

Observed implementation outcomes vary across governance and financing configurations despite the common legal form. Specialized airport operators contribute structuring and coordination capacity, yet delivery also depends on preparation and regulatory conditions. Public support appears in several forms and requires assessment of its purpose, conditions, and contingent liabilities. Traffic-linked payments, phased delivery, and compensation clauses provide mechanisms for adjustment; their contribution to resilience can be examined as projects encounter the relevant shocks and contractual triggers.

Accordingly, appraisal should examine passenger forecasts, documentation quality, contingent public liabilities, and the rules for revising tariffs and compensation. As the investment-stage projects reach operation, the qualitative comparison can be extended with project-level VfM calculations and analysis of long-term operational, social, and resilience outcomes.

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Appendix

Table A1.
Case-level documentary summary.

Project	Project and partner structure	Financing and planned public support	Demand and risk allocation	Observed implementation record	Core sources	Interpretive boundary
Novy Urengoy	2018, 30-year concession; terminal and airfield; Airports of Regions concessionaire	User-pays; VEB.RF and Gazprombank syndicated financing; delivery reported without regional-budget funding	Industrial demand linked to gas-sector travel; substantial risk assigned to the private partner	Commissioned in December 2022; reported on time with stable cost; later tariff claims	Association of Infrastructure Investors and Creditors [6] and Sherpa Group [7]	Strongest documented delivery record in the sample; long-term VfM remains to be assessed
Blagoveshchensk (Ignatievo)	2021, 30-year concession; terminal; joint venture of Airports of Regions and Novaport	Private investment and bank financing; Gazprombank identified	Traffic-linked rent and concession payment; regional and cross-border demand	Terminal completed; cost growth, inefficient expenditure, substandard work, and FAS warning reported	Association of Infrastructure Investors and Creditors [6] ; Sherpa Group [7] and RBC [32]	Completion and contractual sophistication coexist with material implementation limitations
Omsk (Omsk-Fedorovka)	2024, 49-year concession; terminal and airfield; Airports of Regions concessionaire	VEB.RF Project Finance Factory; regional external-infrastructure co-financing	Minimum-income mechanism; exposure to target-traffic risk	Investment stage; price pressure and differing estimates reported	Association of Infrastructure Investors and Creditors [6] ; Sherpa Group [7] and RBC [32]	Final schedule, cost, and delivery performance remain unavailable
Arkhyz	2024, 49-year concession; greenfield terminal and airfield; Airports of Regions concessionaire	VEB.RF and Sberbank; significant budget participation	Tourism-dependent and seasonal demand; sanctions and equipment exposure	Delay and cost growth reported during the investment stage	Association of Infrastructure Investors and Creditors [6] and Sherpa Group [7]	Assessment concerns implementation to date rather than completed-project effectiveness
Salekhard	2023, 30-year concession; terminal with phased airfield reconstruction; Novaport concessionaire	Capital grant plus private funding; Arctic Zone resident status	Phased delivery; conditional payment above 700,000 passengers; mechanism may support adjustment to demand uncertainty	Investment stage; reported as proceeding within the current phased schedule	Association of Infrastructure Investors and Creditors [6] and Sherpa Group [7]	Public support is a planned element of the structure; resilience implications are not yet observed outcomes
Grozny	2022, 49-year concession; airfield reconstruction; construction-oriented concessionaire	Predominantly federal-budget financing; limited private-capital role	Risks largely retained by the public side; reported passenger-traffic decline	Approximately one-year delay; cost growth, additional works, and audit findings	Association of Infrastructure Investors and Creditors [6] ; Sherpa Group [7] and RBC [31]	Evidence supports implementation concerns; a public-procurement counterfactual is unavailable
Gorno-Altaysk	2025, 49-year	RUB 7.9 bn federal	Target traffic exceeds	Early investment stage;	Association of	Budget dominance and

	concession; airfield; existing airport operator backed by Sber Group	financing of RUB 10.2 bn; private share about 20%	current traffic; compensation clauses and special circumstances may allow adjustment	cost and schedule outcomes unavailable; antitrust risk identified	Infrastructure Investors and Creditors [6] and Sherpa Group [7]	demand uncertainty describe structure; final performance and resilience remain unknown
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Table A2.

Revised coding framework and cross-case thematic synthesis.

Dimension	Code	Theme definition	Representative observations	Cases / level
Institutional form and economic structure	I1	Use of a concession agreement as the common legal arrangement	All selected projects are concessions	All seven cases
Institutional form and economic structure	I2	Diffusion or replication of concession structures, including simplified forms	Gorno-Altaysk is identified among the early simplified arrangements	Gorno-Altaysk; sector level
Institutional form and economic structure	I3	Difference between formal PPP status and the financing and risk-transfer structure	User-pays structure versus budget-dominant structures	Novy Urengoy; Grozny; Gorno-Altaysk
Partner capabilities and financing	P1	Industry-specific operating, coordinating, and structuring capabilities	Participation of Airports of Regions and Novaport	Novy Urengoy, Blagoveshchensk, Omsk, Arkhyz, and Salekhard
Partner capabilities and financing	F1	Role of development-finance institutions and commercial lenders	Project Finance Factory and bank lending	Novy Urengoy; Omsk; Arkhyz; Blagoveshchensk
Partner capabilities and financing	F2	Forms of planned public support	Capital grant, external-infrastructure funding, federal capital funding	Omsk; Arkhyz; Salekhard; Grozny; Gorno-Altaysk
Risk allocation, resilience, and implementation conditions	R1	Contractual mechanisms for adapting to passenger-demand uncertainty, without assuming that they are effective	Traffic-linked rent, minimum-income mechanism, phased delivery, conditional payment, and compensation clauses	Blagoveshchensk; Omsk; Salekhard; Gorno-Altaysk
Risk allocation, resilience, and implementation conditions	R2	Underlying demand base and volatility	Industrial demand, tourism seasonality, target-traffic uncertainty, reported traffic decline	Novy Urengoy; Arkhyz; Grozny; Gorno-Altaysk
Risk allocation, resilience, and implementation conditions	R3	Observed preparation, cost, schedule, quality, audit, and compliance outcomes	Cost revisions, delays, substandard work, additional works, audit findings	Blagoveshchensk; Omsk; Arkhyz; Grozny
Risk allocation, resilience, and implementation conditions	R4	Tariff, user-charge, and antitrust context or disputes	FAS warnings and disputes concerning additional charges	Novy Urengoy; Blagoveshchensk; Gorno-Altaysk; sector level