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Diagnosing tourism development priorities in Samota, Indonesia: a four-pillars (4A) PCA approach

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Abstract: Samota, an emerging destination on Sumbawa Island, Indonesia, has been designated a strategic tourism area to stimulate local economic growth; yet development remains fragmented across key destination components. This study assesses Samota's development prospects using the four pillars of tourism development — attractions, accessibility, amenities, and supporting services — based on a survey of 179 tourists, tourism businesses, and destination managers. Principal component analysis (PCA) is employed to identify the latent structure of the pillars and their relative strengths. The results place Samota in a conditional prospect category: each pillar shows development potential, but weak integration limits competitive advantage. Component scores indicate that strengthening amenities is the most urgent priority, followed by improving accessibility quality, upgrading supporting services, and consolidating and packaging existing attractions into coherent products. The findings support a staged, integration-oriented roadmap for emerging destinations seeking competitiveness and sustainable local economic impact.

Keywords: tourism development; destination competitiveness; four pillars (4A); principal component analysis (PCA); emerging destinations; Sumbawa Island (Indonesia)

Diagnóstico de las prioridades de desarrollo turístico en Samota (Indonesia): un enfoque basado en el análisis de componentes principales de cuatro pilares (4A)

Resumen: Samota, un destino emergente en la isla de Sumbawa (Indonesia), ha sido designado área turística estratégica para impulsar el crecimiento económico local; sin embargo, el desarrollo sigue fragmentado entre los componentes fundamentales del destino. Este estudio evalúa las perspectivas de desarrollo de Samota mediante los cuatro pilares del desarrollo turístico —atracciones, accesibilidad, amenidades y servicios de apoyo— a partir de una encuesta aplicada a 179 turistas, empresas turísticas y gestores del destino. Se emplea un análisis de componentes principales (ACP) para identificar la estructura latente de los pilares y su fortaleza relativa. Los resultados sitúan a Samota en una categoría de perspectiva condicional: todos los pilares presentan potencial de desarrollo, pero la débil integración entre ellos limita la ventaja competitiva. Las puntuaciones por componente indican que la prioridad más urgente es fortalecer las amenidades, seguida de mejorar la calidad de la accesibilidad, reforzar los servicios de apoyo y consolidar y articular las atracciones existentes en productos coherentes. Los hallazgos fundamentan una hoja de ruta por etapas, orientada a la integración, para destinos emergentes que buscan competitividad e impacto económico local sostenible.

Palabras Clave: desarrollo turístico; competitividad del destino; cuatro pilares (4A); análisis de componentes principales (ACP); destinos emergentes; isla de Sumbawa (Indonesia)

1. INTRODUCTION

Tourism is widely recognized as a strategic sector for inclusive economic development, particularly in developing countries, because of its capacity to generate employment, reduce poverty, stimulate local entrepreneurship, and increase community income (Bhatt et al., 2024; Simorangkir et al., 2024; Sun et al., 2025; Uula et al., 2023). However, the economic contribution of tourism does not emerge automatically from the mere existence of tourism resources. A destination can function effectively only when its core components operate in a balanced, integrated manner. In destination development studies, this condition is commonly reflected in four fundamental pillars: attractions, accessibility, amenities, and supporting services. Weaknesses or imbalances among these pillars often prevent potentially attractive destinations from becoming competitive, market-ready, and capable of producing sustained local economic benefits. This challenge is particularly relevant because destination performance is multidimensional and depends on the interaction of multiple stakeholders, including government, business actors, local communities, and tourists (Morrison et al., 2025).

This issue is highly relevant in Indonesia, where many emerging destinations possess substantial natural and cultural assets but continue to face structural constraints in their development. One such case is the Samota (Saleh–Moyo–Tambora) area in Sumbawa Island. Beyond its designation as a strategic tourism area by the local government, Samota is also recognized as a UNESCO Biosphere Reserve under the Man and the Biosphere (MAB) Program (nominated in 2019), underscoring the need to align tourism development with conservation and sustainable livelihoods (UNESCO, n.d.). Nevertheless, field conditions indicate that tourism development has not yet generated an optimal economic impact. This suggests that the challenge does not lie solely in the potential of tourism, but in the extent to which the destination's core pillars have

been developed, coordinated, and integrated. Accordingly, a systematic assessment is needed to determine Samota's development prospects and identify priority intervention pillars.

Beyond the technical provision of destination components, tourism development in emerging destinations also needs to be understood as a governance, sustainability, and resource-allocation challenge. The transformation of attractions, accessibility, amenities, and supporting services into a coherent destination product depends not only on physical availability but also on how development priorities are coordinated, how institutional responsibilities are distributed, and how tourism benefits and pressures are managed across actors and local resources. In this sense, the four pillars should not be read merely as operational inputs, but also as institutional and developmental arenas in which competitiveness, sustainability, and local welfare are negotiated. This perspective is particularly relevant in Samota, where tourism development is expected to stimulate economic growth while remaining compatible with conservation commitments and the long-term viability of local livelihoods.

Conceptually, the four pillars can be understood as a destination-readiness system: a set of enabling conditions through which tourism resources are transformed into marketable, reliable, and sustainable destination products. This systems view aligns with the idea that destinations are consumed as an integrated experience and therefore require coordination across multiple elements and stakeholders rather than isolated improvements in a single component (Buhalis, 2000). It is also consistent with destination management perspectives that emphasize the coordinated management of core destination elements to enhance competitiveness and sustainability (World Bank Group, 2022; World Tourism Organization (UNWTO), 2019). Readiness is thus not defined by the maximum strength of a single pillar but by minimum conditions across pillars and the quality of integration among them; imbalances can become binding constraints that limit the conversion of tourism potential into longer stays, higher spending, and repeat visitation (World Bank Group, 2022). Therefore, assessing development prospects requires an approach that captures: 1) the relative strength of each pillar and 2) the interdependence among destination components, in line with competitiveness perspectives that treat destination performance as multidimensional and contingent on both core resources and supporting factors (Crouch & Ritchie, 1999).

Recent tourism studies increasingly emphasize that destination development should be assessed through multidimensional, integrated frameworks rather than isolated indicators. Previous research has shown that the sustainability and competitiveness of destinations depend heavily on the balance among core tourism pillars (Hubner et al., 2022). Other studies have proposed destination-readiness models that combine quantitative and qualitative indicators to capture the complexity of tourism development more comprehensively (Akbar et al., 2024). Similarly, recent work highlights that tourism readiness is shaped by the dynamic interaction among destination components rather than by the strength of a single dimension alone. Studies on tourism competitiveness and destination planning also confirm that a pillar-based framework can provide a structured basis for evaluating readiness and formulating development priorities (Díaz-Padilla et al., 2023; González-Rodríguez et al., 2023). Taken together, this literature suggests that destinations should be evaluated as integrated systems, in which the relative strength of each pillar and their interdependence are both analytically important.

Despite these advances, important gaps remain in the literature. First, many empirical studies on destination development still focus on one dominant dimension, particularly accessibility, because of its

direct influence on tourist mobility, travel efficiency, and destination flows (Yen et al., 2021). Although such studies provide valuable insights, they often do not assess accessibility alongside attractions, amenities, and supporting services within a single operational framework for development prioritization. For example, efficiency-based accessibility studies have deepened understanding of mobility-related performance, yet they provide limited guidance for holistic destination planning (Masiero & Hrankai, 2022). Likewise, research linking accessibility with tourist satisfaction in specific contexts, such as heritage tourism, tends to privilege behavioral outcomes over comprehensive destination diagnosis (Dumitrașcu et al., 2023).

Second, although recent tourism research increasingly promotes inclusivity and multi-stakeholder collaboration, this tendency often remains focused on social or economic inclusion rather than on developing a systematic, multidimensional framework capable of diagnosing destination readiness across its principal components (Korbiel et al., 2025; Panagiotopoulou & Skoultsos, 2025). Other studies have contributed to indicator development and to administrative-scale mapping of tourism potential, thereby enriching assessment methodologies. Still, these approaches are often oriented toward standardization and territorial classification rather than toward practical diagnosis for specific strategic destinations (Rizaldi et al., 2024). As a result, there remains limited empirical evidence on how an integrated four-pillar framework can be applied to evaluate the development prospects of a specific strategic tourism area and to generate clear policy priorities for staged intervention (Papečkys & Jasinskas, 2024).

This study addresses these gaps by analyzing the tourism development prospects of the Samota strategic area through the four pillars of attractions, accessibility, amenities, and supporting services. Using data from key destination stakeholders and applying Principal Component Analysis (PCA), this study seeks to identify the latent structure and relative strength of these pillars as a basis for prioritizing tourism development. The study makes three contributions. First, it provides an integrated empirical assessment of destination prospects in a strategic tourism area in eastern Indonesia, a context that remains underrepresented in the international tourism literature. Second, it moves beyond partial or single-dimensional evaluations by offering a multidimensional diagnostic framework that captures the comparative positions of the four core pillars within a single analytical model. Third, it clarifies the methodological value of PCA for destination-readiness research. Rather than testing causal relationships among predetermined variables, PCA is used here as a diagnostic tool to uncover the latent structure of interrelated destination indicators and to identify which dimensions are more urgent priorities for intervention. This makes PCA especially suitable for emerging destinations, where the analytical task is often to simplify complex multivariate conditions into an interpretable basis for staged policy action.

Accordingly, this study aims to assess the tourism development prospects of Samota and to determine the relative priorities for destination improvement based on the four-pillar framework. In practice, the findings are expected to support more targeted and staged tourism policies in Samota, thereby enabling tourism development to better contribute to regional economic growth and community welfare. More broadly, this study argues that evaluating destination prospects through an integrated four-pillar perspective is essential to transforming high-potential yet underperforming destinations into competitive, sustainable tourism areas.

2. LITERATURE REVIEW

Building on the destination-readiness perspective introduced earlier, this study conceptualizes tourism development as a systems process in which tourism resources are transformed into marketable, reliable, and sustainable destination products through the coordinated functioning of core destination components and stakeholders (Buhalis, 2000; Crouch & Ritchie, 1999; World Tourism Organization (UNWTO), 2019). Within this view, development outcomes are not determined by the strongest individual component, but by the minimum enabling conditions across key components and the quality of their integration. A practical and widely used lens for describing these enabling conditions is the four pillars (often referred to as the "4A" framework): attractions, accessibility, amenities, and ancillary/supporting services. These pillars, together, shape destination performance by influencing experience quality, satisfaction, length of stay, spending, and the ability to generate sustained local benefits (C.-Y. Liu et al., 2023; Qin et al., 2021).

The four-pillar approach is especially relevant for diagnosing emerging destinations because it offers a parsimonious structure for identifying strengths, weaknesses, and bottlenecks. Conceptually, attractions generate motivation and differentiation; accessibility reduces mobility frictions and expands feasible visitation; amenities provide hosting capacity and comfort; and supporting services strengthen reliability through governance, safety, information, marketing, and coordination (World Bank Group, 2022; World Tourism Organization (UNWTO), 2019). Importantly, the pillars are complementary: improvements in one pillar may yield only limited performance gains if the other pillars remain binding constraints. Hence, readiness should be assessed through an integrated perspective that treats the destination as an interdependent system rather than as a checklist of independent elements.

From a more critical perspective, however, the four pillars are also embedded in governance arrangements and in the political economy of destination development. Infrastructure provision, service quality, attraction packaging, and destination promotion are not neutral technical processes; they reflect policy priorities, institutional capacity, stakeholder coordination, and the distribution of resources across sectors and groups. Consequently, destination readiness should also be interpreted as whether the governance system is capable of coordinating development in a way that is both competitive and sustainable. Pillar imbalances matter not only because they reduce visitor satisfaction, but also because they can reproduce uneven development outcomes, weaken local participation, and limit the long-term capacity of tourism to generate broadly shared benefits (World Bank Group, 2022; World Tourism Organization (UNWTO), 2019; Karim et al., 2021; Ikasari, 2021; Hailuddin et al., 2024; Panagiotopoulou & Skoultsos, 2025).

The attraction pillar refers to the natural, cultural, and experiential resources that motivate travel and differentiate a destination. Attractions may be tangible (e.g., landscapes, beaches, heritage sites) or intangible (e.g., cultural practices, identity, and experiential meaning) (Evloeva, 2024; Sirkis et al., 2022). In the destination competitiveness literature, the effectiveness of attractions depends not only on their existence but also on perceived quality, uniqueness, authenticity, and the value of the experiences offered to visitors Cheng et al., 2021; Nazaruddin et al., 2023). Where attraction quality and experiential value are strong, destinations tend to report higher satisfaction and a greater likelihood of repeat visitation, particularly when attractions are supported by reliable access and adequate visitor facilities (Ismadi & Suwitho, 2024). This implies that attraction development should be evaluated as part of an integrated destination product, rather than as a standalone inventory of assets.

Accessibility refers to the extent to which visitors can reach and move within a destination with acceptable time, cost, comfort, and perceived convenience. It includes transport infrastructure, connectivity, service availability, and the ease of internal circulation and wayfinding (Qin et al., 2021; Xu & Wang, 2022). A consistent finding across tourism planning studies is that improved accessibility can increase tourism flows and expand market reach by reducing travel frictions, particularly for emerging and peripheral destinations (Ngarbingan et al., 2023; Xu & Wang, 2022). However, accessibility improvements do not automatically translate into competitiveness if the destination lacks hosting capacity (amenities) or if supporting services and coordination mechanisms remain weak. Consequently, accessibility is best understood as a necessary enabling condition whose development returns depend on complementarities with other pillars.

Amenities comprise facilities and services that shape visitor comfort and enable consumption during visits, including accommodation, food and beverage services, sanitation, basic utilities, and other visitor infrastructure. Amenities are frequently linked to satisfaction, destination image, and length of stay because they determine whether visitors can comfortably remain in the destination and engage in broader spending activities (Harisdani & Simalango, 2023). Research suggests that adequate, high-quality amenities can improve retention and spending, increasing the potential for local economic spillovers (Nazaruddin et al., 2023). In community-based tourism contexts, amenities also matter for sustainability because facility development and service provision can be oriented toward local entrepreneurship, local needs, and ecological responsibility (Hailuddin et al., 2024). These insights position amenities as a core capacity pillar that shapes the destination's ability to convert attraction-led interest into measurable economic outcomes.

Supporting services (ancillary services) are cross-cutting systems that stabilize and enhance the destination product, including information services, visitor assistance, marketing and promotion, safety and security arrangements, governance, and coordination among stakeholders (Karim et al., 2021). Studies emphasize that effective destination governance and management can accelerate development by aligning stakeholder actions, reducing service gaps, and ensuring that attractions, accessibility, and amenities function as an integrated product rather than as disconnected components (Ikasari, 2021). Community involvement is also frequently highlighted as a determinant of sustainability and shared benefits, particularly for destinations seeking inclusive development pathways (Hailuddin et al., 2024). From a readiness perspective, supporting services provide the institutional and operational "glue" that shapes consistency of delivery, visitor confidence, and the resilience of tourism development over time.

Overall, the literature suggests that destination prospects depend on two intertwined conditions: the relative strength of each pillar and the coherence generated by their complementarities. This implies that diagnosing destination readiness requires a framework capable of identifying which pillars function as binding constraints and how pillar conditions combine to shape overall development prospects. Guided by this rationale, the present study uses the four-pillar perspective to structure the empirical assessment of Samota. To support a transparent linkage between theory and measurement, the pillars are translated into destination-relevant indicators reflecting attraction appeal, access conditions, hosting capacity, and supporting services, as summarised in Table 2.

3. METHODS

3.1. Data

This study was conducted in the Samota tourism area, Sumbawa Regency, Indonesia. Primary data were collected using a structured questionnaire designed to capture stakeholders' perceptions of destination development conditions in line with the study objective. The questionnaire items were developed from the four-pillar (4A) framework of tourism development: attractions, accessibility, amenities, and supporting (ancillary) services, and were adapted to the Samota destination context based on prior theory and empirical studies.

The study population comprised three stakeholder groups: 1) visitors/tourists present in the Samota area during the survey period (unknown population size); 2) tourism business actors operating in the Samota area (N = 29); and 3) destination managers responsible for tourism management in the Samota area (N = 14). For the visitor/tourist group, the study employed non-probability on-site intercept (convenience) sampling, recruiting tourists encountered directly at the destination over a 2-week data-collection period. During this period, 136 tourists agreed to participate and completed the questionnaire.

For business actors and destination managers, the study used a census (total enumeration) approach, given the small, fully reachable populations. Census or saturated sampling refers to a data collection strategy that includes all members of a defined population as respondents (Stratton, 2021). This approach is appropriate when the population is limited and when each unit plays a strategic role in the phenomenon under study (Mosha & Ngulube, 2023). In this research, all identified business actors (n = 29) and all destination managers (n = 14) participated in the survey. In total, 179 respondents provided data for the assessment of Samota's tourism development prospects (Table 1).

Because this study aims to assess Samota's destination-level development readiness rather than to compare stakeholder groups as separate analytical populations, the responses of tourists, tourism business actors, and destination managers were analyzed jointly. This pooled design is consistent with the study's systems perspective, which treats destination performance as an integrated outcome of interdependent pillars and actors. Accordingly, the analytical objective is to identify the latent structure of the four pillars at the destination level as a whole, rather than to estimate stakeholder-specific component structures.

This study involved a minimal-risk questionnaire survey. Administrative permission to conduct the research was obtained through official research permit letters issued by the Sumbawa Regency government (Supplementary File 3). Written informed consent was obtained from all participants; the questionnaire cover page provided information on the study purpose, procedures, confidentiality, and participants' rights, and stated that completion of the questionnaire indicated consent (Supplementary File 2). Participation was voluntary, no personally identifying information was collected, and responses were recorded anonymously to protect participants' privacy.

Table 1. Respondents Profile (n=179)

Characteristic	Category	Quantity	
		n	%
Role	Tourists	136	76.0
	Tourism business actors	29	16.2
	Destination managers	14	7.8
Gender	Male	60	33.5
	Female	119	66.5
Education	Primary–secondary education	91	50.8
	Diploma/Bachelor's/Master' s degree	88	49.2
Age group	18-25 years old	116	64.8
	26-33 years old	26	14.5
	≥34 years and above	37	20.7

Source: Data processing results

3.2. Measurement of research variables

This study operationalizes tourism development prospects through the four pillars (4A) framework: attractions, accessibility, amenities, and supporting (ancillary) services. Each pillar is measured using multiple indicators adapted to the Samota destination context, based on relevant theory and prior empirical studies. The full list of indicators and their codes is provided in Table 2.

All indicators were measured using a 7-point Likert-type agreement scale, where respondents rated their level of agreement with each statement (1 = strongly disagree to 7 = strongly agree). Higher scores indicate more favorable perceived destination conditions (e.g., higher attraction appeal, better access conditions, more adequate facilities, or stronger supporting services). For accessibility items referring to distance, the questionnaire statements were phrased in terms of perceived proximity (e.g., "relatively close"), so higher agreement reflects better perceived accessibility. Attractions were measured using seven indicators capturing the perceived appeal and experiential value of Samota's natural, marine, and cultural resources (X1.1–X1.7). Accessibility was measured using nine indicators reflecting perceived transport availability, road quality, affordability, safety and comfort, and proximity/ease of reaching key services (X2.1–X2.9). Amenities were measured using thirteen indicators reflecting the perceived adequacy of core visitor facilities and utilities (e.g., communication network, sanitation, electricity, accommodation, food and beverage outlets, parking, and other basic visitor infrastructure) (X3.1–X3.13). Supporting (ancillary) services were measured using five indicators representing tourism facilitation and safety-related services, including travel services, rentals, guiding services, and general safety provision (X4.1–X4.5).

Table 2. Indicators used to operationalize the four pillars (4A)

Pillars	Component	
Attraction	X1.1	Uniqueness of tourist attractions
	X1.2	Beach cleanliness
	X1.3	Natural scenery
	X1.4	Existence of snorkeling attractions
	X1.5	Underwater scenery
	X1.6	The existence of a mangrove garden
	X1.7	Arts, sports, and cultural performances
Accessibility	X2.1	Availability of transportation modes
	X2.2	Road conditions/quality
	X2.3	Distance to the destination from the parking lot
	X2.4	Distance from destination to accommodation (hotel/inn)
	X2.5	Distance from the destination to the location of consumption facilities (restaurants/restaurants/cafes)
	X2.6	Distance from destination to place of worship
	X2.7	Affordability of transportation prices
	X2.8	Transportation safety
	X2.9	Transportation convenience
Amenities	X3.1	Availability of communication networks
	X3.2	Availability of security tools
	X3.3	Availability of hygiene facilities
	X3.4	Availability of information centers
	X3.5	Availability of the power grid
	X3.6	Availability of consumption facilities (dining area)
	X3.7	Availability of accommodation facilities (hotel/inn)
	X3.8	Availability of toilet facilities
	X3.9	Availability of parking areas
	X3.10	Availability of the gazebo
	X3.11	Availability of places of worship
	X3.12	Availability of the souvenir center
	X3.13	Availability of entertainment centers
Ancillary Services	X4.1	Availability of travel services (travel agent)
	X4.2	Boat/canoe rental services
	X4.3	Vehicle rental services
	X4.4	Tour guide services
	X4.5	Safety services

Source: Authors' survey instrument (Supplementary File 2), adapted from the four-pillar (4A) framework and tailored to the Samota context

3.3. Data analysis

Data were analyzed using Principal Component Analysis (PCA) to summarize patterns of association among the observed indicators and to derive concise measures of pillar strength for destination-readiness assessment (Jolliffe & Cadima, 2016). PCA was selected because it reduces multivariate information into a smaller set of orthogonal components while retaining the maximum possible variance from the original items, thereby supporting transparent prioritization and interpretation (Mazziotta & Pareto, 2024; Scalabrini & Remoaldo, 2024). All analyses were performed in IBM SPSS.

PCA was considered particularly appropriate for this study because the objective was diagnostic rather than causal. The study does not seek to estimate directional effects among destination variables, but to identify how multiple interrelated indicators cluster into interpretable dimensions of destination readiness. In this respect, PCA offers an advantage over approaches aimed primarily at hypothesis testing or causal modeling, because it allows the reduction of complex multivariate information into a smaller number of empirically grounded components that can be compared across pillars and translated into development priorities. Moreover, PCA was conducted on the pooled responses from all stakeholder groups to generate a destination-wide diagnostic profile of Samota rather than separate latent structures for each respondent category.

Data screening and suitability for PCA

Before PCA, the dataset was screened for missing values and out-of-range responses. Cases with incomplete responses on the relevant items were handled using listwise deletion (SPSS default) for PCA runs. The suitability of the data for PCA was assessed through: 1) inspection of the inter-item correlation matrix to confirm the presence of meaningful correlations; 2) the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy (threshold ≥ 0.60); and 3) Bartlett's test of sphericity ($p < 0.05$), indicating that the correlation matrix was not an identity matrix.

Component extraction and retention criteria

PCA was conducted separately for each pillar (Attractions, Accessibility, Amenities, Supporting/Ancillary Services) to obtain a pillar-specific latent structure for comparative assessment. Components were retained based on a combination of the scree plot, interpretability, and a minimum target of cumulative explained variance $\geq 70\%$ within each pillar (Ahmad et al., 2022). Communalities were examined to confirm adequate item representation (target ≥ 0.50).

Rotation, loading threshold, and cross-loading rules

To improve interpretability, retained components were rotated using Varimax with Kaiser normalization (orthogonal rotation), yielding non-correlated component scores suitable for pillar comparison. Items were interpreted as salient when their absolute loading was ≥ 0.50 on a component. Cross-loadings were inspected to ensure interpretability; no items required removal under the specified thresholds.

Factor scores and pillar "relative strength"

To determine the prospects for Samota's development, each factor identified in each pillar was calculated using the SPSS regression scoring method and standardized (mean = 0, SD = 1). To summarize perceptions in an easily understandable manner, standardized scores were classified into three categories using ±1 SD: favorable/prospective (> +1), neutral (−1 to +1), and unfavorable/no prospect (< −1).

4. RESULTS

4.1. Overview of PCA solutions across pillars

During data processing, the PCA suitability diagnostics (KMO ≥ 0.60; Bartlett's test, $p < 0.05$; communality ≥ 0.50) indicated adequate factorability for all pillars (Appendix A, Supplementary File 1). Therefore, no indicators were removed. Furthermore, based on the data processing results from the four pillars, the PCA retained three components for Attractions, Accessibility, and Amenities, and one component for Supporting (Ancillary) Services. The retained solution exceeded the minimum cumulative explained variance threshold of 70%, with the cumulative explained variance ranging from 70.346% to 75.336% (Table 3).

Table 3. PCA summary across the four pillars (retained structure and key indicators)

Pillar	Retained components (k)	Main component variance (%)	Cumulative variance explained (%)	Component labels and defining indicators (loading ≥ 0.50)
Attractions	3	52.819	75.287	**F1 Arts, culture & ecotourism:** cultural performances (0.825), mangrove (0.769), underwater view (0.741). **F2 Snorkeling & scenery:** snorkeling (0.873), natural scenery (0.728). **F3 Beach cleanliness:** beach cleanliness (0.895)
Accessibility	3	54.641	74.495	**F1 Travel comfort & proximity to key amenities:** transport convenience (0.786), proximity to worship (0.776), proximity to accommodation (0.756), transport safety (0.710). **F2 Road quality & access connectivity:** road condition (0.756), availability of transport modes (0.729), proximity to consumption facilities (0.667). **F3 Parking distance & transport prices:** distance from parking (0.845), transport price affordability (0.741)
Amenities	3	52.709	70.346	**F1 Basic facilities for tourist comfort:** worship facilities (0.795), hygiene facilities (0.724), toilets (0.712), gazebos/halls (0.703), parking area (0.698). **F2 Accommodation–consumption–utilities–information:** accommodation (0.758), consumption facilities (0.747), power grid (0.590), information board/center (0.584), communication network (0.553); **F3 Souvenir/security/entertainment:** souvenir center (0.863), security means (0.770), entertainment centers (0.768)
Ancillary services	1	75.336	75.336	**F1 Tourism operational support services:** tour guides (0.907), vehicle rental (0.889), safety services (0.874), travel agent services (0.851), boat/canoe rental (0.816)

Source: Data processing results, Appendix B (Supplementary File 1)

4.2. Specific interpretations between pillars

Based on the retained PCA structure (Table 3), the results suggest that Samota's development challenges are not merely sectoral, but configurational. In other words, the issue is not whether attractions, accessibility, amenities, or supporting services exist in isolation, but how these dimensions combine to produce a destination experience that is reliable, distinctive, and economically productive. The attraction pillar is organized around marine–ecotourism experiences, scenery-based appeal, and beach-quality signals, indicating that Samota's core appeal is already evident but remains fragmented in product form. Accessibility is structured around travel usability, proximity to key facilities, and mobility frictions, suggesting that ease of movement depends not only on road access but also on the quality and predictability of travel. Amenities are structured around basic comfort facilities, accommodation, consumption–utility support, and complementary visitor facilities, indicating that hosting capacity remains a central condition for converting attraction potential into longer stays and higher spending. Finally, supporting services emerge as a single operational dimension centered on guiding, rentals, facilitation, and safety, suggesting that service reliability is perceived as a unified layer of destination functionality. Thus, the extracted components should be interpreted not only as statistical groupings but as practical dimensions of destination readiness that reveal where Samota's development remains constrained.

4.3. Summary of Strengths Between Factors: determining Samota's development prospects

Samota's development prospects were determined by summarizing respondents' perceived strengths for each component identified across the four pillars. Standard factor scores were grouped into categories: favorable/prospective, neutral, and unfavorable/no prospect. Based on the data analysis, across all pillars, neutral responses dominate (60–76%), suggesting that each pillar shows development potential but has not been perceived as a strong competitive advantage; therefore, the overall prospect can be characterized as conditional and requires staged integration (Table 4).

Table 4. Factor scores on each pillar

Pillar	Component	Favorable (%)	Neutral (%)	Unfavorable (%)
Attractions	F1 Arts, culture & ecotourism	19	63	18
	F2 Snorkeling	11	76	13
	F3 Beach cleanliness	15	66	19
Accessibility	F1 Travel comfort & proximity	13	70	16
	F2 Road quality & connectivity	16	69	15
	F3 Parking distance & prices	13	73	13
Amenities	F1 Basic comfort facilities	12	72	16
	F2 Accommodation–consumption–utilities	15	68	17
	F3 Souvenir/security/entertainment	17	64	19
Ancillary services	F1 Tourism operational support	22	60	17

Source: Data processing results, Appendix C (Supplementary File 1)

5. DISCUSSION

Overall, the PCA results indicate a conditional destination-readiness profile for Samota. Across pillars, the neutral category dominates the factor-score distributions (Table 4), suggesting that key destination components are present but have not yet consolidated into a strong competitive advantage. This pattern supports the destination-systems argument that development constraints in emerging destinations often lie in the quality and integration of pillars rather than in the mere availability of tourism resources (Buhalis, 2000; Crouch & Ritchie, 1999; World Bank Group, 2022; World Tourism Organization (UNWTO), 2019). In practical terms, Samota's prospects are shaped by how well the attraction assets, access quality, hosting capacity, and supporting services work together as a coherent destination product.

5.1. Attraction: resources are promising, but product differentiation remains limited

The attraction pillar does not merely indicate the presence of tourism resources; it reveals the extent to which Samota's natural and cultural assets are already functioning as a differentiated destination product. The component structure shows that Samota's appeal is currently organized around marine ecotourism experiences, scenery-based recreation, and beach-quality signals, which together form the symbolic core of the destination offer. This configuration is consistent with the tourism literature, which emphasizes that integrating natural landscapes and cultural elements can strengthen destination appeal and support sustainability (Putra & Ucu Rakhman, 2024). Culture-based attraction studies also highlight that cultural elements contribute to differentiation that motivates visits and strengthens competitiveness (Sirkis et al., 2022). Empirical evidence further suggests that well-managed natural attractions can increase satisfaction and return intention—an important mechanism for long-term destination development (Y. Yuliana et al., 2025).

Substantively, this means that Samota's challenge is not to create attractiveness from scratch, but to strengthen curation, coherence, and experiential packaging so that existing assets are perceived as distinctive and memorable rather than merely available. However, the dominance of neutral perceptions across attraction components (Table 4) implies that these assets are not yet being experienced as a clearly differentiated, consistently high-quality product. This resonates with findings that attractions influence aggregate visitation partly through repeat visitation dynamics (Bagaihing et al., 2022) and that combining cultural and natural elements can enrich experiences and strengthen sustainability perceptions when engagement with local resources is deep and well-designed (Soeswoyo et al., 2022). Recent work on destination attractiveness and development opportunities similarly underscores that unique, authentic, and *integrated* attractions are central to motivating visits and shaping competitive advantage (Gatto et al., 2025; Pasuhuk & Mandagi, 2025). For Samota, this suggests that attraction development should focus less on adding new assets and more on experience design, quality control, and packaging across marine–mangrove culture products.

5.2. Accessibility: functional, but not yet an enabling advantage

The accessibility structure indicates that access in Samota should be interpreted less as a matter of physical reach alone and more as a matter of travel usability. The extracted dimensions suggest that what matters most for destination readiness is whether visitors can move comfortably, safely, and predictably between the destination and key supporting facilities. The literature consistently shows that accessibility-related dimensions contribute significantly to destination development prospects. Studies on accessible tourism show that physical infrastructure and access to facilities can support sustainable local community development (Ahmed & Riaz, 2024). Spatial research on urban transport networks also demonstrates that connectivity between attractions and public transport systems improves mobility convenience and can contribute to tourism growth and local economic development (Iamtrakul et al., 2025). Empirically, this reinforces the relevance of accessibility as a strategic strength in certain contexts—for example, findings that accessibility can position districts as pilots for tourism-city development (Akbar et al., 2024).

This implies that accessibility in Samota is already functional at a basic level. Still, it has not yet become a strong enabling advantage capable of reducing friction enough to support a smoother, more competitive visitor experience. At the same time, the neutral-dominant pattern in Table 4 indicates that accessibility in Samota is perceived as "adequate" rather than distinctly enabling. This aligns with broader perspectives on inclusive tourism, which argue that ease of access, connectivity, and the adaptation of facilities have become fundamental elements of destination strategy (Henríquez et al., 2022). It also parallels evidence that perceived accessibility correlates with satisfaction and subsequently with loyalty and revisit intention (Assaf et al., 2020). For Samota, the implication is that accessibility improvements should prioritize quality frictions (comfort, safety, internal circulation/wayfinding, and price transparency/affordability). Still, their payoff will be stronger once the hosting capacity (amenities) is improved.

5.3. Amenities: the binding capacity constraint and the strongest case for priority

The amenity structure suggests that Samota's principal challenge is not the total absence of facilities, but the uneven quality of its hosting capacity. In substantive terms, this means that visitor comfort, service continuity, and the ability to support longer stays remain weaker than the destination's attraction base. In

Table 4, amenities show consistently high neutral shares and notable "unfavorable" shares, indicating that hosting capacity exists but is perceived as insufficient in adequacy, quality, or consistency.

This pattern aligns with research showing that amenities are not only basic supports but also shape the perceived quality of the overall travel experience and act as part of the destination's value proposition (H. Liu et al., 2025). This is why amenities should be interpreted not simply as supportive infrastructure, but as the practical threshold through which attraction-led interest is either converted into economic value or dissipated before it can generate stronger local spillovers. Amenities influence revisit intention through satisfaction and comfort—high-quality amenities can enhance positive experiences and loyalty (Zebua et al., 2025). Other studies show that facilities can affect revisit intention both directly and indirectly through satisfaction as a mediating mechanism (Hadiwijaya et al., 2025). This supports the interpretation that amenities function as a binding constraint: without adequate comfort facilities and hosting infrastructure, Samota may struggle to convert attraction-led interest into longer stays and higher spending (World Bank Group, 2022).

Amenities also strongly influence risk perception and safety. Adequate security and communication reduce perceived risk—an important barrier for sensitive groups such as older tourists or those with special needs (Sutedja & Pramono, 2024). In tourism village and local economy contexts, facility provision is also linked to sustainable community development through improved public services and empowerment of local business actors (Halawa & Listyorini, 2025). Broader work on tourism infrastructure likewise highlights that meeting tourists' needs and activities requires sufficient facilities and that infrastructure attention can accelerate economic growth and regional development (Hesna et al., 2023; Platov et al., 2022). Taken together, these findings provide a strong rationale for making amenities the first development priority in Samota.

5.4. Supporting (ancillary) services: present, but reliability and standardization remain key

The single-component structure of supporting services suggests that respondents perceive these services as an integrated operational layer of destination reliability rather than as separate auxiliary functions. In substantive terms, guiding, rentals, travel facilitation, and safety services appear to function together as the practical system that shapes whether tourism activity can be delivered smoothly, credibly, and professionally. The literature positions support services as a key element of destination competitiveness and highlights that governance policies, destination management functions, and systematic performance measurement are largely realized through destination-level supporting services (Reinhold et al., 2023). Further, the certainty and availability of services influence repeat visits, reinforcing the idea that supporting services are determinants rather than "optional complements" of performance (Morrison et al., 2025).

In Samota, tour guiding one of the highest-loading elements should be viewed not only as information provision but as experience facilitation and environmental/cultural education; its quality can influence satisfaction, perceived authenticity, and support for sustainable tourism (Mustafa et al., 2021). Similarly, vehicle rental and travel services, including marine transport, shape perceived ease of travel and revisit intentions, and safe, well-managed marine transportation can be decisive for sustainable marine tourism experiences (Assaf et al., 2020). Safety management also shapes experience quality and competitiveness, making safety-related services a strategic element for sustainability (Zou & Yu, 2022). The large neutral share (Table 4) suggests the need to strengthen reliability and standardization (availability, service quality,

basic SOPs, coordination), rather than merely expanding the list of services. From a governance perspective, this also indicates that service standardization and coordination are as important as service availability, because fragmented support functions can weaken the overall consistency of destination delivery.

From an international comparative perspective, Samota's profile resembles a broader pattern observed in many emerging destinations: attractions are often relatively visible at an early stage, whereas competitiveness is constrained by weaker hosting capacity, uneven service coordination, and incomplete integration across destination components. This tendency is consistent with the broader literature, which shows that destination readiness depends not only on resource endowment but also on the extent to which infrastructure, amenities, governance, and service systems mature together. In this sense, Samota should not be treated as an isolated local case, but rather as a characteristic example of an emerging destination whose central challenge lies in converting dispersed tourism potential into a coherent, market-ready destination system. At the same time, Samota's biosphere-reserve context gives this challenge a distinctive sustainability dimension, since competitiveness must be pursued alongside conservation and local livelihood considerations.

6. CONCLUSION

This study assessed the tourism development prospects of the Samota area (Sumbawa Regency, Indonesia) using the four pillars (4A) framework—attractions, accessibility, amenities, and supporting (ancillary) services—as an integrated destination-readiness lens. Using Principal Component Analysis (PCA), the study reduced the observed indicators within each pillar into a parsimonious latent structure. It used the resulting component profiles to diagnose relative readiness and prioritization needs.

The PCA results indicate that the attraction, accessibility, and amenities pillars each comprise three components, whereas the supporting services pillar comprises a single dominant component. Attractions are structured around: 1) arts/culture and ecotourism experiences; 2) snorkeling and natural scenery; and 3) beach conditions/cleanliness. Accessibility is structured around: 1) travel comfort and perceived proximity to key services; 2) road quality and access connectivity; and 3) parking distance and transport price factors. Amenities are structured around 1) basic comfort facilities (e.g., sanitation/toilets and core visitor infrastructure); 2) accommodation, consumption utilities, and information; and 3) souvenir/security/entertainment facilities. Supporting services are captured by a single component centered on tourism operational services (e.g., guiding, rentals, travel facilitation, and safety services).

Across all pillars, factor-score distributions are dominated by the neutral category, indicating that Samota's overall prospect is conditional: development potential exists across pillars, yet integration and delivery quality have not consolidated into a strong competitive advantage. The diagnosis also suggests that the principal constraint is not the absence of attraction potential but the destination's hosting capacity and reliability. In particular, amenities emerge as the most plausible binding capacity constraint for improving the tourist experience and enabling longer stays and higher spending. At the same time, accessibility quality and supporting services require strengthening to stabilize and scale delivery.

Based on these findings, the study recommends a staged and focused development pathway. Stage 1 should prioritize upgrading amenities, especially basic comfort facilities and key hosting infrastructure, to remove the most immediate capacity bottlenecks. Stage 2 should improve accessibility quality by addressing travel comfort, safety, internal circulation/wayfinding, and cost frictions on critical routes. Stage 3 should

strengthen supporting services by professionalizing guiding, rentals, travel facilitation, and safety provision through standardization and coordination. Stage 4 should consolidate and package existing attractions into coherent products by integrating marine experiences, mangrove/ecotourism, cultural performances, and beach-quality signals into marketable itineraries. Across stages, stronger synergy among government, business actors, and local communities remains essential to ensure coordinated implementation and long-term sustainability.

This study contributes in three main ways. First, it reinforces a destination-readiness perspective that emphasizes complementarities among the four pillars rather than single-dimension development. Second, it clarifies how PCA can serve as a concise diagnostic method for destination-readiness assessment, particularly when the analytical goal is to identify latent dimensions and prioritization needs rather than to model causal relationships. Third, it provides a policy-relevant roadmap for an emerging strategic destination in eastern Indonesia that may be adapted to other destinations facing similar integration challenges.

This study has several limitations. It relies on cross-sectional, perception-based indicators and uses a site-intercept sample for tourists, which may not fully capture temporal variation in destination performance. Future research could therefore incorporate objective performance measures, such as travel times, capacity utilization, tourist spending, and length of stay, as well as longitudinal data to evaluate changes following interventions. In addition, although the present analysis intentionally focuses on destination-level readiness by pooling the main stakeholder groups, future studies could examine stakeholder-specific perceptions more explicitly and test whether tourists, tourism business actors, and destination managers prioritize destination pillars differently. Further research may also investigate more directly how improvements in specific pillars relate to broader economic and sustainability outcomes.

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