The primary scientific significance of this model lies in its ability to assess the quality of life not merely through economic indicators, but through human needs and the regional opportunities for meeting them.

Furthermore, by standardizing indicators across regions and calculating an integral index, it is possible to map regional disparities in the quality of life within Uzbekistan. The use of GIS technologies in this process further strengthens the socio-geographic dimension of the research.

In the future, based on this model, it will be possible to develop a comprehensive regional quality - of - life index - grounded in Maslow’s framework - for the Republic of Karakalpakstan, the 12 regions, and the city of Tashkent; to map the results; and to identify at which stage of needs the primary disparities between regions exist.

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BEYOND THE VIRAL BOOM: TOURISM FLOW LIFECYCLE AND DESTINATION GOVERNANCE IN SILK ROAD HERITAGE CITIES — LESSONS FROM DUNHUANG FOR SAMARKAND

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Abstract. *In the all-media era, viral fame can arrive overnight, yet "famous for no more than three months" has become the fate of many internet-famous cities. For cultural heritage destinations the stakes are higher, because damage to fragile monuments is irreversible. Adopting a tourism flow lifecycle perspective—ignition, monetization, and sustained prosperity—this paper examines how heritage cities move from "wild popularity" to "rational long-term prosperity." Drawing on Dunhuang as a benchmark of long-term flow governance, it diagnoses Samarkand's lifecycle position and proposes a three-pronged framework: platform aggregation, innovation-driven attraction, and institution-based flow management. The paper is a phased outcome of a National Social Science Fund project on tourism flow economy (Grant No. 24AGL032).*

Keywords: *tourism flow economy; flow lifecycle; destination governance; sustainable tourism; Dunhuang; Samarkand; heritage city*

Introduction. The all-media era has reshaped how destinations gain attention: a short video or influencer recommendation can turn an obscure city into a travel hotspot within weeks [1]. Yet the same dynamics produce rapid decay. Many destinations suffer the "three-month curse": visitor numbers spike, congestion follows, media narratives turn negative, and the boom collapses. For cultural heritage cities the question is more acute. Unlike a food street, a heritage site cannot be redesigned or expanded to absorb demand; each physical visit permanently consumes a small unit of the resource, and UNESCO has warned that overcrowding accelerates degradation [10]. Governance must therefore manage the destination across the entire tourism flow lifecycle, not merely respond to spikes. This paper develops a lifecycle framework, examines how Dunhuang's Mogao Caves moved from crisis

to institutionalized governance, and proposes a governance pathway for Samarkand. It is a phased outcome of the National Social Science Fund project on tourism flow economy (Grant No. 24AGL032), contributing to the project's third plateau: sustainable development mechanisms and government governance models.

2. A Lifecycle Framework for Tourism Flow Governance. Flow economy describes how regions attract external resources and convert them into economic energy [13]. In tourism, flow evolves through three stages. The **ignition stage** is driven by media exposure and collective emotion; interaction ritual chains explain why crowds amplify excitement and make destinations suddenly "must-visit" [2]. The **monetization stage** converts flows into value through tickets, services, supply chains, and digital products [11]. The **sustained prosperity stage** maintains stable, quality demand over time. Each stage carries specific risks for heritage destinations: demand may outpace capacity during ignition; commercial pressure and community exclusion can erode authenticity during monetization [7]; and fragmented governance, absent monitoring, and weak regulation can turn success into an overtourism crisis [6]. Research emphasizes that trust, power, and social capital are decisive in destination sustainability [7], and that platform aggregation, innovation-driven attraction, and institution-based flow management are the three essential levers of flow governance [4]. This paper analyzes heritage destinations through the interaction of lifecycle stage and governance lever.

3. Dunhuang: From Crisis to Long-term Flow Governance. Dunhuang's Mogao Caves offer a rare longitudinal case of lifecycle governance. After the site opened to tourism in 1979, visitor numbers rose inexorably; by the early 2000s, conservators observed that temperature, humidity, and carbon dioxide inside the caves spiked beyond safe thresholds during peak hours—an ignition stage without governance infrastructure [3]. The response was gradual and institutional. Dunhuang Academy, manager of the site since 1944, initiated a master planning process with international partners, producing visitor capacity studies [3]. In 2014, the Digital Exhibition Center opened, introducing "total volume control, online appointment, digital display, cave visitation," with a daily cap of 6,000 visitors set on conservation grounds. What sustained the model was continuous innovation: the Academy digitized 300 caves and 28,100 m² of murals, built a digital library visited over 23 million times by users in 78 countries, and operates a scheduling command center integrating appointment data, turnstile counts, and micro-environment readings to predict and guide flows. A provincial monitoring platform now covers six grotto sites, backed by the 2002 Dunhuang regulations [3]. The lesson: long-term governance requires all three levers in sequence institutions to absorb the initial shock, innovation to sustain attractiveness without physical expansion, and monitoring to detect risk before damage occurs.

4. Samarkand: A Heritage Destination in the Growth Stage. Samarkand, inscribed as a World Heritage site in 2001, is in the fastest growth phase of its tourism history. Foreign visitors rose from about 180,000 in 2015 to 2.6 million in 2024, with projections above 3 million for 2025 [8]; average stay lengthened from 2.6 to 3.5 days, and the airport handled 1.38 million passengers in 2024, up 37% [5]. Samarkand sits between ignition and monetization, yet the governance infrastructure of the sustained prosperity stage is largely absent. Four gaps are evident. First, carrying capacity is unassessed: no formal evaluation exists for Registan, Gur-e-Amir, Bibi-Khanym, or Shah-i-Zinda, and core attractions rely on walk-up tickets. Second, monitoring is absent: UNESCO's 2025 report notes peak-season

overcrowding and accelerated degradation, yet no continuous micro-environment monitoring operates inside enclosed monuments [10]. Third, monetization bypasses the community: although the Hunarmand Association has over 3,000 members, tourism revenue flows mainly to external operators and mahalla residents have limited voice [7]. Fourth, governance is fragmented across culture, tourism, and urban planning agencies, with no coordinating body [10]; UNESCO's 2024 mission warned that the "Third Renaissance" renovation plan could threaten the property without prudent assessment [9].

5. A Lifecycle Governance Pathway for Samarkand. Applying the three levers to Samarkand's lifecycle position yields a staged pathway. **Platform aggregation**: carrying capacities for the four core monuments must first be scientifically assessed, then a unified electronic appointment platform should be built under the State Committee for Tourism, integrating time-slot booking, tiered pricing, and off-peak guidance; a digital exhibition center and a "Cloud Tour Samarkand" service would absorb demand before visitors enter fragile structures—the digital substitution proven at Dunhuang [3]. **Innovation-driven attraction**: prioritize high-precision digitization of the most fragile monuments and develop immersive products that extend stay and spending; all-media strategies, including influencer collaborations shown to shape visit intention [12], shift competition from price to experience; mahalla-based tourism—family guesthouses, craft workshops, intangible heritage experiences—diversifies the product while channeling revenue to residents. **Institution-based flow management**: deploy preventive micro-environment monitoring linked with meteorological services; establish a unified Samarkand heritage management agency coordinating conservation, tourism, and urban planning, supported by special regulations and a capacity-building program; a community tourism development fund drawn from core-site revenue would align resident livelihoods with conservation and build the social capital that governance research identifies as decisive [7]. Sequencing matters: assessment and monitoring first (1–2 years), digitization and mahalla engagement second (3–5 years), regulatory and institutional consolidation third (5–10 years).

6. Conclusion and Policy Implications. The Dunhuang experience shows that heritage destinations can escape the "three-month curse" and move from wild popularity to rational long-term prosperity—but only through deliberate, lifecycle-aware governance. Three implications follow. First, flow governance must begin before the boom: carrying capacity and monitoring cannot be built after a crisis, because heritage damage is irreversible. Second, institutions matter more than technology: a unified agency, special regulations, and benefit-sharing mechanisms are the conditions that make platforms and sensors effective. Third, innovation must continue after stabilization: digitization and community-based products sustain attractiveness without increasing physical pressure. The pathway is tailored to Samarkand's dispersed heritage geography and mahalla structure and aligns with UNESCO and State Committee for Tourism recommendations. Subsequent work will develop quantitative measures of flow efficiency and longitudinal evaluation of policy implementation in Samarkand and other Central Asian heritage cities.

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