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Perceived Trail Accessibility and Competitive Advantage in Kenya's Adventure Tourism Sector

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Abstract

Kenya's adventure tourism sector has strong potential because of its exceptional ecological diversity. However, the sector faces an "Infrastructure Paradox" where world-class natural assets are undermined by inconsistent accessibility standards. Guided by the Resource-Based View and Expectation Disconfirmation Theory, this study examined the effect of perceived trail accessibility on competitive advantage in Kenya's adventure tourism sector. The study sought to determine the effect of perceived trail accessibility on the competitive advantage of Kenya's adventure tourism sector. A convergent mixed-methods design was employed, targeting a population of active hikers and adventure tourism stakeholders. A sample of 400 hikers was selected using convenience sampling for the quantitative phase, while 12 stakeholders were purposively selected for qualitative interviews. Data was collected using structured questionnaires and semi-structured interview guides. Structural model results using Partial Least Squares Structural Equation Modelling (PLS-SEM) showed that perceived trail accessibility did not have a statistically significant direct effect on competitive advantage ($\beta = 0.026$, $p = 0.663$). Scenic beauty ($\beta = 0.522$, $p < 0.001$) and trail length ($\beta = 0.211$, $p < 0.001$) emerged as the primary determinants of competitive advantage. These results suggest that trail accessibility functions as a threshold resource. It is necessary to prevent visitor dissatisfaction, but does not by itself create a unique competitive edge. Qualitative findings corroborated this, identifying degraded feeder roads and information gaps as key barriers to improving the visitor experience. The study concluded that while accessibility is essential for operational viability, it functioned as a threshold resource rather than a strategic driver. It recommended that the Ministry of Tourism and wildlife management agencies adopt a Standardized Signage Protocol and a national trail classification framework based on international best practices to align infrastructure quality with the high value of Kenya's natural landscapes.

Keywords: *adventure tourism; competitive advantage; perceived trail accessibility; Resource-Based View; mixed methods*

1. Introduction

1.1 Background of the Study

Kenya's adventure tourism is defined by globally significant ecological assets, from the Afro-alpine moorlands of Mt. Kenya to the volcanic landscapes of the Rift Valley. However, the sector is currently characterized by an "Infrastructure Paradox", a phenomenon where high-value natural resources are undermined by suboptimal supporting infrastructure (Njuguna, 2024). While the Resource-Based View (RBV) argues that a firm's competitive advantage is derived from resources that are valuable, rare, and inimitable, modern strategic management distinguishes between "threshold resources" and "distinctive resources."

In the context of adventure tourism, perceived trail accessibility, which comprises road conditions, navigational signage, and entry facilitation, may function as a threshold resource. According to Expectation Disconfirmation Theory (EDT), these elements are fundamental requirements for service delivery. If they are perceived as poor, they lead to significant dissatisfaction; however, their presence may not independently drive a unique competitive edge (Chai & Liu, 2025). This study explored whether enhancing these accessibility features actually yields a sustained competitive advantage or simply serve as a baseline for market participation.

1.2 Statement of the Problem

Despite the substantial interest in outdoor recreation and hiking in Kenya, the sector's competitive position was constrained by a persistent disconnect between natural asset quality and infrastructure standards. This "Infrastructure Paradox" manifested as degraded feeder roads, insufficient trailhead facilities, and a lack of standardized wayfinding systems, which collectively depressed visitor turnout and limited the sector's growth potential. While existing literature often assumes a direct linear relationship between infrastructure quality and destination competitiveness, empirical evidence using Partial Least Squares Structural Equation Modelling (PLS-SEM) remains scarce in the Sub-Saharan African context. At the time of this study, there was a knowledge gap regarding whether perceived trail accessibility functioned as a strategic differentiator or simply as a threshold resource necessary for market participation. Without resolving this ambiguity, there was a risk that policymakers and private developers would misallocate resources toward infrastructure that satisfies basic needs without achieving desired competitive differentiation. This study addressed this gap by evaluating the impact of perceived trail accessibility on the competitive advantage of Kenya's adventure tourism sector.

1.3 Research Objective and Hypothesis

The primary aim of this research was to assess the relationship between perceived trail accessibility and competitive advantage in Kenya's adventure tourism sector.

The null hypothesis tested in the study was:

H₀: There is no statistically significant relationship between perceived trail accessibility and competitive advantage in Kenya's Adventure Tourism sector.

2. Literature Review

2.1 The Resource-Based View and Trail Accessibility

The Resource-Based View (RBV), as advanced by Barney and Hesterly (2020), argues that a sustained competitive advantage is contingent upon the possession and deployment of resources that are valuable, rare, inimitable, and organized (VRIO). Within the tourism sector, physical infrastructure and accessibility frameworks are recognized as strategic assets that

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determine a destination's capacity to transform raw natural endowments into commercially viable products (Arici & Koseoglu, 2025). Traditional RBV models often emphasize the static attributes of resources. This study extends that paradigm by arguing that in the context of experiential tourism, inherently inimitable natural assets such as Kenya's Afro-alpine moorlands, remain functionally dormant in the absence of complementary accessibility resources. These resources constitute the essential organizational infrastructure required for value capture (Barney et al., 2021).

Empirical evidence from comparative studies in Sarawak and Henan Province suggests that tangible infrastructure such as road networks and trail signage function as a critical mediating variable in the relationship between natural attractiveness and destination competitiveness (Chin et al., 2025). Similarly, research by Chan et al. (2023) identifies 'hard' infrastructure investment as a primary predictor of perceived competitiveness among international cohorts. These findings support the theoretical proposition that accessibility is not a secondary amenity, but a multiplicative strategic resource. In this capacity, it acts as a catalyst that determines the extent to which a destination's inherent ecological value can be converted into market-facing competitive performance.

2.2 Expectation Disconfirmation Theory and Accessibility

Expectation Disconfirmation Theory (EDT), as formulated by Oliver (1980) and subsequently operationalized within tourism research, provides an explanatory framework for evaluating how accessibility failures erode a destination's competitive positioning. The core premise of EDT is that satisfaction is determined by the cognitive comparison between pre-purchase expectations and post-visit performance. Within the hiking sector, negative disconfirmation occurs when the logistical realities of trail access and navigation fail to meet visitor expectations, thereby diminishing perceived value, brand loyalty, and secondary advocacy (Kozak & Rimmington, 2000).

In the Kenyan context, the adventure tourism segment is characterized by a significant expectational gap. Visitors arrive with high-level expectations driven by Kenya's established reputation as a premier global ecotourism destination. When these expectations encounter inadequate feeder roads, inconsistent trail signage, and a lack of critical safety information, the resulting negative disconfirmation is acute, directly eroding destination loyalty. As noted by the World Tourism Organization (2025), accessibility functions as a 'gatekeeper variable' in Sub-Saharan African adventure destinations; in its absence, scenic capital cannot be successfully converted into visitor satisfaction, regardless of the inherent quality of the ecological environment.

2.3 Empirical Evidence on Trail Accessibility and Competitiveness

A growing body of empirical evidence across diverse geographical contexts suggests that strategic perceived trail accessibility yields quantifiable competitive returns. Evidence from the South Korean urban trail system demonstrates that the redesign of the Seoul Trail, through route optimization and the integration of strategic entry points, broadened the visitor demographic and enhanced destination attractiveness by lowering functional barriers to entry (Cho, 2024). This strategic redesign successfully broadened the visitor demographic by transitioning the trail from a niche endurance asset, historically dominated by hikers aged 40 and above, into an inclusive leisure destination. By reducing section lengths and improving logistical clarity, the intervention lowered the threshold for younger cohorts, families, and international visitors, thereby maximizing the trail's social and economic utility. This is further corroborated by findings in Incheon, where spatial proximity and logistical accessibility emerged as the primary predictors of visitation frequency (Jeong et al., 2022). These studies

affirm that accessibility functions not merely as a capacity-building measure, but as a critical determinant of actual behavioural intention and sustained engagement with trail-based assets.

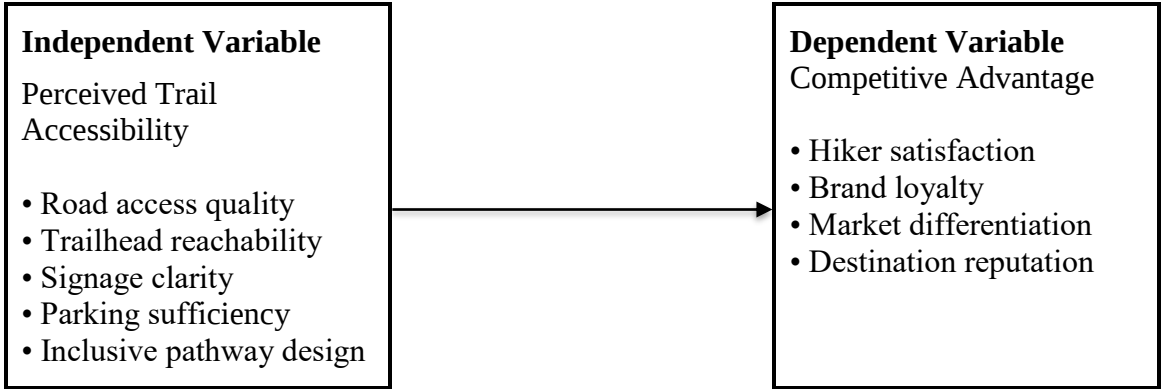
The link between infrastructure investment and competitive performance is further validated within the mountain tourism sub-sector. Case evidence from China's Huangshan Scenic Area demonstrates that the deployment of modern cableway systems, which substantially lowered physical accessibility barriers, directly generated 12.6% of total tourism revenue with a gross profit margin of 67.7% (Hunan Provincial Department of Culture and Tourism, 2023). These accessibility advancements significantly expanded the destination's addressable market. In a regional context, Kahangirwe et al. (2025) found that infrastructural interventions within Uganda's Kalinzu Central Forest Reserve served as a principal determinant of sustained visitor satisfaction and destination competitiveness. These findings suggest that for African adventure tourism, the transition from raw scenic capital to a commercially viable destination is contingent upon the quality of the logistical interface.

For Kenya, the strategic significance of infrastructure is demonstrated by empirical data from Kiambu County, where Kambaga and Omare (2023) established that infrastructure quality, encompassing access roads, trailheads, and basic amenities, accounted for 41.4% of the variance in tourism development outcomes ($R^2 = 0.414$). This suggests a disproportionate reliance on accessibility investment for value creation in the local sector. Despite this, an implementation gap persists; Gitau et al. (2023) observed that in Nyeri County, the adventure recreation sector continues to be hampered by structural deficiencies, including dilapidated access routes and inadequate signage, which suppress both domestic and international participation. This is further corroborated by the Kenya Wildlife Service (2023), which notes that while the national protected area network encompasses approximately 2,591 kilometres of tourist roads, connectivity to primary hiking tracks is characterized by a state of developmental arrest. Consequently, while the resource potential is high, the logistical interface is the primary bottleneck to competitive performance.

The synthesized literature suggests that accessibility functions as a threshold variable; below a critical baseline of infrastructure quality, natural endowments, regardless of their ecological richness, fail to generate a sustainable competitive advantage. This occurs because the logistical friction of the visit itself becomes a primary source of negative disconfirmation. Conversely, once this threshold is surpassed, investment in accessibility yields compounding returns by expanding market reach, increasing visitation frequency, and enhancing the destination's capacity to attract high-yield international segments (Gonzalez-Rodriguez et al., 2023). Consequently, infrastructure transcends its role as a supportive amenity, serving as the primary strategic multiplier that converts inherent natural capital into a realized competitive advantage.

2.4 Conceptual Framework

A conceptual framework maps the logical relationships between study variables, guiding hypothesis formulation and the interpretation of empirical findings. This study links specific trail accessibility dimensions to measurable competitive advantage outcomes, positioning accessibility as an enabling condition whose strategic value depends on how effectively it is organized and delivered. The conceptual framework for this study is grounded in the Resource-Based View (RBV) and Expectation Disconfirmation Theory (EDT) (Barney et al., 2021; Oliver, 1980).



Relationship: Threshold Resource

Figure 2.1 Conceptual Framework

3. Research Methodology

3.1 Research Design

This study adopted a convergent mixed-methods design, which allowed for the simultaneous collection and analysis of quantitative survey data and qualitative interview insights. This design was specifically chosen to allow integration of quantitative and qualitative data, where qualitative insights could help interpret and contextualize quantitative findings, particularly in cases where relationships may appear weak, complex, or statistically non-significant.

3.2 Population and Sampling

The target population comprised active hikers and adventure tourism stakeholders within Kenya. For the quantitative phase, a sample of 400 hikers was reached using convenience sampling. For the qualitative phase, 12 stakeholders, including tour operators and park managers, were selected via purposive sampling to ensure expert depth.

3.3 Data Collection Instruments

Primary data collection involved a dual-instrument approach. Structured questionnaires were administered to hikers to quantify their perceptions of trail accessibility and destination competitiveness, while semi-structured interview guides were employed with key stakeholders to identify systemic structural bottlenecks and critical information gaps within the sector.

3.4 Data Analysis and Statistical Validity

Quantitative analysis was conducted using Partial Least Squares Structural Equation Modelling (PLS-SEM) via SmartPLS 4. The measurement model was refined to ensure convergent validity and internal consistency. Initial assessment revealed that the Competitive Advantage construct yielded an Average Variance Extracted (AVE) of 0.459, slightly below the recommended 0.50 threshold (Hair et al., 2022). To resolve this, two items with factor loadings below 0.70 (those related to perceived value for money and comparative market popularity), were removed from the construct. This adjustment successfully improved the AVE to 0.530 and ensured the statistical integrity of the structural model.

4. Results

4.1 Descriptive Analysis of Trail Accessibility Investment

Table 1 presents the descriptive statistics for perceived trail accessibility. Overall, respondents rated trail accessibility moderately ($M = 3.28$, $SD = 0.86$), suggesting that accessibility across the sampled hiking destinations was generally acceptable but left room for improvement. The highest rated aspect was the ease of the entry process, including registration and fee payment ($M = 3.53$, $SD = 1.10$), followed by the adequacy of parking facilities ($M = 3.43$, $SD = 1.14$) and the perception that trails were manageable for a person of average fitness ($M = 3.41$, $SD = 1.19$). These findings suggest that visitors generally experienced few challenges once they reached the trailhead.

In contrast, the condition of roads leading to trailheads received the lowest rating ($M = 2.98$, $SD = 1.39$), while trail signage was rated only slightly above the neutral point ($M = 3.06$, $SD = 1.19$). These lower ratings indicate that the journey to the trailhead and on-route wayfinding remain areas requiring improvement. Overall, the descriptive findings indicate that although basic accessibility infrastructure is available across many hiking destinations, weaknesses remain in external access and navigation. These shortcomings may reduce visitor convenience even where the hiking experience itself is attractive.

Table 1: Descriptive Statistics for Trail Accessibility Construct

Trail Accessibility Item	Mean (M)	Std. Dev. (SD)	Interpretation
Entry process is straightforward	3.53	1.10	Highest rated
Parking availability at trailheads is adequate	3.43	1.14	Moderate
Trails are manageable for a person of average fitness	3.41	1.19	Moderate
Trail signage is clear and sufficient	3.06	1.19	Slightly above neutral
Roads leading to trailheads are in good condition	2.98	1.39	Lowest rated
Overall Construct Mean	3.28	0.86	Moderate

Scale: 1 = Strongly Disagree, 5 = Strongly Agree

4.2 Measurement Model Assessment (Reliability and Validity)

In line with PLS-SEM requirements (Hair et al., 2022), the measurement model was evaluated prior to structural analysis. Following the refinement process detailed in Section 3.4, all constructs demonstrated satisfactory internal consistency and reliability as shown in Table 2.

Table 2: Measurement Model for Reliability and Validity

Construct	Cronbach's Alpha	Composite Reliability (CR)	AVE	Assessment
Perceived Trail Accessibility	0.767	0.843	0.518	Satisfactory
Competitive Advantage	0.871	0.899	0.530	Satisfactory
Recommended Threshold	≥ 0.70	≥ 0.70	≥ 0.50	—
Validity Test	Value Range	Threshold	Result	
HTMT Ratio (Discriminant Validity)	0.412 – 0.784	< 0.85	Confirmed	

Perceived Trail Accessibility demonstrated satisfactory measurement properties, with a Cronbach's Alpha of 0.767, Composite Reliability of 0.843, and Average Variance Extracted (AVE) of 0.518, exceeding the recommended thresholds for internal consistency and convergent validity (Hair et al., 2022). The Competitive Advantage construct also demonstrated satisfactory reliability and validity, with a Cronbach's Alpha of 0.871, Composite Reliability of 0.899, and an AVE of 0.530. In addition, discriminant validity was confirmed using the Heterotrait–Monotrait (HTMT) ratio, with all values ranging from 0.412 to 0.784, below the recommended threshold of 0.85 (Hair et al., 2022). These results confirmed that the measurement model was reliable and valid, providing an adequate basis for evaluating the structural relationships between the study constructs.

4.2.1 Structural Model Results (PLS-SEM)

The structural model was assessed to determine the effect of perceived trail accessibility on competitive advantage. The results are presented in Table 3.

Table 3: Structural Model Results (PLS-SEM)

Null Hypothesis	Path	β	t-value	p-value	95% CI	Decision
H ₀	Perceived Trail Accessibility → Competitive Advantage	0.026	0.436	0.663	[-0.085, 0.148]	Fail to reject H ₀

The structural model results indicated that perceived trail accessibility did not have a statistically significant direct effect on competitive advantage ($\beta = 0.026$, $t = 0.436$, $p = 0.663$). Accordingly, the study failed to reject the null hypothesis because the evidence did not demonstrate a statistically significant relationship between perceived trail accessibility and competitive advantage. The findings therefore did not support the alternative hypothesis that investment in perceived trail accessibility significantly enhances competitive advantage within Kenya's hiking tourism sector.

The structural model demonstrated moderate explanatory power, with an R² value of 0.531, indicating that the predictor variables jointly explained 53.1% of the variation in competitive

advantage. This suggests that the model captured a substantial proportion of the factors influencing competitive advantage, although other factors beyond the variables included in this study may also contribute to destination competitiveness. Predictive relevance was also confirmed, with a Q^2 value of 0.284, indicating that the model possessed satisfactory predictive capability.

Although perceived trail accessibility was important for the visitor experience, the findings indicate that it did not function as a distinguishing source of competitive advantage. From a Resource-Based View perspective, accessibility appears to represent a threshold resource. Its presence is necessary to support the visitor experience, but by itself it does not create meaningful differentiation between competing hiking destinations.

4.2.2 Qualitative Findings and Discussion

The qualitative findings provided additional insight into why perceived trail accessibility did not emerge as a statistically significant predictor of competitive advantage. Stakeholders consistently identified poor feeder roads linking major highways to trailheads as a persistent challenge. Although visitors could generally reach hiking destinations, the final stage of the journey was often slow, uncomfortable and costly. Stakeholders also highlighted inconsistent trail signage and the absence of standardised trail grading systems, making it difficult for visitors to assess trail difficulty and plan their hiking experience. These observations suggest that physical access alone is insufficient if visitors cannot easily navigate and understand the trail environment. Similar findings have been reported by Eichelberger et al. (2021) and Mandić et al. (2021), who observed that both physical accessibility and effective wayfinding influence destination choice and visitor experience in nature-based tourism.

Stakeholders further observed that investment was frequently concentrated on entrance facilities rather than the overall visitor journey. While administrative gates and entry points had improved in several destinations, less attention had been given to feeder roads, trail signage, wayfinding systems and family-friendly accessibility features. Stakeholders indicated that this limited the ability of hiking destinations to attract a broader range of visitors and reduced the overall quality of the hiking experience. They also noted that neighbouring countries were making faster progress in developing integrated trail systems that better support nature-based tourism. These observations are consistent with studies that have questioned investments focused primarily on entrance infrastructure without corresponding improvements to the complete visitor experience (Vanhove, 2022; Jarrad & Davies, 2024).

These findings help explain the quantitative results by showing that perceived trail accessibility functions primarily as a supporting condition rather than a source of competitive differentiation. While good accessibility contributes to a positive visitor experience, it does not by itself create a sustainable competitive advantage. Instead, accessibility supports the hiking experience, while competitive advantage is created by the attributes that make one destination stand out from another, such as scenic beauty and trail length. This interpretation is consistent with the Resource-Based View and with earlier studies suggesting that accessibility functions as a qualifying condition, while competitive advantage is created through resources that differentiate one destination from another (Crouch & Ritchie, 1999; Goffi et al., 2019).

5. Conclusions and Recommendations

This study examined the role of perceived trail accessibility in shaping the competitive advantage of Kenya's adventure tourism sector. The findings showed that while trail accessibility is important, it does not independently create competitive advantage. The absence of a statistically significant relationship suggests that accessibility functions primarily as a

threshold resource. It is necessary for visitors to access and enjoy hiking destinations but, on its own, it does not distinguish one destination from another.

The findings also showed that competitive advantage is more strongly influenced by experiential attributes such as scenic beauty and trail diversity. The qualitative findings helped explain these results by identifying weaknesses in feeder roads, trail signage and the availability of standardised trail information. These challenges reduce the overall visitor experience and limit the sector's ability to fully benefit from its natural resources. Overall, the study suggests that improving physical access alone is unlikely to strengthen competitiveness unless it is supported by better information and a more integrated visitor experience.

Three recommendations arise from these findings. First, there is a need to develop and implement a national trail grading and signage framework to improve visitor navigation, increase confidence and provide a more consistent hiking experience across destinations. Second, infrastructure investment should place greater emphasis on feeder roads, wayfinding systems and inclusive trail design so that accessibility extends beyond the main entry points to the entire visitor journey. Third, trail development should adopt a more coordinated approach that brings together national agencies, county governments, local communities and other stakeholders to improve the quality and consistency of trail infrastructure across the country.

Future research could examine the contribution of digital and informational infrastructure to visitor behaviour and destination competitiveness. Longitudinal studies would help determine how improvements in trail standardisation and wayfinding influence visitor satisfaction, loyalty and repeat visitation over time. In addition, behavioural approaches such as discrete choice experiments could provide a better understanding of how hikers value different trail attributes, thereby supporting more effective infrastructure planning and investment.

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