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Article

Modular Assessment of Net Room-Nights for Economic Effectiveness Analysis of MICE Events in Uzbekistan

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Abstract: Economic assessment of the MICE segment in Uzbekistan is complicated by the fact that direct spending by business visitors is often estimated without accounting for binding infrastructure constraints, primarily the shortage of high-quality accommodation capacity, and without an explicit separation between the gross effect and the net increment for the host territory. This paper proposes a calibratable modular model that combines delegate expenditure estimation aligned with the tourism satellite account with an accommodation capacity-constraint filter and an operationalization of displacement via the net room-nights metric. The model separates hotel revenue from other categories, introduces a scaling parameter that reduces non-accommodation spending under accommodation scarcity, and incorporates local capture interpreted as the inverse of leakage. An empirical demonstration compares Tashkent and Samarkand as two MICE locations with different accommodation structures. The results indicate that, under high segment-level scarcity, efficiency per participant-day may decrease despite higher gross spending, and that the choice of the relevant accommodation segment can materially change estimated value added. The practical implication is the need to shift from gross indicators to KPIs normalized by infrastructure-feasible volumes and to move planning emphasis from simply expanding the event calendar to managing effective capacity.

Keywords: MICE, economic impact, direct and indirect effects, displacement, leakage, net room-nights, capacity constraints, tourism satellite account, input-output balance, multiplier, Uzbekistan.

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1. Introduction

Uzbekistan's strategic economic transformation is characterized by aggressive policy support for the tourism sector and related infrastructure, as evidenced by the dynamics of commissioning new facilities and official service-sector statistics [1], [2]. Within this strategy, particular emphasis is placed on the development of the MICE industry: the hosting of large-scale events, such as the Tashkent International Investment Forum or sessions of the UN Tourism General Assembly, is positioned as a driver of economic growth and the attraction of foreign direct investment [3], [4], [5]. Institutional support for this strategic direction is enshrined in a series of government decisions aimed at expanding the events calendar and modernizing accommodation facilities [6], [7], [8]. However, as hotel occupancy reports indicate, rapid demand growth is encountering binding infrastructure constraints, especially in the segment of high-quality supply [9], [10].

Under these conditions, applying standard methods of economic effectiveness assessment that rely on delegates' gross expenditures becomes methodologically vulnerable. Foundational work on Tourism Satellite Accounts (TSA) and input-output analysis [11], [12] provides a basis for accounting for direct and indirect effects; however, the classical TSA architecture, oriented toward national accounts, is insufficiently sensitive to localized short-run demand–supply imbalances [13], [14].

A critical review of the specialized literature reveals a substantial gap between "gross" reports and the real net contribution of events. A number of researchers rightly note that ignoring the displacement effect and the reallocation of existing flows leads to systematic overestimation, especially when "politically motivated" figures are involved [15], [16]. If an event occupies scarce room capacity, displacing leisure tourists or business travelers with higher margins, the resulting economic effect may be zero or negative despite high gross spending by participants [17].

A second critical factor that undermines the validity of traditional multipliers in developing economies is leakage. As noted in studies of destination economic sustainability, a significant share of revenues from international events does not remain in the local economy but is transferred out through imports of goods and services, management franchises, and cross-border financial flows [18], [19], [20]. Without explicit parameterization of a local capture coefficient, impact assessment based on standard input-output tables [11] creates the illusion of high value added where, in reality, only capital transit occurs.

Thus, the scientific problem lies in the absence of an instrument that integrates the strict logic of satellite accounts [12] with corrections for the physical scarcity of infrastructure and the structure of leakages. The present study addresses this gap by introducing the metric of net room-nights. This approach enables a shift from gross turnover to an assessment of the net incremental contribution, constrained by effectively available capacity [21], [22], and provides a valid basis for managerial decision-making under conditions of resource scarcity.

2. Materials and Methods

The model is structured as a sequence of modules, each of which explicitly specifies assumptions, measurement units, and calibration points. This structure ensures reproducibility of calculations, portability to other locations, and parameter substitution as primary surveys become available. A mathematical specification of the key modules is provided below.

Demand segmentation. For a single event, the following are specified: number of occurrences count, number of participants P, segment shares s_f, s_d, s_l (foreign, domestic, local), average lengths of stay $stay_f$, $stay_d$, $stay_l$ (days), and participant-days:

$$PD = P \cdot count \cdot \left(s_f \cdot stay_f + s_d \cdot stay_d + s_l \cdot stay_l\right) \quad (1)$$

Direct expenditures by category. For segment $g \in \{f, d, l\}$, daily expenditures $w_{g,k}$ are specified by category k, with accommodation separated. Gross direct expenditures without capacity constraints:

$$Direct_{\text{gross}} = \sum_g \left(P \cdot count \cdot s_g \cdot stay_g \cdot \sum_k w_{g,k}\right) \quad (2)$$

Category compatibility with an interindustry accounting scheme is ensured by aligning the structure with the tourism satellite account [12].

Infrastructure constraint and net room-nights. Accommodation demand is converted into room-nights. Gross demand:

$$RN_{\text{gross}} = \frac{P \cdot count \cdot (s_f \cdot stay_f + s_d \cdot stay_d)}{ppr} \quad (3)$$

where ppr is the average number of guests per room.

Available capacity over window T:

$$RN_{\text{free}} = rooms \cdot T \cdot (1 - occ_0) \quad (4)$$

where $rooms$ is the number of rooms in the relevant segment and occ_0 is the baseline occupancy rate. Infrastructure-feasible volume:

$$RN_{\text{net}} = \min\left(RN_{\text{gross}}, RN_{\text{free}}\right) \quad (5)$$

Displaced volume:

$RN_{\text{disp}} = RN_{\text{gross}} - RN_{\text{net}}$ (6)

Binding fraction:

$bind = \frac{RN_{\text{disp}}}{RN_{\text{gross}}}$ (7)

Accommodation accounting without double counting. The hotel component is calculated via ADR and RN_{net}:

$Direct_{\text{accom}} = RN_{\text{net}} \cdot ADR$ (8)

This avoids double counting in cases where accommodation spending is simultaneously included in daily expenditure estimates and in accommodation-market revenue. For calibration of ADR and baseline occupancy, available market and statistical sources are used, and parameterization is separated from the model structure [9].

Displacement and crowding-out for non-accommodation categories. Under accommodation scarcity, part of the accompanying spending is not realized locally because the corresponding share of visitors does not actually arrive. For non-accommodation categories, a parameter $\eta \in [0; 1]$ is introduced to scale the reduction proportionally to $bind$:

$Direct_{\text{nonhotel}}^{\text{adj}} = (1 - \eta \cdot bind) \cdot \sum_g \left(P \cdot count \cdot s_g \cdot stay_g \cdot \sum_{k \neq accom} w_{g,k}\right)$ (9)

When $\eta = 1$, the reduction is fully proportional to displacement; when $\eta = 0$, expenditures are assumed independent of accommodation constraints, which can be interpreted as an upper bound.

Local capture and indirect effects. For each category, a local capture share $c_k \in [0; 1]$ is specified, reflecting import content, supplier ownership, and leakages through external value chains. With c_k, the local direct effect is:

$Direct_{\text{local}} = Direct_{\text{accom}} \cdot c_{\text{accom}} + Direct_{\text{nonhotel}}^{\text{adj}} \cdot c_{\text{nonhotel}}$ (10)

in a more detailed form, c_k is specified by category. Indirect effects are estimated using input-output apparatus. In simplified form, an output multiplier M and a value-added share $VA/Output$ from IO/MRIO sources [11] are applied in a TSA-consistent setting [23]. Then

$Output = Direct_{\text{local}} \cdot M$ (11)

$VA = Output \cdot (\text{VA/Output})$ (12)

If a full vector form is required, a final-demand vector y consistent with expenditure allocation across sectors is introduced and the standard relation

$x = (I - A)^{-1} y$ (13)

is used for sectoral output.

Key efficiency indicators. For event comparability, normalized metrics are computed: local effect per participant-day, VA/PD, and effect per net room-night, VA/RN_{net}, allowing the result to be interpreted as a return per infrastructure-feasible unit of accommodation.

3. Results and Discussion

Results

The statistical and infrastructural baseline defines the upper bound RN_{free} and determines displacement thresholds. For Tashkent, an operational assumption considers the modern 4-5 segment with $rooms \approx 2000$, baseline occupancy $occ_0 \approx 0{,}63$, and $ADR \approx 137$ USD [9]. For Samarkand, two cases are considered: the full stock $rooms \approx 6603$ with lower baseline occupancy $occ_0 \approx 0{,}30$ and $ADR \approx 110$ USD, and the relevant higher-quality segment $rooms \approx 1450$ with $ADR \approx 110$ USD [21], [22]. Daily expenditure parameters by segment and category shares are set based on available delegate spending estimates and benchmarks for business travel costs [23], [24], [25]. Parameters M and $VA/Output$ are taken from MRIO tables in an up-to-date version, preserving consistency with TSA and the regional economy [11], [12].

Table 1. Key scenario metrics are summarized

Parameter	Tashkent (modern 4-5 stock)	Samarkand (full stock)	Samarkand (relevant segment)
Case	TIIF-like forum	UN Tourism GA-like congress	UN Tourism GA-like congress
Window, days	4	5	5
Participants in scenario, persons	2 500	1 700	1 700
No-displacement threshold, persons	987	3 378	583
Share of displaced demand, %	60,5	0,0	65,7
Local direct effect, thousand $	922,6	1 486,7	749,2
Value added, thousand $	913,4	1 471,8	741,7
Effect per participant-day, $	108,5	198,8	100,2
Effect per net room-night, $	311,7	223,7	328,9

Note: compiled by the author based on a synthesis of data from sources [3], [4], [5], [9], [21], [22].

Table 1 indicates that efficiency estimates critically depend on the choice of the relevant accommodation segment and baseline occupancy parameters. In Tashkent, high demand for the high-quality segment yields a no-displacement threshold of about 987 participants over a 4-day window, after which more than 60% of potential demand does not convert into net room-nights. In Samarkand, the absence of displacement under the "full stock" scenario produces a higher effect per participant-day; however, when shifting to the relevant high-quality segment, displacement of about 66% emerges and value added declines by almost half while efficiency per net room-night increases. This implies that the managerial criterion should be set according to the objective: maximizing VA per event requires expansion of relevant capacity, whereas maximizing VA per unit of the scarce resource justifies stricter selection and targeting toward a high-ADR segment.

A conceptual scheme of the modular model is presented in Figure 1.

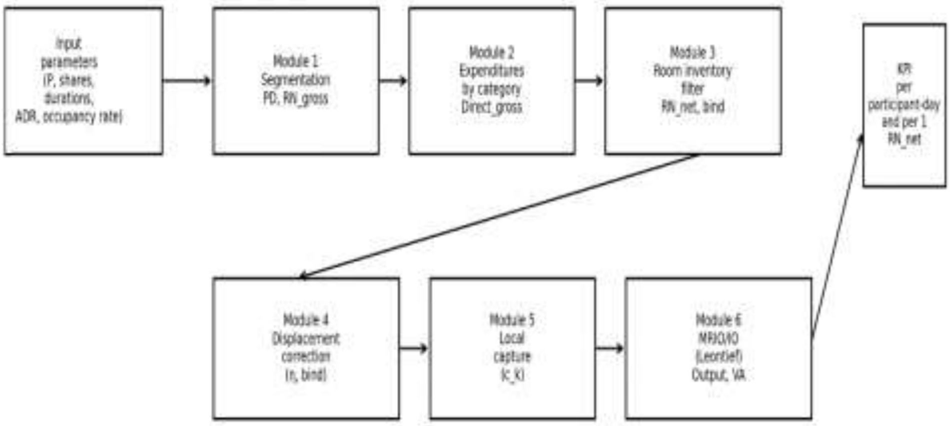

Figure 1. Logic of the modular model: from event parameters to VA accounting for a capacity filter and leakages.

To reduce arbitrariness in local capture parameters, Table 2 presents recommended intervals of c_k and the logic for their calibration based on import structure and interindustry linkages [11], [12].

Table 2. Recommended intervals for local capture parameters (c_k) and calibration logic by expenditure category

Expenditure category k	c_k interval (recommended)	Economic interpretation	Practical calibration benchmark
Accommodation (accom)	0,55-0,75	Part of hotel revenue leaks through imports, international chains, external payments, and booking platforms	Hotel financial structure and import share; adjustment using MRIO import coefficients and commission schemes
Food and catering	0,60-0,85	High local content when local suppliers dominate, but dependence on imported products and beverages is possible	F&B procurement structure; comparison with sectoral import intensity in MRIO
Local transport	0,70-0,90	High locality with predominantly local operators; lower when dependent on imported fuel and equipment	Tariffs and cost structure of carriers; import coefficients for fuel and transport
Retail and souvenirs	0,40-0,75	Range depends on the share of imported goods and supply channels	Share of imported goods in retail turnover; MRIO import structure for relevant sectors
Culture and entertainment	0,75-0,95	Typically high locality if content and labor are local	Share of local contractors, fees, and licenses
Business services (venue rental, equipment, contractors)	0,50-0,85	Strong variability due to imported equipment and external contractors	Share of external contractors and imported equipment; adjustment using the contract structure of the event

Note: compiled by the author.

The intervals in Table 2 should be interpreted as prior constraints for calibration: in developing economies, estimated VA is sensitive to c_k. Therefore, a two-step procedure is preferable, in which sectoral import coefficients from MRIO are fixed first and parameters are then refined using procurement data and the contract structure of specific events.

Sensitivity of results to η is presented in Table 3. The calculation is a scenario recalculation of VA for $\eta \in \{0; 0,5; 1\}$ with all else equal, where $\eta = 1$ corresponds to the specification in Table 1. Recalculation uses an assumption about the accommodation share in the local direct effect: $\alpha_T = 0,45$ for Tashkent and $\alpha_S = 0,35$ for Samarkand, which is consistent with typical business travel expenditure structures and TSA decomposition practice [12, 23]. Scenario $\eta = 0$ should be interpreted as an upper estimate, and $\eta = 1$ as a conservative estimate under full dependence of non-accommodation expenditures on accommodation constraints.

To assess the model's uncertainty regarding the crowding-out of accompanying expenditures, the sensitivity of the total Value Added to variations in the scaling parameter η is presented in Table 3.

Table 3. Sensitivity analysis of Value Added (VA) to the non-accommodation displacement parameter (η) across different scarcity scenarios

Case	Bind	VA at $\eta = 0$, thousand $	VA at $\eta = 0,5$, thousand $	VA at $\eta = 1$, thousand $	$VA\ reducti$ $), (η=0→1), %
Tashkent, 4-5	0,605	1682,9	1298,1	913,4	45,7
Samarkand, full stock	0,000	1471,8	1471,8	1471,8	0,0
Samarkand, relevant segment	0,657	1665,1	1203,4	741,7	55,5

Note: compiled by the author.

Table 3 shows that, when bind is nonzero, η is a critical source of uncertainty. In the Tashkent scenario, the VA range between $\eta = 0$ and $\eta = 1$ reaches about 46%, and in the Samarkand relevant-segment scenario about 56%, whereas sensitivity disappears when displacement is absent. Accordingly, for a Q1-level publication it is preferable either to identify η empirically using survey and transaction data or to present interval estimates with explicit scenario bounds.

Discussion

The results should be interpreted as a scenario-based assessment aimed at reducing upward bias in economic contribution estimates through explicit treatment of capacity constraints, displacement, and leakages. For empirical verification of major events and associated management decisions, official publications and regulatory documents are preferable, including communications by relevant agencies on investment forum outcomes, government announcements of international tourism sessions and decisions on event hosting, as well as official statistical series on occupancy of collective accommodation facilities [6], [7], [8], [10].

Classical critiques of event impact assessments emphasize that ignoring crowding-out and mechanically applying multipliers leads to overestimation, especially when requests for "large numbers" are politically motivated [15], [16], [17]. In tourism economics, leakages are interpreted as the loss of part of income outside the destination through imports, asset ownership, financial channels, and digital platforms, which requires an explicit local capture parameter and careful calibration of interindustry coefficients [18], [19], [20]. From a methodological perspective, the proposed modular scheme is consistent with the TSA approach and its extensions for the meetings industry, where emphasis is placed on compatibility with national accounts and correct allocation of final demand across sectors [12], [13], [14].

For public planning practice in Uzbekistan, the key conclusion is that comparing locations by gross revenue or gross delegate spending is methodologically insufficient. Even when event demand rises, total VA may decline if the relevant accommodation segment is already operating near its constraint. Therefore, evaluation of ROI for subsidies and investments in MICE should be linked to VA per participant-day and VA per net room-night, and management decisions should include measures to expand the relevant high-quality segment and to reduce leakages through localization of supply chains.

Limitations of the study. The limitations are related to the lack of detailed panel series on ADR, segment-specific occupancy, and delegate expenditure structure in open administrative data. In the present version, part of the expenditure parameters and basket structure relies on overview estimates used as benchmarks and subject to replacement as primary surveys become available [23], [24], [25]. To mitigate publication risks, a mixed validation strategy is recommended: fix infrastructure parameters (capacity, occupancy, sector output) using official statistics and agency data [1], [10], and estimate expenditures and leakages through delegate surveys, accommodation operator data, and the contract structure of events.

4. Conclusion

A modular model for assessing the economic efficiency of MICE events has been developed, combining business visitor expenditures, an accommodation capacity filter, and explicit adjustments for displacement and leakages. The introduced net room-nights metric separates net increment from demand redistribution and reduces upward bias in impact estimates. The comparison of Tashkent and Samarkand demonstrates that the choice of the relevant accommodation segment and baseline occupancy parameters critically determine displacement thresholds and total VA. The practical application of the model lies in supporting investment decisions, managing the event calendar, and constructing KPIs normalized by infrastructure-feasible volumes.

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Conflict of interest

The author declares no conflict of interest.

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