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Article

Integral Assessment and Spatial Clustering of Regional Tourism Potential in Uzbekistan: A Meso-Level Composite-Index Approach

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Abstract: Aggregate national tourism statistics conceal pronounced sub-national heterogeneity that conditions the efficiency of place-based tourism policy. This study develops and applies a meso-level Integral Tourism Potential Index (ITPI) to thirteen administrative regions of Uzbekistan, aggregating expert-rated attractiveness scores across seven tourism-product types, and validates it against realized inbound orientation. Regions are ranked and partitioned by tercile thresholds into high-potential, medium-potential and emerging tiers, and positioned within a two-dimensional potential-attractiveness space. Samarkand (4.41) leads the ranking, followed by a diversified high-potential tier comprising Tashkent region, Kashkadarya, Fergana and Surkhandarya. Notably, the heritage-specialized regions of Bukhara and Khorezm occupy the medium tier despite dominating the historical-cultural and pilgrimage dimensions, because a breadth-based index penalizes narrow product specialization. The decomposition demonstrates that regional potential is product-specific rather than uniform: agro, ethnographic and recreational strengths are spatially complementary to heritage assets. The findings provide an empirical basis for differentiated, cluster-specific regional tourism strategies.

Keywords: Regional Tourism, Composite Index, Spatial Clustering, Tourism Potential, Meso-Level Analysis, Uzbekistan

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1. Introduction

National tourism indicators, however carefully constructed, describe an average destination that no visitor actually experiences. Tourism is consumed in places, and the capacity of a country to convert its endowments into visitor value is distributed unevenly across its territory. For a geographically diverse country such as Uzbekistan - encompassing the desert heritage cities of the west, the mountain and agrarian landscapes of the Fergana valley, and the recreational zones of the east - the meso, or regional, scale is the natural unit at which tourism potential should be assessed and policy differentiated.

This paper constructs a meso-level Integral Tourism Potential Index (ITPI) for the thirteen administrative regions of Uzbekistan and uses it to classify regions into development tiers. The motivation is both analytical and practical. Analytically, a composite index disciplines the comparison of regions that are strong in different product categories onto a common scale. Practically, the resulting classification supports the allocation of scarce public investment, the design of region-appropriate product strategies, and the identification of regions whose potential is under-exploited relative to their

endowments. The study thus complements national competitiveness benchmarking by descending to the spatial scale at which most tourism policy is implemented.

Two questions organize the analysis. First, how is tourism potential distributed across Uzbek regions, and does it cluster into distinct tiers? Second, is potential broadly uniform across product types within a region, or is it product-specific in ways that would invalidate a one-size-fits-all regional strategy? The paper proceeds through the IMRAD structure, reviewing the literature on regional tourism assessment and composite indices, detailing the index construction and clustering procedure, reporting the spatial results, and discussing their implications for differentiated regional policy.

Literature Review

The assessment of tourism potential at the sub-national scale sits at the intersection of two literatures. The first is the destination-competitiveness tradition of Ritchie and Crouch [1] and Dwyer and Kim [2], which, although originally framed at the national level, supplies the conceptual vocabulary - endowed versus created resources, core attractions versus supporting factors - that any regional assessment must operationalize. Crouch's [3] ranking of determinant attributes is particularly relevant, since it establishes that core resources and attractions dominate the competitiveness hierarchy, justifying their central weight in a potential index.

The second literature concerns the construction of composite indices and multi-criteria evaluation in tourism. Gooroochurn and Sugiyarto [4] pioneered weighted aggregation of competitiveness themes; Pulido-Fernandez and Sanchez-Rivero [5] developed a composite index of tourism sustainability; and Zhang and colleagues [6] applied TOPSIS with information entropy weighting to evaluate destination competitiveness across the Yangtze River Delta, demonstrating the value of multi-criteria methods at the regional scale. Mazanec and colleagues [7] caution, however, that aggregation can obscure determinant-level variation, a caution that directly motivates the present study's explicit decomposition of the index into its product-type components.

A third, methodologically adjacent strand uses clustering and typological analysis to group destinations. Albaladejo and colleagues [8] combine clustering with panel causality to show that the tourism-growth relationship is cluster-specific, while index-based national studies by Uyar and colleagues [9] and Pavlukovic and colleagues [10] confirm that composite measures retain explanatory traction. Despite these advances, rigorous, index-based meso-level assessment of Central Asian tourism remains rare, and systematic clustering of Uzbek regions by tourism potential has not, to the author's knowledge, been published. This study addresses that gap.

2. Research Methodology

2.1 Data

The analysis uses a regional attractiveness matrix covering thirteen administrative regions of Uzbekistan and nine tourism-product dimensions: ecological, historical-cultural, pilgrimage, agro, ethnographic, mountain-extreme, recreational, domestic and inbound attractiveness. Each cell records an expert-assessed attractiveness score on a five-point scale, derived from structured evaluation of each region's resource base, product readiness and market appeal. The matrix constitutes the meso-level evidentiary core of the wider dissertation and is here subjected to formal index construction and clustering.

2.2 Construction of the Integral Tourism Potential Index

The ITPI for region i is defined as the arithmetic mean of its seven supply-side product attractiveness scores, ITPI_i = (1/7) sum_{j in J} a_ij, where J denotes the ecological, historical-cultural, pilgrimage, agro, ethnographic, mountain-extreme and recreational dimensions. The two demand-orientation dimensions - domestic and inbound attractiveness - are held out of the index and used instead as external validation axes, so that the index measures latent supply-side potential while realized market orientation is treated as a separate, partially endogenous construct. Equal weighting is adopted as the transparent baseline, consistent with the practice of treating expert-rated ordinal dimensions as exchangeable in the absence of a defensible a priori weighting. A consequence of this breadth-based construction, made explicit in the results, is that broadly endowed regions are favoured over narrowly specialized ones.

2.3 Clustering and positioning

Regions are partitioned into three tiers - high potential, medium potential and emerging - using tercile thresholds of the ITPI distribution. This non-parametric rule is robust to the small sample and avoids imposing distributional assumptions. To position regions within a development space, each region is mapped onto two axes: resource/product potential (the ITPI) on the horizontal axis and inbound attractiveness on the vertical axis. The resulting quadrants distinguish regions whose realized inbound orientation matches their potential from those whose potential is under-exploited, providing a direct diagnostic for prioritization. Profile heterogeneity is examined through a region-by-type heatmap and through radar comparison of the highest- and lowest-ranked regions against the national mean.

3. Results

3.1 The distribution of regional tourism potential

Figure 1 ranks the thirteen regions by the Integral Tourism Potential Index. The distribution is continuous but clearly tiered. Samarkand leads decisively (4.41), reflecting a combination of world-class heritage assets and broad secondary endowments. The remainder of the high-potential tier is occupied by Tashkent region (3.97), Kashkadarya (3.89), Fergana (3.84) and Surkhandarya (3.80) - regions whose strength derives from product breadth across heritage, recreational, agro and ethnographic categories rather than from a single dominant asset. A medium-potential tier follows, comprising Khorezm, Bukhara, Jizzakh and Namangan, and an emerging tier - Andijan, Navoiy, Sirdarya and Karakalpakstan (3.15) - completes the distribution. The spread between the highest and lowest regions exceeds one-and-a-quarter scale points, confirming substantial meso-level heterogeneity.

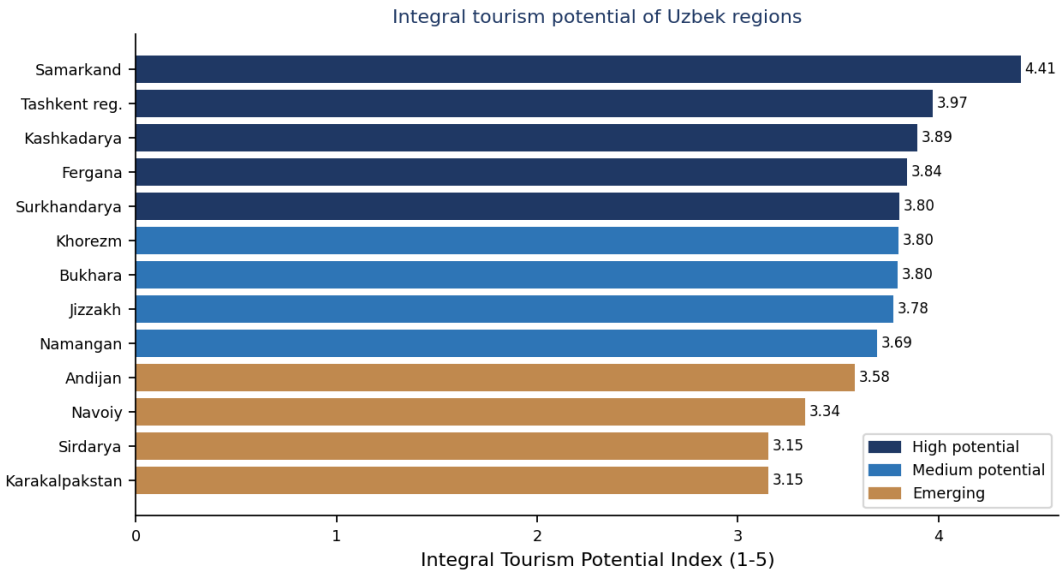

Figure 1. Integral Tourism Potential Index by region, coloured by potential tier.

A result of particular analytical interest is the medium-tier placement of Bukhara and Khorezm. These regions host the country's most celebrated heritage ensembles and, as Figure 2 confirms, dominate the historical-cultural and pilgrimage dimensions; yet a breadth-based index ranks them below more diversified regions because their strength is narrowly concentrated. This is not an artefact to be suppressed but a substantive finding: under an equal-weight, multi-product conception of potential, depth in one category does not compensate for thinness across others.

Table 1. Regional ranking by Integral Tourism Potential Index and assigned tier.

Rank	Region	ITPI	Inbound attr.	Tier
1	Samarkand	4.41	4.73	High potential
2	Tashkent reg.	3.97	4.04	High potential
3	Kashkadarya	3.89	3.96	High potential
4	Fergana	3.84	3.69	High potential
5	Surkhandarya	3.80	3.85	High potential
6	Khorezm	3.80	4.46	Medium potential
7	Bukhara	3.80	4.52	Medium potential
8	Jizzakh	3.78	3.79	Medium potential
9	Namangan	3.69	3.60	Medium potential
10	Andijan	3.58	3.35	Emerging
11	Navoiy	3.34	3.37	Emerging
12	Sirdarya	3.15	3.21	Emerging
13	Karakalpakstan	3.15	3.40	Emerging

3.2 Product-specific heterogeneity

Figure 2 disaggregates the index into its nine constituent dimensions. The heatmap reveals that potential is decidedly product-specific. Bukhara, Khorezm and Samarkand dominate the historical-cultural and pilgrimage columns but are comparatively unremarkable on agro and mountain-extreme dimensions. Conversely, regions such as Surkhandarya, Kashkadarya, Fergana and Jizzakh display their strongest scores on agro,

ethnographic, mountain-extreme and recreational tourism, categories in which the heritage cities are relatively weak. The column-wise variation is comparable in magnitude to the row-wise variation, meaning that what a region is good at matters as much as how good it is overall - the empirical refutation of a uniform-potential assumption.

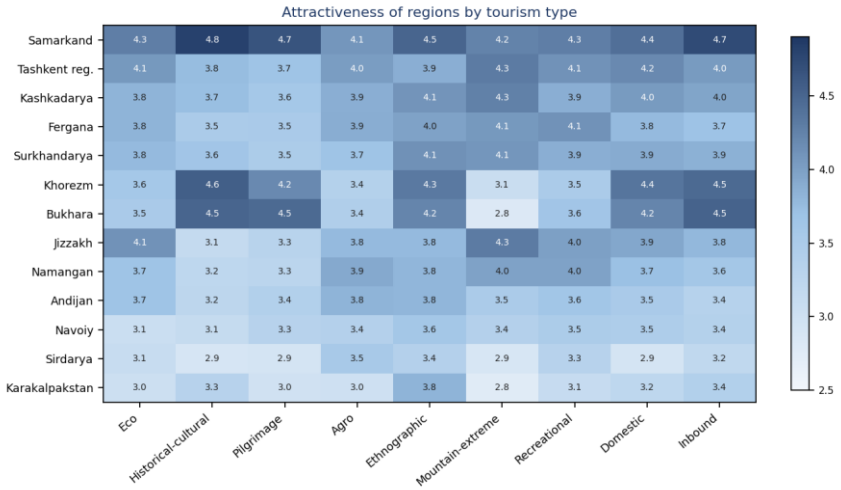

Figure 2. Region-by-type attractiveness heatmap (regions ordered by ITPI).

3.3 Potential and realized inbound orientation

The two-dimensional positioning in Figure 3 maps resource potential against inbound attractiveness. The heritage-oriented regions - Samarkand, Bukhara and Khorezm - occupy the upper region of the inbound axis, confirming that their concentrated heritage assets translate efficiently into international market appeal even where their breadth-based index is moderate. Several diversified medium- and high-tier regions occupy an intermediate position in which solid product potential is only partially converted into inbound attractiveness; these are the clearest candidates for market-development intervention. The emerging tier sits in the lower-left quadrant, where both potential and inbound orientation require foundational development.

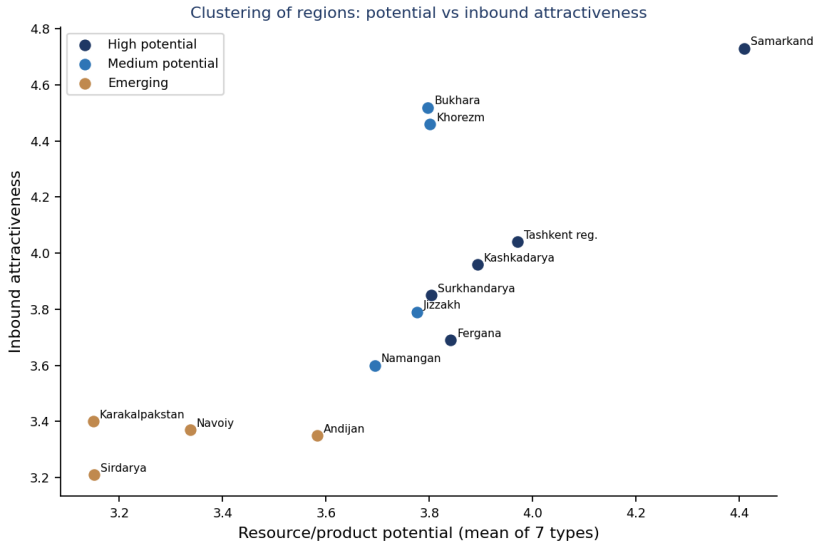

Figure 3. Regional positioning in the potential-attractiveness space, by tier.

3.4 Profile comparison

Figure 4 contrasts the attractiveness profiles of the top-ranked region (Samarkand), the lowest-ranked region (Karakalpakstan) and the national mean. Samarkand's profile is both elevated and comparatively balanced, achieving high scores on heritage axes without collapsing on the others - the configuration that drives its index leadership. The lowest-ranked region's profile is compressed and flat, indicating uniformly modest development. The national mean traces an intermediate shape. The contrast clarifies that index leadership in Uzbekistan is currently achieved through a combination of heritage depth and product breadth, a configuration that only Samarkand fully attains.

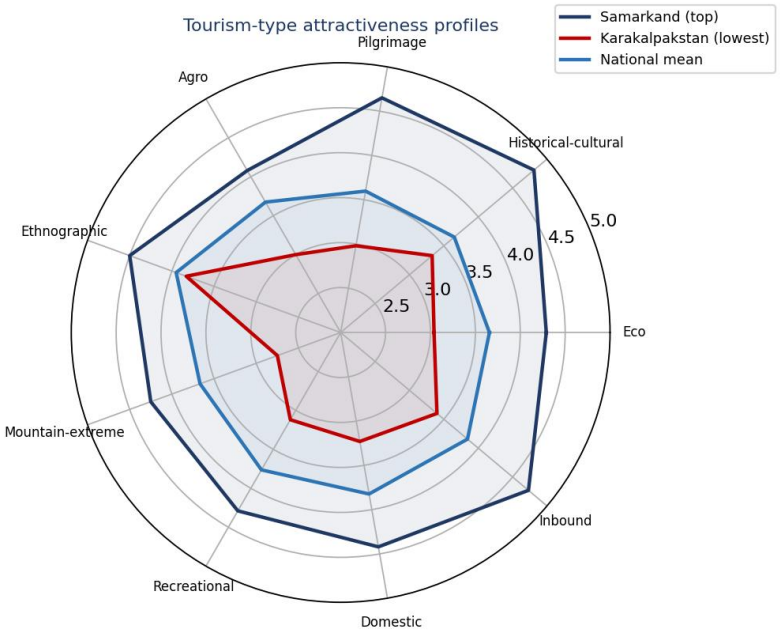

Figure 4. Tourism-type attractiveness profiles: top region, lowest region and national mean.

4. Discussion

The results carry three principal implications. First, the existence of well-defined potential tiers justifies a differentiated rather than uniform regional tourism policy. The high-potential tier requires investment in carrying-capacity management, service quality and demand dispersion, whereas the emerging tier requires foundational product development and basic infrastructure. Applying identical instruments across these tiers would be allocatively inefficient, a conclusion consistent with the cluster-specific tourism-growth findings of Albaladejo and colleagues [8].

Second, the product-specificity of potential reframes the diversification debate. The agro, ethnographic, mountain-extreme and recreational strengths of the diversified regions are largely complementary to, rather than competitive with, the heritage assets of Bukhara, Khorezm and Samarkand. A national strategy that channelled the diversified regions toward heritage imitation would squander their comparative advantage; a strategy that developed them as distinct experiential products would expand the national portfolio and reduce the spatial concentration of visitor pressure on the heritage cities. This reasoning aligns with the resource-differentiation logic central to the Dwyer and Kim [2] model.

Third, the medium-tier placement of the heritage cities exposes a tension between two legitimate conceptions of potential - breadth versus depth - and signals a policy choice rather than a measurement error. If national strategy prioritizes international heritage tourism, a depth-weighted index would re-elevate Bukhara and Khorezm; if it prioritizes balanced regional development and demand dispersion, the breadth-weighted index used here is the more appropriate guide. Making this weighting explicit, rather than implicit, is itself a contribution. Where product potential exists but inbound attractiveness lags, the binding constraint is typically market access rather than the resource base - a constraint addressable through connectivity, digital marketing and the smart-destination tools described by Gretzel and colleagues [11], and through the ground-connectivity improvements that Khadaroo and Seetanah [12] show to raise effective attractiveness.

The study has limitations. The attractiveness scores are expert-assessed and therefore carry the subjectivity inherent in such instruments; triangulation against revealed-demand data would strengthen validity. Equal weighting, while transparent, could be refined through entropy or TOPSIS-based schemes of the kind employed by Zhang and colleagues [6], and the breadth-versus-depth choice could be formalized through sensitivity analysis. Finally, the cross-sectional design precludes analysis of how regional potential evolves; a temporal extension is a natural next step.

5. Conclusion

Descending from the national to the meso scale reveals a regional tourism landscape in Uzbekistan that is both tiered and product-specific. The Integral Tourism Potential Index ranks Samarkand first and identifies a diversified high-potential tier - Tashkent region, Kashkadarya, Fergana and Surkhandarya - whose strength derives from product breadth, while the heritage-specialized regions of Bukhara and Khorezm rank in the medium tier precisely because of their concentration. Because potential varies as much across product types as across regions, an efficient national strategy must be differentiated by both region and product, and must make explicit whether it values breadth or depth. The composite-index and clustering framework developed here provides a transferable instrument for such differentiated regional planning.

Foundational and applied contributions to destination-competitiveness measurement and the tourism-growth nexus further underpin the present framework, including [13], [14], [15], [16], [17].

The study's quantitative orientation is additionally informed by the tourism demand-forecasting literature, notably [18], [19].

Evidence on the infrastructure-tourism relationship also bears on the analysis, including [20].

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