



Article

Ways of Managing Costs Related to Tourist Transport Services in Samarkand Region

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Abstract: Disruptions in tourist transport, such as vehicle breakdowns, delayed flights or lost booking information, threaten not only a single transfer but the entire chain of services that makes up a trip. This study examines how a safe alternative transport option should be selected, how decision authority should be assigned, and how recovery costs should be evaluated when tourist transport services in Samarkand are disrupted. The research combines a comparative analysis of peer-reviewed literature on tourist transport, service quality, service recovery and organizational resilience, and applicable national regulatory requirements with analytical cost modeling. The proposed Tourist Service Recovery (TSR) mechanism links five stages: recording the incident, ensuring safety, approving the solution, resuming the service for the tourist, and eliminating the root cause. As a result, a decision scheme, a passport of seven performance indicators, and a break-even threshold for the incremental costs of recovery were developed. In an illustrative scenario with 1,000 orders per month, fixed costs of UZS 5 million, and an additional cost of UZS 150,000 per disrupted order, an avoidable loss of UZS 500,000 and a 60% share of relevant cases yield a break-even threshold of 3.33% of orders disrupted. At a disruption rate of 4%, the net incremental operating difference equals UZS 1 million per month. These values are computational results of the model assumptions, not observations or forecasts. The paper shows that verifying the practical effect of the proposal requires an order register, a comparison group, and a pre-specified evaluation protocol.

Keywords: tourist transport; service recovery; Samarkand; quality management; recovery costs; passenger safety; difference-in-differences

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1. Introduction

In tourist travel, the function of transport does not end with carrying a passenger from one location to another. Meeting tourists at the airport, transferring them to their hotel and delivering them to attractions at the scheduled time are interdependent obligations, and a disruption in any one of them affects the fulfillment of subsequent services. Consequently, a reduction in carrier costs or the completion of a single transfer does not in itself mean that the whole trip has been successfully organized. Preserving the sequence of services when managing city transfers in Samarkand and tourist routes in its surroundings is therefore a distinct research problem.

Research on tourist mobility shows that the performance of transport at a destination, including reliability, ease of use and the quality of information, is directly associated with tourists' overall satisfaction with the destination [1]. A review of tourist use of public transport likewise identifies reliability, convenience and the coordination of services as key factors in tourists' travel decisions [2]. Nevertheless, these studies focus mainly on regular transport performance rather than on the management of failures. The present article addresses this gap by jointly considering whether an alternative vehicle is

available, who has the authority to call it, and who approves the related expenditure, and it develops these elements into a stand-alone management model.

Service recovery, understood as the actions a provider takes in response to a service failure, has long been recognized as a source of competitive advantage, because a well-handled failure can preserve customer loyalty and future revenue [3]. Critical-incident research has shown that employee responses to failures of the core service are among the principal sources of both satisfying and dissatisfying service encounters [4].

Tax, Brown and Chandrashekar demonstrated that, when customers evaluate a firm's response to a complaint, the outcome obtained, the procedure used to reach a decision and the quality of interpersonal treatment all matter [5]. Applied to tourist transport, this perspective distinguishes three separate requirements: the tourist should be offered an acceptable solution, the process of reaching that solution should be understandable, and the tourist should be treated with respect. Hence, merely increasing the amount of compensation does not cover all the functions of service recovery.

Smith, Bolton and Wagner analyzed the fit between a service failure and the recovery effort through its effect on customer satisfaction [6]. Maxham and Netemeyer showed in a longitudinal study that the positive effect of a satisfactory recovery weakens when failures recur, which underlines the need to remove root causes rather than only compensate for consequences [7]. Wirtz and Mattila found that compensation, speed of recovery and apology interact, so that a prompt response and an apology may matter as much as monetary redress [8], and a meta-analysis by Orsingher, Valentini and de Angelis confirmed that distributive, procedural and interactional justice jointly shape satisfaction with complaint handling [9].

Michel, Bowen and Johnston revealed the tensions that arise when solving the customer's problem, correcting the process and supporting employees are managed separately from one another [10]. Bowen and Lawler argued that empowering front-line employees accelerates responses but must be bounded by clear rules and limits [11]. The first group of studies explains why a solution is acceptable to the tourist; the second takes into account employee authority and the redesign of the process. When these findings are applied to local transport operations, management principles rather than ready-made effectiveness coefficients are adopted.

In tourism research, disruptions are most often examined within crisis and disaster management frameworks. Faulkner proposed a staged framework covering preparedness, emergency response, recovery and review [12], and Ritchie extended it into a strategic approach emphasizing proactive planning, response and organizational learning [13]. These frameworks, however, concentrate mainly on destination-level crises, whereas routine operational failures of individual transfer orders and their cost consequences receive considerably less attention.

Duchek links organizational resilience to the capabilities of anticipating an event, coping with its consequences and adapting on the basis of experience [14]. For tourist transport, this view makes it possible to combine the advance designation of a backup operator, the recovery of the interrupted service and the elimination of the cause of repeated disruptions. The scientific contribution of this article lies not in declaring a new transport obligation but in linking these functions to verifiable indicators and a cost threshold. In doing so, the conceptual proposal, the computational scenario and the practical effect that remains to be tested in future work are clearly separated.

The central research question of the study is as follows: how should a decision procedure be organized that protects the tourist's interests when tourist transport is disrupted, is verifiable, and is economically justified? To answer it, the study (i) specifies the decision sequence and authority levels of the TSR mechanism, (ii) defines a set of measurable recovery indicators, (iii) derives a break-even condition for the incremental costs of recovery, and (iv) outlines an evaluation design for testing the mechanism in practice.

2. Materials and Methods

2.1. Research Design and Sources

The study is based on comparative document analysis and analytical modeling. The materials include primary scientific works on tourist transport [1], [2] and service recovery and organizational resilience [3]–[14], the applicable national regulatory act [15], and official descriptions of quality management principles and standards [16], [17]. Sources were selected according to their direct relevance to the topic and the possibility of verifying specific claims. This selection should not be interpreted as a systematic literature review covering all publications. Because primary order logs and cost documents were not available, no empirical estimate of the effect for Samarkand was calculated.

2.2. Regulatory Baseline

Paragraph 26 of Annex 2 to Resolution No. 482 of the Cabinet of Ministers of the Republic of Uzbekistan of 4 November 2003 was examined as the regulatory starting condition. It requires that, where a malfunction or the driver's condition threatens safety, movement be stopped, the bus or driver be replaced, and measures be taken to ensure that the carriage is completed [15]. Therefore, dispatching an alternative bus is not in itself treated as a scientific novelty in this article, and the baseline for comparison must also be a service in which this obligation is fulfilled. The additional content of the proposal consists in linking decision time, partner authority, cost approval and evidence of execution.

2.3. Unit of Observation and Data Recording Rules

The unit of observation is a confirmed tourist transport order whose execution date falls within the reporting period. An order may relate to an individual tourist or to a group; the number of orders is not equated with the number of tourists. If several disruptions occur within one order, the incidents are coded separately, but the order is counted only once in the denominator. Intra-city transfers, transport to tourist zones and intercity services are grouped separately according to distance and the composition of obligations. Cancelled, unfulfilled and incompletely observed orders are not excluded from the calculation.

In the database, order and incident codes are separated from personally identifiable information. Where service type, area, time, group size, cause of disruption, recovery method and expenditure are sufficient for the analysis, no further personal data are collected. If communication is lost, a temporary record is kept; once the system is restored, the actual time of the incident and the time of data entry are recorded separately. Empty time fields are not replaced by zero minutes. Duplicate records are identified by jointly checking the order code, date and incident type, and the reason for any deleted or corrected record is retained. This procedure is intended to ensure that the calculation can be reproduced and that a later audit yields the same result.

2.4. Process Criteria

The process criteria were aligned with the principles of the International Organization for Standardization (ISO) of customer focus, process approach and evidence-based decision making [16]. Accessibility was considered across the entire tourist service chain on the basis of the publicly available description of ISO 21902:2021 [17]. No claim is made that the full text of the standard was applied or that any enterprise is certified. Safety and the provision of assistance agreed in the order are treated as mandatory conditions that precede any economic calculation.

2.5. Economic Model

The economic model estimates the monthly incremental operating difference:

$$E = N \times p \times (r \times L - c) - F, \quad (1)$$

where N is the number of confirmed orders; p is the share of orders with at least one relevant disruption; r is the share of disrupted orders in which the new procedure prevents an additional avoidable loss; L is the average avoidable loss in such a case, UZS; c is the additional cost of the new procedure per disrupted order, UZS; and F is the

monthly fixed additional cost of preparedness and management, UZS. The denominator of r is the number of disrupted orders; r is not simply the share of orders that were completed.

L includes the non-overlapping components of avoidable external rebooking costs, penalties and lost marginal revenue. A refunded gross payment and the lost revenue of the same order are not counted twice, and internal payments between partners are not recounted as a new resource cost to the network. The tourist's loss of time is tracked as a separate outcome; because there is no evidence of its monetary value, it was not included in this calculation. Only when $r \times L > c$ is the break-even threshold determined as

$$p^* = F / [N \times (r \times L - c)]. \quad (2)$$

2.6. Illustrative Scenario and Assumptions

To make the calculation reproducible, a hypothetical scenario with all values stated openly was chosen: $N = 1,000$, $F = \text{UZS } 5,000,000$, $L = \text{UZS } 500,000$ and $c = \text{UZS } 150,000$. Variants of 40%, 60% and 80% were examined for r , and a range of 1%–10% for p . These values are not enterprise observations, expert survey results or 2025 statistical estimates; using a common set of values serves to show under which conditions the model yields a positive difference. The calculation relies on the simplifying assumption that transport capacity is sufficient and that simultaneous calls do not change costs.

The cost c is applied to all disrupted orders, including those in which a recovery attempt did not deliver the expected additional result; this prevents counting the costs of successful incidents only. F includes on-call duty, standby payments and monitoring costs directly attributable to the new procedure. If one-off costs such as initial training or system development arise, they should be reported separately and allocated over the relevant periods. The value of F in the scenario is not a validated estimate of such actual costs.

3. Results

3.1. Decision Sequence of the TSR Mechanism

The study specified the decision procedure of the Tourist Service Recovery mechanism. Its first stage is to record the incident at the time the disruption was detected, as far as possible, rather than at the time the report was received. The duty officer then checks safety, the need for assistance and the feasibility of reaching the next service. If there is a safety threat, the trip is stopped; an economic limit cannot justify continuing hazardous movement. The cost of an alternative service is approved only after it has been confirmed that the service meets the tourist's agreed requirements (Fig. 1).

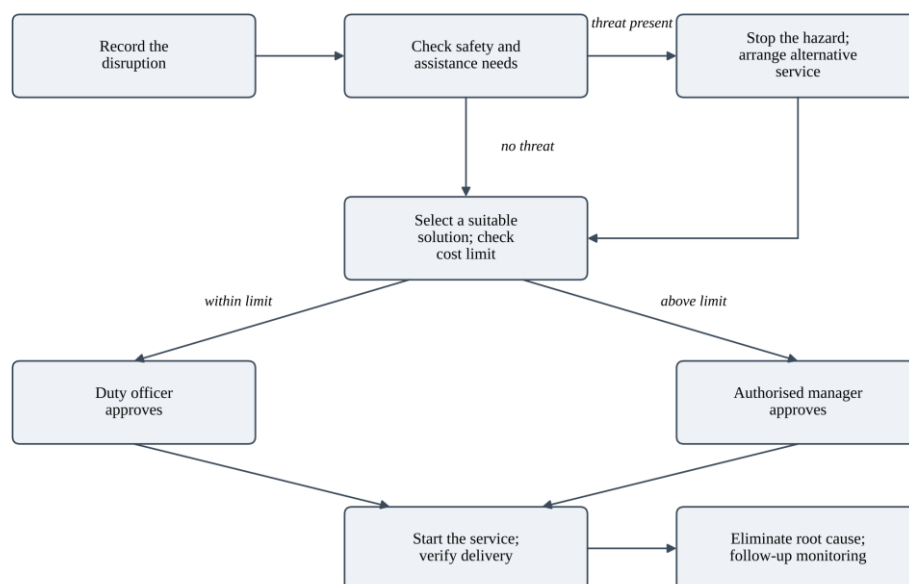


Figure 1. Linkage between safety, decision authority and service recovery in a tourist transport disruption.

Source: developed by the author on the basis of Paragraph 26 of Annex 2 to Resolution No. 482 [15] and the service recovery literature [9], [10], [12].

The decision procedure also requires information that is understandable to the tourist. The message contains confirmed information on the cause of the incident, the available solution, the expected next step and a contact channel. An arrival time that has not yet been confirmed is not communicated as a firm promise. The tourist's response, assistance request and consent to the alternative are linked to the order. However, a flag indicating that a message was sent does not mean that the service has been restored: the record contains separate time fields for sending the message, its receipt by the tourist, approval of the decision and the actual start of transport.

In Fig. 1, authority is linked to the type of decision: the duty officer acts within pre-approved conditions, while expenditure above that level is referred to the appropriate authorized manager. A rapid decision must not delay the provision of safety. Once the alternative transport has started, the original order is not closed; the tourist's arrival at the destination and the fulfillment of the agreed subsequent services are confirmed separately. This prevents sending a message, dispatching a vehicle and serving the tourist from being recorded as one and the same outcome.

3.2. Incident Types and Priorities

Three types of incidents illustrate the decision sequence. In the case of a technical breakdown, a safe condition and a suitable vehicle are provided first. In the case of a delayed flight, a joint rescheduling of the transfer and the subsequent tourist service is considered. If booking information has been lost, the confirmation and execution assignment are restored before the tourist can be required to pay again. For these situations, a single average recovery time does not provide sufficient information for management; therefore, the type and severity of each incident are recorded, and recurring causes are monitored separately.

3.3. Measurement Passport of Recovery Outcomes

Table 1 presents the measurement passport of seven indicators developed for the TSR mechanism.

Table 1. Measurement passport of tourist transport service recovery outcomes

Indicator	Calculation and unit	Required record	Interpretation rule
Share of disrupted orders	Orders with at least one disruption / all confirmed orders $\times 100$; %	Order code; incident code; period	Each order counted once in the denominator
Recovery time	From detection of the disruption to the start of the alternative service; minutes	Start and recovery timestamps	Unfinished incidents reported separately
Complete order fulfillment	Orders with all essential conditions met / all confirmed orders $\times 100$; %	Confirmation of destination and next service	Start of alternative transport is not sufficient
Transport-related cancellation	Orders cancelled due to transport disruption / all confirmed orders $\times 100$; %	Cancellation reason and evidence	Cancellations by tourists for other reasons kept separate
Cost per disrupted order	Total recovery cost / disrupted orders; UZS	External costs and time records	Internal transfers not double-counted
Cost per order (all orders)	Total preparedness and recovery cost / all confirmed orders; UZS	Full cost for the same period	Active call-out costs alone are insufficient
Compliant recovery	Recoveries meeting safety and agreed assistance / completed recoveries $\times 100$; %	Inspection and agreement with the tourist	Number of open incidents reported separately

Source: developed by the author.

The two cost indicators in Table 1 answer different questions. The cost per disrupted order shows how resource-intensive the resolution of an incident is, while the cost per order of all orders reveals the cost of keeping the system permanently prepared. When disruptions decrease, the first indicator may change or even increase, because the remaining incidents are likely to be more complex. For this reason, both indicators are interpreted together. Reporting the mean recovery time only for successfully completed cases may conceal long-running incidents.

3.4. Break-Even Threshold of Recovery Costs

In the hypothetical calculation for the central variant, the expected avoidable loss per disrupted order was UZS 300,000, and the difference after the additional cost was UZS 150,000. Covering the fixed cost of UZS 5 million therefore requires 33.33 expected disrupted orders per month, which for $N = 1,000$ corresponds to a threshold of 3.33%. Because actual orders are recorded as integers, if the model conditions remain unchanged, the nearest higher practical discrete threshold is 34 disrupted orders, or 3.4% (Table 2).

Table 2. Hypothetical calculations of recovery cost coverage

Calculation item	Variant r = 40%	Variant r = 60%	Variant r = 80%
Orders per month, N	1,000	1,000	1,000
Fixed additional cost F, million UZS	5.0	5.0	5.0
Additional cost per disrupted order c, thousand UZS	150	150	150
Avoidable loss per beneficial recovery L, thousand UZS	500	500	500
Share of cases with additional loss prevented r, %	40	60	80
Expected net variable difference per disruption, thousand UZS	50	150	250
Break-even threshold p^* , %	10.00	3.33	2.00
Monthly E at $p = 4\%$, million UZS	-3.0	1.0	5.0

Source: calculated by the author under the open scenario assumptions. All input values are hypothetical and represent neither observed results nor forecasts.

The main message of Table 2 and Fig. 2 is not that an increase in disruptions is a positive outcome. Rather, they show under which conditions the same fixed preparedness cost is recovered. In the central variant with $p = 4\%$, an additional loss is assumed to be prevented in 24 of 40 disrupted orders. The total avoided loss is UZS 12 million, the variable additional cost is UZS 6 million and the fixed cost is UZS 5 million, giving a difference of UZS 1 million. This is not an actual profit but the arithmetic result of the stated assumptions.

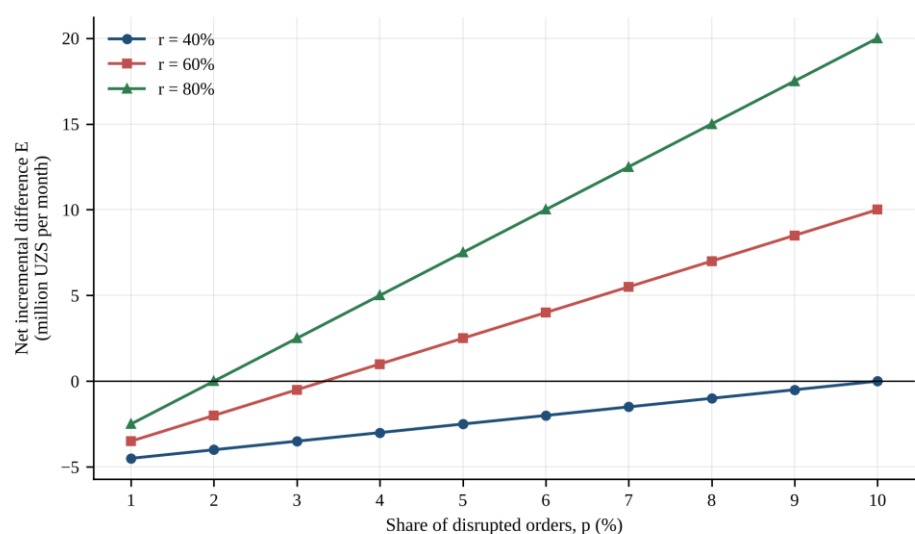


Figure 2. Share of disrupted orders and net incremental operating difference: hypothetical sensitivity analysis.

Source: calculated by the author using (1) with $N = 1,000$, $F = \text{UZS } 5 \text{ million}$, $L = \text{UZS } 500,000$ and $c = \text{UZS } 150,000$. Hypothetical scenario; not actual statistics.

The result is highly sensitive to r . At a disruption rate of 4%, the 40% variant yields a negative difference of UZS 3 million, whereas the 80% variant yields a positive difference of UZS 5 million. Counting the number of disruptions alone is therefore insufficient for an investment decision; it must be verified which losses the new procedure actually prevents in addition to the baseline. If $r \times L \leq c$, increasing the number of orders does not recover the fixed cost, and the contract, the cost structure or the recovery method should be reconsidered.

4. Discussion

4.1. Managerial Implications

The managerial significance of the proposal lies in transforming service recovery from the personal initiative of an individual driver into a verifiable inter-organizational procedure. The carrier confirms technical readiness, the tour operator confirms the itinerary and the agreement with the tourist, and the receiving organization confirms the timing of the next service. Such a distribution of responsibility reduces the risk of treating a shift of costs from one party to another as overall savings. The contract distinguishes the party that pays initially from the party that is ultimately liable; resolving the tourist's problem should not wait for a subsequent review of cost allocation. This is consistent with the integrated view of customer, employee and process perspectives in service recovery [10], [11].

Customer satisfaction and operational performance are complementary forms of evidence. A tourist's silence does not mean that the problem has been resolved; conversely, an increase in complaints after a clear feedback channel is introduced may indicate that previously hidden cases are now being recorded. Therefore, repeat contacts, delays, cancellations and final service fulfillment are monitored together with the number of complaints. Satisfaction questions may distinguish outcome, procedure and communication aspects [5], [9], but their aggregate score does not compensate for a shortfall in safety.

Staff incentives must also be consistent with the definition of the outcome. Rewarding staff solely for closing requests quickly may encourage them to mark complex incidents as resolved prematurely. This article proposes linking rewards to data completeness, fulfillment of the agreed service and independent verification. Rather than automatically penalizing employees who record errors, it is important to distinguish deliberate concealment from process defects. An incentive for timely reporting is assessed separately from the actual service outcome delivered to the tourist.

4.2. Pilot Implementation and Evaluation Design

It is advisable to begin testing with a pre-defined group of transfers in Samarkand. First, a uniform recording procedure is established for all orders, disruptions and costs. Then, by agreement with carriers, the new authority and service recovery procedure is introduced in stages. City transfers and transport to tourist zones are not pooled into one group. Season, group size, distance, arrival time and assistance conditions are recorded from the initial period onward. The size of the observation sample is planned according to the number of available orders and the difference to be detected; no ready-made number of respondents is set without justification.

In the evaluation report, the change in the cancellation rate is presented in two forms: the absolute difference in percentage points and the percentage change relative to the baseline rate. If the baseline rate is zero, no relative reduction is calculated. For recovery time, the median, the mean and the number of observations are reported together, and the duration of open incidents is kept separately. The cost per order of all orders is compared at a common price base. Before these indicators are combined into a single composite score, their different economic meanings and mandatory constraints must be examined.

If random assignment is not possible, a difference-in-differences (DiD) design is considered for comparing before–after changes in the treatment and comparison groups. Callaway and Sant'Anna show that, when interventions are introduced at different times, effects must be correctly separated by group and period [18], and Goodman-Bacon demonstrates that the conventional two-way fixed-effects estimator can be biased under staggered adoption [19]. In a local pilot, it must be documented which service switched to the new procedure and when, and the comparison group must be drawn from services not yet treated. A single before and a single after mean do not fully control for seasonal variation.

The parallel trends assumption requires that, in the absence of the new procedure, the outcomes of the groups would have evolved in comparable directions. Examining pre-treatment dynamics is useful, but a statistically insignificant pre-trend test does not prove this assumption; this limitation is discussed in recent methodological reviews [20]. The use of a common dispatcher or backup vehicles may also affect the comparison group, so intervention units should be defined to match groups of jointly managed services. Selecting successful orders or excluding complex cancelled cases would artificially improve the results.

Over time, outcomes belonging to the same partner or route may be correlated. Bertrand, Duflo and Mullainathan showed that, if such correlation is ignored, the uncertainty of difference-in-differences estimates is understated [21], and Cameron and Miller provide practical guidance on cluster-robust inference in such settings [22]. Therefore, the number of observations is distinguished from the number of independent service clusters. Without a sufficient number of independent clusters, the availability of hundreds of orders is not by itself sufficient for a credible causal conclusion. Since such data are not available for this article, no effect coefficient, standard error or confidence interval is reported.

4.3. Limitations and Directions for Future Research

The practical scope of the model is also important. If many disruptions occur simultaneously, backup vehicles may run out, call-out prices may increase and recovery time may lengthen. In that case, the assumptions of constant c and r in the linear calculation are violated. Future research should account for incident timing, vehicle location and the number of concurrent calls. For infrequent disruptions, a pre-agreed external service may be examined economically as an alternative to a dedicated permanent reserve; such an option must also meet safety and assistance requirements.

National or regional passenger statistics for 2025 cannot substitute for the indicators of the enterprise concerned. The disruption rate of tourist transfers, recovery time or the share of additional losses cannot be derived from the total number of passengers carried. Likewise, an implementation certificate is not sufficient for testing a quantitative effect without an order log and cost evidence. Hence, scaling up the proposal should rely not on the existence of a contract but on a joint assessment of compliance with safety requirements, the tourist's final outcome, comparable full costs and the quality of evidence.

A positive result of the financial analysis does not mean that disruptions themselves are beneficial for business. The model compares the new recovery procedure only under conditions in which a disruption has occurred; in overall business terms, a disruption remains a loss for tourists and organizations. Prevention and recovery budgets are therefore complementary. Tourist trust, reputation and the likelihood of future repeat visits were not monetized in this calculation, and until independent observations of them are available, adding them to the operating difference as additional benefits is not justified.

5. Conclusion

To manage transport disruptions in Samarkand tourism, the Tourist Service Recovery mechanism should integrate decision authority, a suitable alternative service, cost approval and evidence of final execution. The study developed a decision scheme and seven measurement indicators corresponding to these functions. Replacing a bus is an existing legal obligation; the additional contribution of the proposal lies in organizing that obligation as a measurable management procedure among partners.

The hypothetical calculation showed that the economic viability of the new procedure depends not only on the number of disruptions but also on the additional avoidable loss and the cost of recovery. Under the stated central conditions, the break-even threshold is 3.33%, and the operating difference at a 4% disruption rate is UZS 1 million per month. These values are neither an observed effect nor a forecast for Samarkand. Before practical conclusions are drawn, the model parameters N , p , r , L , c and F must be replaced with values derived from primary order and cost documents.

When testing the proposal, the primary outcome and calculation rules should be specified in advance, cancelled orders should be retained in the analysis, and the credibility of the comparison should be assessed. If requirements regarding safety, necessary assistance or evidence quality are not met, a positive economic calculation does not constitute sufficient grounds for scaling up. This approach supports the joint management of service quality and costs and replaces unverified claims of benefit with explicit measurements.

Declarations

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Data Availability Statement: No new empirical data were generated. All input values of the illustrative scenario are reported in Section 2.6 and Table 2, allowing full reproduction of the calculations.

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