

Investment in Trailhead Facilities and Its Influence On Competitive Advantage in Kenya’s Adventure Tourism Sector

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Abstract

Trailhead infrastructure forms an important component of the hiking experience and influences how visitors evaluate a destination. Facilities such as sanitation, signage, information points, and emergency support contribute to visitor comfort, safety, and preparedness. In Kenya's adventure tourism sector, these facilities represent a critical interface between natural attractions and the overall visitor experience. This study investigated the extent to which these investments influenced sustained competitive advantage in Kenya’s adventure tourism sector. Theoretically grounded in the Resource-Based View (RBV) and Expectation Disconfirmation Theory (EDT), the research sought to determine if superior infrastructure could truly differentiate one trail from its competitors, or if such infrastructure served merely as basic requirements for participation. The study employed a convergent mixed-methods design. Quantitative data was collected through a structured questionnaire administered to 400 active hikers within Greater Nairobi and the Central Highlands, while qualitative data was obtained through semi-structured interviews with twelve key stakeholders. Descriptive analysis revealed a mean construct score of 3.10 for trailhead infrastructure investment, reflecting moderate satisfaction. Notably, restroom cleanliness recorded the lowest individual score ($M = 2.70$, $SD = 1.39$). Within the broader structural model, which explained 53.1% of the variance in competitive advantage, investment in trailhead infrastructure was not a statistically significant direct predictor of sustained competitive advantage ($\beta = 0.089$, $p = 0.093$). Qualitative insights suggested that infrastructure functions as “hygiene factors”, essential for basic operations but insufficient on their own to create a unique edge. The study concluded that while basic infrastructure is a prerequisite for service delivery, it is not a direct source of competitive advantage.

Keywords: *Trailhead infrastructure, adventure tourism, hiking, competitive advantage, Kenya, Resource-Based View, Expectation Disconfirmation Theory.*

1. Background to The Study

Tourism contributes significantly to economic activity and employment across many countries (World Travel and Tourism Council [WTTC], 2025). Within this sector, adventure tourism has established itself as an important market segment, with hiking attracting visitors seeking engagement with natural environments and outdoor recreation (Zhou et al., 2023). The quality of the hiking experience influences visitor satisfaction, destination performance, and visitor loyalty.

The delivery of a high-quality hiking experience extends beyond the trail itself to include the supporting infrastructure that facilitates access, safety, comfort, and information provision. Consequently, investment in trail development requires attention not only to natural attractions but also to the facilities that support visitor use before, during, and after the hiking experience. Such facilities play an important role in shaping perceptions of service quality and destination professionalism (Ng, 2024; Orden-Mejia et al., 2025).

Trailhead facilities are foundational resource attributes that shape the visitor experience. They constitute both the initial and final point of contact between a destination and its visitors. Sanitation, accurate and comprehensive directional signage, rest stations, information boards, and emergency response facilities contribute to perceptions of welcome, safety, preparedness, and confidence throughout the hiking experience. Empirical evidence suggests that the availability of properly-kept supporting facilities makes a difference in the visitor experience as it turns a mere hiking expedition into a more comfortable, educational, and enriching experience (Kantini et al., 2024; Tengan et al., 2024).

Kenya features a diverse range of natural landscapes that support hiking activities. However, the provision and quality of trailhead infrastructure vary considerably across the country. According to the World Economic Forum's Travel and Tourism Development Index, Kenya's tourism infrastructure ranks among the lowest in Africa. With a score of 1.25 out of 7, Kenya's performance trails significantly behind regional competitors such as Rwanda and Tanzania (Njuguna, 2024). Essential amenities such as signage, sanitation facilities, and emergency support services are inconsistently provided across some trailheads (Kenya Tourism Board, 2025; Kenya Wildlife Service, 2024). These deficiencies compromise the visitor experience and limit the conversion of natural assets into high-value tourism products.

Trailhead facilities support access, navigation, safety, and visitor comfort within hiking destinations. This study examined whether investment in these facilities contributes to destination competitiveness or primarily serves as a foundational requirement for service delivery. The relationship was evaluated through the combined lens of the Resource-Based View (RBV) and Expectation Disconfirmation Theory (EDT) using a PLS-SEM framework.

2. Statement of The Problem

The problem addressed in this study is that Kenya's adventure tourism sector is characterized by a significant infrastructure deficit at trailheads, reflecting weaknesses in the strategic configuration of tourism resources. Despite the expansion of adventure tourism in the country, questions remain regarding the sector's ability to consistently translate its natural asset base into sustained competitive advantage. While scenic quality and trail diversity offer clear appeal, supporting

infrastructure particularly sanitation, resting areas, and information systems remains inconsistently developed and poorly coordinated.

This problem primarily affects international tourists, families, and novice hikers who place high value on safety, hygiene, and clear information when engaging in outdoor experiences. When such visitors encounter inadequate restrooms, poor signage, or absent emergency guidance, it leads to a negative disconfirmation of expectations, reducing satisfaction and increasing the likelihood of negative word-of-mouth (Pike & Page, 2014).

The issue is widespread across Kenya's trail network. There is a clear contrast between well-serviced urban-adjacent trails and poorly equipped rural or remote trailheads. This unevenness has resulted in a fragmented visitor experience and an informal "two-tier" system of service quality, which undermines the consistency and credibility of the destination offering (Tourism Regulatory Authority [TRA], 2025).

If unresolved, this situation risks limiting the full economic potential of Kenya's natural tourism assets. The sector may continue to underperform in converting natural endowments into structured, high-value tourism products. Over time, this could weaken Kenya's competitive position as neighbouring destinations increasingly attract higher-value adventure tourists through more reliable and better-maintained trail systems (Southern & East African Tourism Update, 2026).

Despite its importance, a key gap remains in understanding the strategic role of trailhead infrastructure. Existing studies tend to acknowledge infrastructure challenges in general terms but do not clearly establish whether trailhead infrastructure functions as true sources of competitive advantage or simply as baseline hygiene factors that prevent dissatisfaction without creating differentiation.

This study addresses this gap by examining the influence of trailhead infrastructure investment on competitive advantage in Kenya's adventure tourism sector. It provides empirical evidence to clarify whether these facilities act as strategic differentiators or foundational requirements, supporting more informed allocation of resources in destination management.

Contribution and Novelty of the Study

The research makes a distinct empirical contribution by isolating trailhead infrastructure as a specific determinant of competitive advantage, a variable often overshadowed by broader scenic attributes in previous studies. While existing literature documents general infrastructure deficits, this study examines the strategic role of trailhead infrastructure within Kenya's adventure tourism sector using PLS-SEM. The findings highlight a "Professionalization Gap" and clarify the relationship between infrastructure investment and destination competitiveness.

The non-significant result ($p = 0.093$) yielded an important strategic insight by indicating that trailhead infrastructure functions as a hygiene factor rather than a primary differentiator. This suggests that while such facilities are essential for operational viability, they are not, on their own, sufficient to create a superior market position. The finding extends the application of the Resource-Based View (RBV) by positioning trailhead facilities as part of the "augmented product" necessary to stabilize the visitor experience before higher-order resources can be leveraged for sustained market leadership. Furthermore, the study proposes a National Trail Quality Framework as a practical roadmap for standardizing sanitation, safety, information provision, and digital infrastructure across Kenya's hiking circuits.

3. Research Objective and Hypothesis

The study sought to evaluate the strategic influence of investment in trailhead infrastructure on sustained competitive advantage of Kenya's adventure tourism sector

The corresponding null hypothesis tested was:

H₀₄: There is no statistically significant relationship between investment in trailhead infrastructure and competitive advantage in Kenya's adventure tourism sector.

To provide a conceptual basis for testing this relationship, the study leveraged the Resource-Based View (RBV) and Expectation Disconfirmation Theory to examine how physical infrastructure serves as a necessary hygiene baseline for visitor satisfaction and destination differentiation.

4. Theoretical Review

This study integrated the Resource-Based View (RBV) and Expectation Disconfirmation Theory (EDT) to establish a causal chain between destination assets and market performance. While RBV identifies trailhead infrastructure as the augmented product, the tangible, organized resources required to unlock the value of natural landscapes, EDT provides the psychological mechanism through which these resources evaluated by visitors, shaping satisfaction and behavioural responses.

In this framework, the physical quality of a resource, such as sanitized restrooms or digital signage, acts as a key performance cue through which hikers evaluate their experience against prior expectations. A resource is therefore not considered "valuable" within the RBV framework simply by existing; it gains strategic significance when it contributes to positive disconfirmation of visitor expectations. Synthesizing these perspectives, trailhead infrastructure can be understood as the link between resource configuration (RBV) and visitor perception (EDT). Within this relationship, the Resource-Based View categorizes infrastructure as part of the augmented product required for organizational capability, while Expectation Disconfirmation Theory explains that their effectiveness depends on whether they meet or exceed visitor expectations.

Resource-Based View

The Resource-Based View (RBV), pioneered by Penrose (1959) and Wernerfelt (1984) and later formalized by Barney and Hesterly (2020), posits that sustainable competitive advantage stems from the possession and strategic organization of resources that are valuable, rare, inimitable, and non-substitutable (VRIN). In adventure tourism, this framework explains why specific destinations maintain a superior market position while operating within identical natural environments. This suggests that competitive outcomes are not accidental, but are the direct result of how facility investment and management are prioritized as strategic resources.

Within the RBV framework, trailhead infrastructure constitutes the augmented product. In this study, they are conceptualized as Enabling Resources, assets that are 'Valuable' and 'Organized' but may lack the 'Rare' or 'Inimitable' qualities required for solo differentiation. Their role is to transform latent natural endowments into commercially viable offerings by providing the structural support needed for safe and consistent delivery. While forest ecosystems and mountain features represent the core product, these natural endowments do not inherently generate a competitive

advantage. Their strategic potential remains untapped in the absence of the organizational capabilities required to ensure professional service standards. Functional amenities like sanitized restrooms and emergency assistance stations fulfil the Valuable and Organized criteria of the VRIN model. They allow diverse market segments to engage with the environment reliably. Standardized signage and designated rest areas further ensure that core assets remain accessible regardless of a visitor's experience level, providing the foundational support needed to accommodate multiple demographics with equal quality.

In line with Kovacic et al. (2024), infrastructure quality can serve as a signalling mechanism, conveying professionalism, preparedness, and reliability to potential visitors. Rather than acting as a primary driver of competitive advantage, it plays a complementary role by enabling the effective use of other core resources. Within this perspective, trailhead infrastructure forms a foundational capability, providing the conditions necessary for consistent and credible tourism experiences. While they may not determine the entire visitor experience, they strengthen the functionality and appeal of other key resources. Viewed this way, infrastructure emerges as a supporting yet essential resource, enabling destinations to leverage their natural endowments into sustained competitive advantage, as highlighted in the RBV literature.

While the RBV positions the trailhead as a strategic supporting resource, its influence on competitiveness can be better understood through the psychological evaluation process described by Expectation Disconfirmation Theory.

Expectation Disconfirmation Theory

Expectation Disconfirmation Theory (EDT), developed by Oliver (1977, 1980), argues that visitor satisfaction is a function of the cognitive comparison between pre-consumption expectations and perceived post-consumption performance. When the actual service experience exceeds initial benchmarks, positive disconfirmation occurs, leading to heightened satisfaction, increased loyalty, and favourable advocacy. Conversely, when performance falls short of these expectations, negative disconfirmation triggers dissatisfaction and detrimental behavioural outcomes, specifically reduced revisit intentions and negative word-of-mouth (Schiebler et al., 2024; Yuwono et al., 2024).

Expectation Disconfirmation Theory (EDT) provides an analytical framework for evaluating trailhead infrastructure, where the efficacy is measured against the high expectations typically associated with Kenya's nature-based tourism sector. These benchmarks dictate the baseline for visitor satisfaction across the entire journey, including the functional amenities supporting the activity. Neglected restrooms, absent emergency protocols, or inadequate signage trigger an immediate negative disconfirmation at the point of initial contact. This unfavourable first impression creates a psychological filter that diminishes the perceived value of even the most superior scenic assets. Conversely, trailhead infrastructure that consistently meets or exceeds visitor requirements for hygiene, information accuracy, and safety infrastructure trigger positive disconfirmation, which enhances overall satisfaction and destination loyalty. Within the EDT framework, investment in trailhead infrastructure serves as a strategic intervention to bridge the gap between visitor expectations and service delivery at the critical moment of entry.

5. Empirical Review

Research has linked the quality and availability of trailhead infrastructure to visitor experience and destination performance. Empirical evidence suggests that the availability of maintained

supporting amenities enhances the psychological and educational value of a hike, transforming a basic transit route into an informative and enriching experience. In a study of visitor satisfaction within Tarangire National Park, Tanzania, Kantini et al. (2024) demonstrated that the quality of infrastructure and services directly dictates overall enjoyment. Signage and wayfinding infrastructure emerged as statistically significant predictors of satisfaction. These findings suggest that such infrastructure is essential to destination appeal, functioning as a primary driver of repeat visitation and long-term loyalty.

Similarly, Tengan et al. (2024) observed that satisfaction within national park tourism is contingent upon functional amenities such as restrooms, information kiosks, and designated rest areas. These provisions facilitate a seamless visitor journey by integrating physical comfort and safety with requisite logistical information. Wu et al. (2025) examined the role of infrastructure as a moderator of visitor experience within urban green spaces. Their findings indicate that well-equipped trailheads exert a positive influence on the overall experience across diverse environmental contexts and settings.

Research in Europe indicates that trailhead infrastructure dictates the visitor experience in wilderness destinations. Hygiene, consistent maintenance, and professional staffing drive higher visitation while distinguishing a destination through organizational excellence. Conversely, neglected trailheads and absent signage fail to attract visitors and suffer from diminished performance ratings. Kovacic et al. (2024) demonstrated that professional management of infrastructure directly shapes how visitors and local stakeholders evaluate a destination's quality and long-term viability.

Literature focusing on Africa and other developing economies reinforces these findings. In Malaysia's oldest national park, Chew, Zainol, and Goh (2024) found that the quality of accommodation, transportation, and foundational amenities significantly improves the tourist experience. Ahmad et al. (2025) established that infrastructure and service quality act as primary determinants of visitor satisfaction and destination image within Malaysian ecotourism. However, where these foundational elements are lacking, the tourism potential is stunted. In South Africa, Rogerson and Baum (2023) identified deficient infrastructure such as inadequate sanitation and absent signage as a fundamental barrier to rural tourism development. These deficiencies discourage families and comfort-seeking demographics, leading to avoidance of the affected trails.

The Kenyan context shows a misalignment between market expansion and physical infrastructure. According to the Kenya Tourism Board (2025), the demand for adventure activities, particularly hiking, has outpaced the development of the infrastructure required to sustain such growth. This creates a widening disparity between product diversification and the supporting infrastructure. This deficit is reflected in recent global benchmarks; Njuguna (2024) notes that Kenya's performance on the World Economic Forum's Travel and Tourism Development Index remains low, signaling structural shortages that stifle sectoral competitiveness.

Although infrastructure improvement is frequently identified as a priority within destination management, there is no data-driven evidence explaining how these assets contribute to competitive advantage. It remains unclear if infrastructure investment is a primary driver of growth or merely a baseline requirement that Kenya is currently failing to meet.

While global and local studies agree that infrastructure matters, they offer divergent perspectives on its actual weight. This lack of consensus creates a need for a methodological approach that

moves beyond simply listing assets. To address this, the study used a pragmatic, mixed-methods design to distinguish between the physical presence of infrastructure and its strategic impact. This allowed for a dual-layered analysis: using quantitative data to test for competitive significance and qualitative audits to understand how these resources function as baseline hygiene factors within the visitor experience.

6. Research Methodology

This study adopted a pragmatic paradigm to examine infrastructural disparities within Kenya's hiking sector through the integration of quantitative and qualitative evidence. The approach facilitated the integration of objective (RBV) and perceptual (EDT) perspectives within a convergent mixed-methods design (Creswell & Creswell, 2022). A concurrent triangulation strategy was employed, whereby quantitative data established the presence of facilities while qualitative audits and interviews provided insights into their functional condition and strategic significance.

The target population (N) for the quantitative phase comprised hikers utilizing 25 active trailheads within the Greater Nairobi and Central Highlands. Based on tourism arrival data and participation rates from the Tourism Research Institute (2025) and KIPPRA (2025), the regional target population was determined to be 205,499 hikers. Using the Yamane (1967) formula with a 5% margin of error, a sample size (n) of 400 was established.

Participants were recruited using convenience sampling, with the research instrument distributed as a digital survey via Google Forms. The survey link was disseminated through official digital communication platforms and moderated member networks of registered adventure companies. This approach was justified by the need to access a verified and active sampling frame of hikers who possess recent, direct experience with the specific trailheads under study. By leveraging the established digital databases and professional communication channels of verified tour operators, the study reached a niche and geographically dispersed population of active hikers. This purposive element within the convenience sampling framework ensured that respondents met the specific criteria of 'active hikers,' thereby increasing the likelihood that respondents possessed recent and relevant experience of the trailheads under investigation. It is noted as a limitation that the results may not fully represent independent hikers outside these professional networks.

The qualitative population consisted of 60 senior managers and technical experts from the Ministry of Tourism, KFS, KWS, and private sector leadership. From this cohort, 12 key stakeholders were selected via purposive sampling, with the final sample size determined by thematic saturation (Braun & Clarke, 2021).

Primary data was collected concurrently in line with NACOSTI ethical protocols using a structured hiker survey (5-point Likert scale) and a semi-structured interview guide for stakeholders. The survey was adapted from established tourism scales and administered digitally via Google Forms to verified hiking groups, while qualitative data was obtained through semi-structured interviews.

A pilot study (n = 30) confirmed internal consistency, with Cronbach's alpha exceeding the 0.70 threshold for both Trailhead Facilities ($\alpha = 0.939$) and Competitive Advantage ($\alpha = 0.906$) (Bujang, 2024). Construct validity was assessed through the measurement model using Average Variance Extracted (AVE) and Composite Reliability (CR).

To support triangulation, physical audits were conducted at 25 trailheads using a standardized observation checklist.

Quantitative data was analysed using SmartPLS 4.0 to perform Partial Least Squares Structural Equation Modelling (PLS-SEM). This involved a two-stage evaluation: assessing the measurement model for reliability and validity, followed by the structural model to determine path coefficients and predictive power (R^2) (Hair et al., 2024). Simultaneously, qualitative data was subjected to thematic analysis to identify key recurring patterns. These findings were integrated using a joint-display matrix, allowing the qualitative narratives to explain the reasons for the statistical relationships identified in the PLS-SEM model.

7. Conceptual Framework

The study conceptualizes trailhead infrastructure investment as the independent variable and competitive advantage as the dependent variable. Trailhead facilities investment was operationalized using four indicators: availability of amenities (presence and adequacy of restrooms, water points, and resting infrastructure), quality of amenities (cleanliness, maintenance, and functionality), quality of rest areas (provision of seating, shaded spaces, and picnic facilities), and presence of information points (clarity, completeness, and accessibility of trail information, safety notices, and emergency contacts). Competitive advantage was measured as a multidimensional construct comprising hiker satisfaction, revisit intention, and perceptions of trail uniqueness and overall destination value (Noor & Sharma, 2024; Yuwono et al., 2024). This approach captures both evaluative and behavioural dimensions of destination performance.

The framework (Figure 1) is anchored in the RBV, positioning facilities as value-adding elements. It is further refined by EDT to explain how these facilities serve as hygiene factors; their presence maintains a 'Neutral' to 'Positive' confirmation, while their absence (as seen in the descriptive mean scores) triggers an immediate collapse in destination credibility.

This integrated framework directly informed the instrument design, guided the specification of the PLS-SEM model, and provided the basis for the integrated interpretation of both quantitative and qualitative findings.

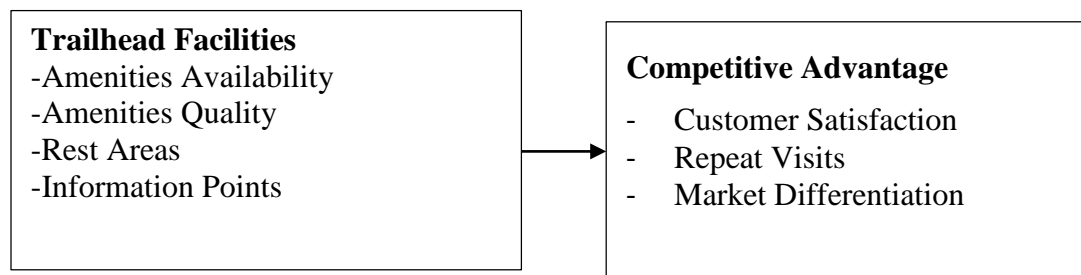


Figure 1: Conceptual Framework

8. Findings

Descriptive Analysis of Trailhead Facilities Investment

Trailhead facilities investment was assessed using six items measured on a five-point Likert scale. Table 1 presents the mean scores and standard deviations for each item, alongside the overall construct mean.

Table 1: Descriptive Statistics for Trailhead Facilities Investment

Statement	Mean	Std. Dev
The restroom facilities at the trailheads are clean and functional	2.70	1.39
The information provided at the trailheads (e.g., maps, rules) is clear and helpful	3.10	1.17
There are sufficient resting areas (e.g., benches, picnic spots) at the trailheads	3.06	1.24
Safety information (e.g., emergency contacts, hazards) is clearly displayed	3.04	1.25
I felt safe and secure at the trailhead and during my hike	3.36	1.19
The overall appearance and functionality of trailhead facilities meet my expectations	3.34	1.14
Construct Mean Score	3.10	0.92

The results indicated that trailhead facilities investment attained a mean construct score of 3.10, approximating the neutral midpoint of the scale. This suggested moderate and somewhat heterogeneous levels of satisfaction among hikers regarding trailhead infrastructure. The range of item means (2.70–3.36) further reflected variability in perceived quality across different facility dimensions.

Restroom cleanliness and functionality recorded the lowest mean score ($M = 2.70$, $SD = 1.39$), signaling a clear point of negative disconfirmation for hikers. This suggested that sanitation failed to meet even basic baseline expectations. Under Expectation Disconfirmation Theory (EDT), this below-neutral score identified a critical 'dissatisfier' that can overshadow the destination's natural appeal, as the physical state of the facility serves as a negative performance cue before the hike even begins.

In contrast, perceptions of safety and security at trailheads and along hiking routes received the highest rating ($M = 3.36$, $SD = 1.19$), suggesting that, despite infrastructural limitations, hikers generally perceive the environment as secure. Similarly, the overall appearance and functionality of trailhead facilities were rated relatively higher ($M = 3.34$, $SD = 1.14$), although the observed variability indicates inconsistencies in service delivery across different sites.

Other facility components, including the clarity of information provided ($M = 3.10$, $SD = 1.17$), adequacy of resting areas ($M = 3.06$, $SD = 1.24$), and visibility of safety information ($M = 3.04$, $SD = 1.25$), recorded marginally above-average scores. These findings suggest that while such facilities are generally present, their quality and effectiveness were uneven across the trail network.

Taken together, the descriptive results indicated that trailhead infrastructure constituted an important yet underdeveloped component of the hiking experience in Kenya. The findings highlighted specific gaps in sanitation, information provision, and rest area infrastructure, pointing to substantial opportunities for targeted investment. These results were consistent with prior studies (e.g., Tengan et al., 2024), which emphasize the importance of basic amenities such as clean restrooms, accessible information, and adequate resting facilities in shaping visitor satisfaction.

Measurement Model Assessment

The measurement model was evaluated using Partial Least Squares Structural Equation Modelling (PLS-SEM) to ensure the reliability and validity of the constructs prior to testing the structural hypotheses. The assessment focused on internal consistency reliability, convergent validity, and discriminant validity.

Internal consistency reliability was assessed using Composite Reliability (CR) and Cronbach’s alpha coefficients. All constructs exceeded the recommended threshold of 0.70, indicating satisfactory reliability. Convergent validity was evaluated using the Average Variance Extracted (AVE), where values of 0.50 or higher were considered acceptable. The results are presented in Table 2.

The measurement model demonstrated robust internal consistency, with Composite Reliability (CR) for Trailhead Facilities reaching 0.873 and Competitive Advantage at 0.899. Convergent validity was confirmed with Average Variance Extracted (AVE) values exceeding the 0.50 threshold, 0.537 for facilities and 0.530 for competitive advantage. This confirmed that the indicators effectively represent their respective underlying constructs.

Table 2: Measurement Model Assessment for Trailhead Facilities

Construct	Cronbach’s α	CR	AVE
Trailhead Facilities (TF)	0.841	0.873	0.537
Competitive Advantage (CA)	0.880	0.899	0.530

Note. CR = Composite Reliability; AVE = Average Variance Extracted.

Discriminant validity was assessed using the Heterotrait-Monotrait Ratio (HTMT) criterion. All HTMT values were below the conservative threshold of 0.90, indicating satisfactory discriminant validity.

The results confirm that Trailhead Facilities is empirically distinct from other constructs in the model, such as Trail Accessibility and Scenic Beauty, thereby supporting the uniqueness of the construct within the measurement model.

Structural Model Assessment

The relationship between trailhead facilities investment and competitive advantage was evaluated using PLS-SEM. Within the broader structural model, 53.1% of the variance in competitive advantage was explained ($R^2 = 0.531$). However, the path coefficient for trailhead facilities investment ($\beta = 0.089$, $t = 1.684$, $p = 0.093$) was not statistically significant at the 0.05 level,

indicating that trailhead facilities did not exert a significant direct effect on competitive advantage. Although the coefficient was positive, the findings suggest that trailhead facilities play a supporting rather than a primary strategic role within the broader resource configuration.

Table 3: PLS-SEM Path Results for Trailhead Facilities Investment

Path Coefficient (β)	t-value	p-value	Result
0.089	1.684	0.093	not statistically significant

Note. TF = Trailhead Facilities Investment; CA = Competitive Advantage.

In alignment with the Resource-Based View (RBV) and Expectation Disconfirmation Theory (EDT), these findings suggested that trailhead infrastructure serves as a foundational 'enabling' resource rather than a primary differentiator. While the statistical link to competitive advantage was not statistically significant at the 95% confidence level ($p = 0.093$), the qualitative evidence and descriptive mean scores, particularly the low rating for restrooms ($M = 2.70$), substantiated the argument that these facilities function as baseline requirements. Consequently, the study characterized trailhead professionalization as a prerequisite for maintaining destination credibility, even if it was not the sole driver of market leadership.

9. Discussion of Findings

The results indicate that investment in trailhead infrastructure was not a statistically significant predictor of competitive advantage ($\beta = 0.089$, $p = 0.093$). Although the broader structural model demonstrated substantial explanatory power ($R^2 = 0.531$), the specific contribution of trailhead facilities was not statistically significant, suggesting that infrastructure alone is unlikely to serve as a primary driver of competitive advantage.

This pattern aligns with the Resource-Based View, which treats such facilities as part of the augmented product rather than the core resource. Trailhead infrastructure supports the use of natural assets by providing a basic level of functionality, safety, and accessibility. However, it does not, on its own, create a compelling reason for destination choice.

Instead, the findings point to a more supportive role. Infrastructure appears to operate as a baseline condition that enables the tourism product to function effectively. Where facilities are inadequate, they can undermine the overall experience, but when present, they do not necessarily enhance it in a way that differentiates one destination from another.

These findings suggest that trailhead infrastructure functions primarily as an enabling resource within the broader destination system. While investment in such facilities remains important for ensuring service quality, visitor comfort, and operational reliability, it is insufficient on its own to generate a sustained competitive advantage. Consequently, infrastructure investment should be viewed as a necessary foundation upon which other strategic resources, particularly those that create destination distinctiveness and memorable visitor experiences, can be effectively leveraged.

10. Qualitative Findings

The qualitative evidence from stakeholder interviews provided context for the “professionalization gap” identified in the structural model. While quantitative results indicated a marginal statistical relationship, the qualitative findings explained why these investments were essential for operational viability. Stakeholders identified deficiencies in sanitation, sheltered resting areas, and emergency support as 'deal-breakers' that prevent the professionalization of the sector.

A recurring concern was the institutional prioritization by managing authorities, such as Kenya Wildlife Service (KWS) and Kenya Forest Service (KFS), of park entry points, security, and revenue collection, with comparatively limited emphasis on the functional needs of hikers beyond the gate. This imbalance resulted in the absence of standardized infrastructure, which in turn constrained accessibility for high-value market segments, including international tourists, families, and less-experienced hikers who place greater emphasis on safety, clarity of information, and basic amenities. Although Kenya's natural landscapes are regarded as a significant tourism asset, stakeholders emphasized that the supporting service infrastructure at trailheads did not consistently meet the expectations of these segments. This mismatch limited the sector's ability to fully leverage its natural resource base in attracting and retaining diverse visitor groups.

The findings further revealed marked spatial disparities in the quality of trailhead infrastructure. Urban-proximate trails, such as Karura Forest and Ngong Hills, were consistently identified as reference points for relatively well-developed infrastructure, characterized by functional sanitation, clear signage, and established safety protocols. In contrast, more remote and peripheral trail systems were associated with significantly lower levels of facility provision and maintenance.

This uneven distribution of infrastructure contributed to a fragmented visitor experience and effectively created a two-tier system within the national trail network. Stakeholders indicated that such inconsistencies undermined overall destination credibility and reduced the predictability of the hiking experience. There was broad agreement that systematic and institutionalized investment in trailhead infrastructure was necessary to improve service consistency and enhance visitor confidence.

The integration of structural model results and qualitative insights underscored the role of trailhead infrastructure as a key enabling component of destination competitiveness. While scenic attributes remained the primary drivers of attraction, trailhead infrastructure functioned as a critical support system that shaped the usability, accessibility, and perceived professionalism of the hiking experience. The findings suggested that deficiencies in sanitation, safety information, and navigational support limited the effective conversion of natural assets into high-quality tourism products. Addressing these gaps was essential for strengthening Kenya's competitive position in outdoor recreation environments.

These findings extend the structural model results by providing contextual explanations for the observed statistical relationships. When considered alongside the quantitative evidence, the qualitative insights offer a more complete account of the trail experience and inform both the conclusions and the recommendations that follow regarding the role of trailhead infrastructure in shaping competitive advantage.

11. Conclusion and Recommendations

This study examined the role of trailhead infrastructure in shaping competitive advantage in Kenya's adventure tourism sector. The findings show that, within a broader structural model that explained 53.1% of the variance in competitive advantage ($R^2 = 0.531$), the direct effect of trailhead infrastructure was weak and not statistically significant ($\beta = 0.089$, $p = 0.093$). These findings indicate that trailhead infrastructure contributes as part of a broader resource configuration rather than acting as a primary driver of competitiveness.

From a Resource-Based View perspective, Kenya's hiking destinations possess natural assets that exhibit characteristics associated with strategic resources. However, the ability to translate these assets into sustained competitive advantage is constrained by organisational challenges, particularly in the coordination, maintenance, and standardisation of supporting infrastructure. Consequently, the conversion of natural endowments into a consistent and high-quality tourism product varies across destinations.

Qualitative findings reinforce this interpretation. While Kenya's landscapes generate strong visitor expectations, these are not consistently met at the point of use. Gaps in sanitation, signage, and basic navigation support create a mismatch between expected and actual experience. This is particularly evident among international tourists, families, and less experienced hikers, who place greater emphasis on safety, clarity, and reliability of services. In such cases, dissatisfaction is linked less to the natural environment and more to the condition of supporting facilities.

Overall, trailhead infrastructure functions as an enabling condition that supports access, safety, and usability rather than as a feature that directly differentiates destinations. Where these facilities are inconsistent or underdeveloped, they reduce the quality of the visitor experience and limit the sector's ability to fully leverage its natural resource base. Strengthening and standardising this infrastructure is necessary to improve the reliability and credibility of the tourism product.

To address these issues, several actions are recommended. First, standardisation of trailhead infrastructure should be treated as a foundational priority, with emphasis on essential elements such as sanitation, sheltered rest areas, and clearly communicated safety information. Second, trail managers should implement consistent signage systems and visible emergency response protocols across all major trailheads, as these have been shown to improve visitor satisfaction and navigation (Kantini et al., 2024). Third, a National Trail Quality Framework should be established by the Ministry of Tourism and Wildlife in collaboration with relevant agencies to define minimum standards and introduce a certification system for trail infrastructure. Fourth, digital tools such as QR-coded information points, digital trail maps, and real-time updates should be integrated into trail management to improve accessibility and reduce reliance on physical infrastructure, particularly in remote areas (Ng, 2024). Fifth, targeted fiscal incentives, including tax relief on infrastructure investments and import duty exemptions for eco-friendly materials, should be introduced to encourage private sector participation, given the established link between infrastructure quality and destination competitiveness (Ahmad et al., 2025). Finally, local communities should be incorporated into trail stewardship programmes to support routine maintenance, visitor guidance, environmental conservation, and monitoring of trailhead facilities.

References

- Ahmad, A., Khan, M. S., & Jamil, S. (2025). The role of physical infrastructure in shaping destination competitiveness: A study of nature-based tourism. *Journal of Destination Marketing & Management*. Advance online publication. <https://www.sciencedirect.com/journal/journal-of-destination-marketing-and-management>
- Barney, J. B., & Hesterly, W. S. (2020). *Strategic management and competitive advantage: Concepts and cases* (6th ed.). Pearson.
- Braun, V., & Clarke, V. (2021). *Thematic analysis: A practical guide*. Sage.
- Chew, S.-S., Zainol, R., & Goh, H. C. (2024). Satisfaction of international and domestic tourists in Malaysia's oldest national park: Taman Negara Pahang. *Planning Malaysia*, 22(33). <https://doi.org/10.21837/pm.v22i33.1548>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.
- Creswell, J. W., & Creswell, J. D. (2022). *Research design: Qualitative, quantitative, and mixed methods approaches* (6th ed.). Sage
- Kantini, E., Kahana, F., Nyakyi, J., Kiondo, E., & Goroi, L. (2024). Visitor satisfaction in Tanzania's Tarangire National Park: Facilities, signage, and competitive positioning. *African Journal of Tourism Studies*, 11(2), 45–62.
- Kenya Tourism Board. (2025). *Adventure tourism infrastructure development brief*. Kenya Tourism Board.
- Kenya Wildlife Service. (2024). *Kenya hiking and adventure tourism development report*. KWS Publications.
- Kovačić, S., Cimbaljević, M., Pavluković, V., Škorić, S., & Petrović, M. (2024). Trailhead infrastructure and destination brand perception: Evidence from European wilderness destinations. *Tourism Management Perspectives*, 50, 101215.
- Ng, S. I. (2024). Strategic trail investment and destination attractiveness: Evidence from Asia-Pacific hiking circuits. *Journal of Destination Marketing and Management*, 32, 100891.
- Njuguna, J. (2024). Kenya's tourism infrastructure and the Travel and Tourism Development Index: Implications for competitive strategy. *African Economic Review*, 18(1), 22–36.
- Noor, N., & Sharma, D. (2024). Sustainable tourism service quality and visitor experience: An empirical investigation. *Tourism Management Perspectives*, 49, 101198.

- Orden-Mejia, M., Gomez-Suarez, M., & Crespo-Almodovar, M. (2025). Trail quality and visitor loyalty in nature tourism. *Tourism Management*, 103, 104915.
- Penrose, E. T. (1959). *The theory of the growth of the firm*. John Wiley & Sons.
- Pike, S., & Page, S. J. (2014). Destination marketing organizations and destination marketing: A narrative analysis of the literature. *Tourism Management*, 41, 202–227. <https://doi.org/10.1016/j.tourman.2013.09.009>
- Rogerson, C. M., & Baum, T. (2023). Rural tourism infrastructure and competitive differentiation in sub-Saharan Africa. *Journal of Rural Tourism Research*, 7(1), 88–104.
- Schiebler, S. A., Lee, H. J., & Brodbeck, J. (2024). Expectation disconfirmation and destination satisfaction: A meta-analysis. *Journal of Travel Research*, 63(2), 315–334.
- Southern & East African Tourism Update. (2026, January 20). *East Africa tourism at a crossroads*. <https://www.tourismupdate.com/article/east-africa-tourism-at-a-crossroads>
- Sufa, B., Setiawati, L., Afiat, M., & Rijal, A. (2024). Infrastructure improvement and visitor satisfaction in Bali's tourism sector. *International Journal of Hospitality and Tourism Administration*, 25(3), 204–219.
- Tengan, C., Anzagira, L. F., Acheampong, S., Acheampong, A., Tetteh Kwofie, E., & Nani, G. (2024). Visitor satisfaction determinants in national park tourism: Facilities, comfort, and safety. *Journal of Ecotourism*, 23(1), 55–73.
- Tourism Regulatory Authority. (2025). *Tourism (tourism enterprises) regulations, 2025*. <https://tra.go.ke/wp-content/uploads/2025/07/DRAFT-TOURISM-ENTERPRISES-REGULATIONS-JUNE-2025.pdf>
- Tourism Research Institute. (2025). *Annual tourism sector performance report 2024*. Nairobi, Kenya. <https://tri.go.ke/wp-content/uploads/2025/02/TRI-Tourism-Sector-Performance-Report-2024.pdf>
- Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5(2), 171–180.
- World Travel and Tourism Council. (2025). *Travel and tourism economic impact 2025: Kenya*.
- Wu, J., Chen, Y., Zhang, L., & Liu, Q. (2025). Moderating effects of park accessibility and environmental quality on visitor experience in urban green spaces. *Urban Forestry and Urban Greening*, 95, 128306.
- Yuwono, A., Santoso, A., Riadi, E., & Kusuma, B. (2024). Expectation disconfirmation, experience quality, and visitor satisfaction in ecotourism. *International Journal of Environmental Research and Public Health*, 21(3), 412.
- Zhou, X., Liu, J., Wang, M., Li, X., & Cheng, S. (2023). Trends and motivations in hiking tourism: Global patterns and emerging markets. *Journal of Outdoor Recreation and Tourism*, 41, 100578.