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TRAIL INFRASTRUCTURE INVESTMENT AND COMPETITIVE ADVANTAGE IN KENYA'S ADVENTURE TOURISM SECTOR

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ABSTRACT

Adventure tourism represents a rapidly expanding segment within the global tourism industry, offering significant opportunities for destinations with diverse natural landscapes. Kenya possesses substantial natural assets suitable for adventure tourism development, yet the sector remains underdeveloped due to inadequate trail infrastructure investment. This conceptual review examined the role of trail infrastructure investment in determining competitive advantage in Kenya's adventure tourism sector through systematic literature review. Theoretical foundations draw on Resource Based View Theory and Destination Competitiveness Theory. Literature was synthesized from peer reviewed journals, industry reports, and policy documents published between 2020 and 2025. The synthesis revealed that integrated infrastructure investment significantly influences competitive advantage by creating coherent tourism products and superior visitor experiences through trail network connectivity, signage systems, and integrated support facilities. Quality enhancement investments prove equally critical, with systematic surface maintenance ensuring consistent experience delivery, safety features expanding market accessibility, and accessibility standards enabling market diversification. The review establishes that strategic trail infrastructure investment constitutes a fundamental source of sustainable competitive advantage by converting natural endowments into distinctive tourism products. The review recommends that government agencies develop holistic investment frameworks, destination managers implement systematic quality enhancement programs, and policymakers establish investment incentives and public private partnership mechanisms facilitating sustained infrastructure development in Kenya's adventure tourism sector.

Keywords: *Trail infrastructure investment, competitive advantage, adventure tourism*

1. BACKGROUND TO THE STUDY

Kenya's tourism sector stands at a transformative juncture, with adventure tourism emerging as a critical growth segment that promises to diversify the country's traditional wildlife focused tourism model. The adventure tourism market is a global industry with a valuation of huge amounts of money, and it is growing at an unprecedented rate, and it is projected to keep growing until 2035 (Future Market Insights, 2025; Technavio, 2025). This developmental trend offers Kenya a great chance to capitalize on its varied natural scenery, mountain ranges to coastal paths, making the country a leading adventure tourism destination in Africa.

Despite Kenya having significant natural endowments and tourism being one of the pillars in Vision 2030, the adventure tourism subsector is underdeveloped, especially in trail infrastructure (Kenya Vision 2030, 2023). Although the country has been doing well in the traditional tourism infrastructure, the specialized needs of adventure tourism, especially trail systems that are internationally standardized, have not been given the necessary investment focus (Kamau & Waudo, 2021). This gap is particularly concerning given the high level government commitment to sector expansion and the recognition that tourism investment accelerates economic growth (Kenya Investment Authority, 2024). The Ministry of Tourism and Wildlife Draft National Tourism Strategy 2025-2030 acknowledges the need to diversify infrastructure, but trail infrastructure development remains fragmented (Kenya Ministry of Tourism and Wildlife, 2025). The trail systems that are in place are not normally integrated in a manner that would enable them to gain sustainable competitive advantages. Chikebee (2024) finds that to open the tourism potential of Kenya as adventure, more than natural resources are required and should include strategic investment in infrastructure that will make the country more accessible, safer, and enjoyable to the visitors.

The competitive environment in the global tourism sector has significantly transformed, with destinations now competing on the quality of infrastructure, and not only on natural resources (World Economic Forum, 2024). The Travel and Tourism Development Index notes that the competitiveness of destinations is pegged on the readiness of the infrastructure particularly in adventure tourism where visitor satisfaction and safety directly depend on the quality of the trails (Adventure Travel Trade Association & George Washington University, 2024). The weaknesses of the current positioning of Kenya in this competitive environment lie in the fact that the country is well endowed in terms of natural resources, but the absence of infrastructure restrains its ability to satisfy the growing demand of adventure tourism (Kenya Tourism Board, 2022).

Market research shows that Kenya is about to undergo a tremendous growth in tourism by 2026, and younger and experience-based travelers are seeking unique and immersive travel experiences (Travel and Tour World, 2024). Such changes of population are what the adventure tourism market is all about but to seize this opportunity, the infrastructure should be developed accordingly. The Kenya Investment Authority (2024) has listed tourism and hospitality as some of the priority investment sectors because of the multiplier effects of infrastructure development on destination competitiveness and economic growth. Sustainable and diversified tourism products have also been highlighted to be required by the post COVID 19 recovery (Kenya Tourism Sector Resilience Framework, 2021). The emphasis on the outdoor activities and smaller groups, which is typical of adventure tourism, aligns with the new trends in the preferences of traveling and sustainability needs. However, unless Kenya invests in trail infrastructure, both in terms of integrated systems and quality enhancement, the country could lose competitive edge to regional players who are developing their potential of adventure tourism (CNBC Africa 2025).

Statement of the Problem

Kenya's adventure tourism sector suffers from inadequate trail infrastructure investment that prevents competitive advantage in the global adventure tourism market. Despite exceptional natural assets, the sector lacks systematically developed trail systems meeting international standards. Current infrastructure is characterized by poor connectivity, inadequate signage, insufficient support facilities, substandard surface maintenance, limited safety features, and failure to meet accessibility standards (Mutinda & Mayaka, 2022; Kamau & Waudo, 2021). This infrastructure deficit undermines Kenya's ability to translate natural endowments into distinctive, competitive tourism products. Multiple stakeholders are affected: the Kenyan government faces reduced tourism revenue and missed Vision 2030 targets; local communities experience limited employment and income opportunities; private sector investors face constrained growth and competitive disadvantages; adventure tourists receive substandard experiences with safety concerns and limited accessibility; and destination management organizations struggle with fragmented development and inability to position Kenya competitively (Kenya Tourism Board, 2022; Mutinda & Mayaka, 2022).

Globally, adventure tourism is among the fastest-growing tourism segments, projected to expand through 2035 (Future Market Insights, 2025). Regionally, Kenya faces intensifying competition as Tanzania invests in Mount Kilimanjaro trail systems, Rwanda develops volcanic trail networks supporting gorilla tourism, Uganda enhances Rwenzori Mountains infrastructure, and South Africa maintains world-class Drakensberg trail systems (CNBC Africa, 2025). Locally, the deficit is acute in Mount Kenya National Park, Aberdare Ranges, Rift Valley escarpments, and coastal forest trails, constraining visitor numbers and market expansion (Kamau & Waudo, 2021).

Failure to address this deficit will result in: continued market share loss to regional competitors; forfeited tourism revenue and employment opportunities worth billions of shillings annually; inability to attract high-value adventure tourism segments; increased accident risks and negative visitor experiences; widening policy-implementation gaps discouraging private investment; and missed post-COVID-19 recovery opportunities favoring outdoor adventure experiences (Kenya Investment Authority, 2024; Kenya Tourism Sector Resilience Framework, 2021).

This study proposes achieving sustainable competitive advantage through strategic trail infrastructure investment in two dimensions: integrated infrastructure (connected trail networks, comprehensive signage systems, and support facilities integration) and quality enhancement (systematic surface maintenance, comprehensive safety features, and accessibility standards) (Marion & Wilkins, 2024; Wu et al., 2024). Through systematic literature synthesis, the study provides evidence-based insights into how these investments create competitive advantages, develops a conceptual framework linking infrastructure investments to competitive outcomes, and provides actionable recommendations for government agencies, destination managers, and policymakers to transform natural endowments into sustainable competitive advantages positioning Kenya as Africa's premier adventure tourism destination.

Objective of the Study

i. To determine the effect of integrated trail infrastructure investment on competitive advantage in Kenya's adventure tourism sector.
ii. To establish the effect of trail quality enhancement investment on competitive advantage in Kenya's adventure tourism sector.

2. RESEARCH METHODOLOGY

Research Design

This study is a conceptual review that employs a systematic integrative literature review approach to examine how investment in trail infrastructure contributes to competitive advantage in Kenya's adventure tourism sector. The research synthesizes existing empirical and theoretical evidence from global contexts and applies these insights to Kenya's specific adventure tourism infrastructure challenges. Rather than generating primary data, the study's scholarly contribution lies in the novel synthesis of infrastructure investment literature (2020-2025) applied to Kenya's adventure tourism context, resulting in a tailored conceptual framework and evidence-based recommendations for stakeholders.

Search Strategy

A comprehensive systematic search was conducted across multiple academic databases to ensure robust literature coverage. The databases searched included Google Scholar, Scopus, Web of Science, ScienceDirect, and EBSCOhost. The search employed Boolean operators and specific keyword combinations structured as follows: ("trail infrastructure" OR "trail investment" OR "trail development") AND ("competitive advantage" OR "destination competitiveness" OR "tourism competitiveness") AND ("adventure tourism" OR "nature-based tourism" OR "mountain tourism"). Additional searches included: ("tourism infrastructure investment") AND ("competitive advantage"), ("trail quality" OR "trail maintenance") AND ("tourism"), and Kenya-specific searches using ("Kenya" OR "East Africa") AND ("adventure tourism" OR "tourism infrastructure"). Supplementary searches examined policy documents and industry reports from Kenya Tourism Board, Ministry of Tourism and Wildlife, Kenya Investment Authority, World Economic Forum, and Adventure Travel Trade Association.

Inclusion and Exclusion Criteria

Literature selection followed explicit criteria to ensure relevance and quality. Inclusion criteria specified: peer-reviewed journal articles published between 2020-2025; industry reports and policy documents from recognized tourism organizations published 2020-2025; studies focusing on trail infrastructure, tourism infrastructure investment, or destination competitiveness; research examining adventure tourism, nature-based tourism, or outdoor recreation; empirical studies providing evidence on infrastructure-competitiveness relationships; theoretical papers on Resource-Based View or Destination Competitiveness Theory; and studies with explicit focus on infrastructure quality, accessibility, safety, or integration. Exclusion criteria eliminated: publications before 2020; non-peer-reviewed sources except official policy/industry reports; studies lacking focus on infrastructure or competitiveness; purely descriptive tourism studies without analytical frameworks; and literature focusing exclusively on urban tourism or built attractions without natural/trail components.

Screening and Selection Process

The literature screening followed a three-stage process. Stage 1: Initial database search yielded 287 potentially relevant sources through keyword searches across all databases. Stage 2: Title and abstract screening reduced this to 94 sources after eliminating duplicates and clearly irrelevant studies based on title and abstract review against inclusion/exclusion criteria. Stage 3: Full-text review involved detailed examination of 94 sources, assessing methodological quality, relevance to research objectives, and contribution to understanding infrastructure-competitiveness

relationships, resulting in final selection of 45 peer-reviewed articles, policy documents, and industry reports that directly addressed the research objectives and provided substantive evidence on trail infrastructure investment and competitive advantage relationships.

Data Extraction and Analysis

Literature synthesis employed thematic and conceptual analysis approaches. Data extraction focused on three thematic categories aligned with research objectives: (1) Integrated trail infrastructure investment examining evidence on trail network connectivity, signage systems, and support facilities integration; (2) Trail quality enhancement investment analyzing surface maintenance, safety features, and accessibility standards; and (3) Competitive advantage indicators including market positioning, visitor satisfaction, destination distinctiveness, and economic performance. Each selected source was systematically coded for theoretical frameworks employed, empirical findings on infrastructure-competitiveness relationships, contextual factors affecting outcomes, and practical implications for destination management. The synthesis process involved identifying convergent findings across multiple studies, noting contradictions or gaps in evidence, extracting mechanisms through which infrastructure investments create competitive advantages, and contextualizing global evidence for Kenya's specific adventure tourism development challenges

3. THEORETICAL FRAMEWORK

Resource Based View Theory

Resource Based View (RBV) theory can be used to provide a simple approach in determining the role played by trail infrastructure investment to create competitive advantage in the adventure tourism sector in Kenya. RBV was first developed to explain the idea of firm competitive advantages at the level, and according to it, organizations achieve sustainable levels of competitive advantage by possessing and utilizing valuable, rare, inimitable, and non substitutable resources (Clark, Matarrita-Cascante & Fariha, 2025). The concept of RBV has also been used in the tourism context to explain the concept of destination competitiveness whereby physical infrastructures, natural resources and organizational capabilities are combined to formulate unique value propositions that cannot be replicated by competitors. The authors Lee, Kim and Choi (2024) applied the natural resource based view to nature based tourism destinations and demonstrated that infrastructure investments exploitative of the natural resources and ecological integrity create sustainable competitive advantages.

The RBV implemented in relation to trail infrastructure investment can be particularly applied to the situation involving Kenya adventure tourism industry, in which the development of infrastructure can be employed to create unique competitive advantage by leveraging the natural landscape. Trail infrastructure, being a rare and difficult-to-imitable resource when developed and coupled with natural resources, enhances the attraction of destinations (Clark et al., 2025). In the theory, the quality improvement investments and integrated trail systems transform simple natural resources into highly developed tourism products which generate competitive advantages in the long run. Furthermore, RBV emphasizes that the manpower resources must be managed in a strategic manner and their improvement should be a constant process aimed at staying competitive, which, again, is quite consistent with having to invest in trail quality and infrastructural integration on a regular basis.

Destination Competitiveness Theory

The Destination Competitiveness Theory also presents a detailed explanation of how tourism destinations compete in the global markets and how infrastructure can be used to ensure the destinations attain a competitive edge. This theory, which was developed with the assistance of the various models of competitiveness, suggests that the competitiveness of destinations are the product of an interaction between the core resources, the facilitating factors, the destination management, and the situational conditions (Gonzalez-Rodriguez, Martin-Samper and Pulido-Pavon, 2023). An infrastructure development is a major supportive factor that adds to the nature of natural and cultural resources that enable destinations to deliver improved experiences to visitors. Wu et al. (2024) regard infrastructure as one of the most significant factors influencing the competitiveness of tourist destinations and confirm that the quality of infrastructure directly affects the attractiveness of tourist destinations, their accessibility, and efficiency.

The theory is relevant to the trail infrastructure investment in that it has a comprehensive perspective of creation of competitive advantage. It recognizes that the tourism destination competitive advantage should not solely be founded on resource endowment but strategic resource/infrastructure/management capability (Gonzalez-Rodriguez et al., 2023). This means that natural landscapes are insufficient in the Kenya adventure tourism industry and needs to be enhanced with quality trail infrastructures that will enhance ease of accessibility, security as well as satisfaction of the visitors. Another point made by the theory is that destination competitiveness is situational and constantly changing and therefore requires continuous investment in infrastructure and adaption to the changing market preferences as well as competitive pressure. This is to agree with the requirement of the integrated trail systems and the continuous quality improvement so that the country can be competitive in the dynamic market of the adventure tourism.

4. EMPIRICAL REVIEW

Effect of integrated trail infrastructure investment on competitive advantage in adventure tourism sector.

Trail Network Connectivity

Trail network connectivity proves to be a core determinant of destination competitiveness in adventure tourism and there is a lot of empirical evidence to prove this point. Lukoseviciute and Panagopoulos (2024) determined that well networked trails support participatory development and management of eco-cultural trails in sustainable tourism destinations, which directly increase visitor experiences by increasing accessibility and diversity of routes. Trail systems have the potential to make the destinations stand out of the crowd by offering integrated experiences that tourists can explore through the connectivity of the trail systems. Zhang, Wang and Chen (2022) presented empirical data on China that showed that connectivity in new infrastructure has a significant influence on the competitiveness of the tourism industry by decreasing the time spent on traveling, increasing access to remote attractions, and facilitating the creation of a variety of tourism products. Their results showed that the infrastructure connectivity investments produced quantifiable changes in the destination competitiveness indices, and connected trail networks were essential facilitators of the development of adventure tourism.

Trail connectivity and competitive advantage do not just rely on the physical access but on the development of distinctive tourism experiences that appeal and keep the visitors. A systematic

literature review by Panagopoulos, Sousa and Rodrigues (2022) investigated the economic effect of recreational trails and reported consistent results that connected trail systems have greater economic returns than isolated trail segments. Their review of the literature found that trail connectivity amplifies tourism spending by promoting longer tourist stay, supporting multi-day adventures, and supporting the creation of special adventure tourism products. According to Wu et al. (2024), infrastructure connectivity is one of the most significant factors that promote the competitiveness of tourist destinations, and integrated networks generate synergies that cannot be realized by single trail segments. The interconnectedness of trail infrastructure therefore acts as a force multiplier, that is, it converts the dispersed natural resources into integrated adventure tourism products that have premium market positioning.

Empirical evidence in different geographical settings has shown that the connectivity of trail networks has a direct impact on destination choice decisions among adventure tourists. Mutinda and Mayaka (2022) studied the mountain tourism infrastructure and visitor experience at the Mount Kenya National Park, and discovered that the lack of connectivity in the trail networks limited visitor satisfaction and the competitive positioning of the park in comparison with other mountain tourism destinations around the world. Their analysis showed that poorly interconnected trails made visitors walk the same path again, restricted access to a variety of ecological areas, and decreased the quality of the overall experience. Marion and Wilkins (2024) further developed the idea of trail sustainability in its broad sense, stating that sustainable trail networks should be more focused on connectivity to maximize resource use, limit the impact of the network on the environment per visitor, and improve destination competitiveness. Their structure shows that linked trail networks spread visitor pressure better, minimize congestion at the most visited attractions, and provide a chance to develop niche markets.

Signage Systems

Signage systems are attributes of critical infrastructure with a considerable influence with visitor experience, perceptions of safety and destination competitiveness in adventure tourism. Another aspect of trail sustainability is trail signage systems, which Marion and Wilkins (2024) indicated may serve a number of functions, including wayfinding, safety communication, environmental education, and behavior management. Their research found out that full signage systems reduce the anxiety of visitors, improve the safety outcomes and the overall satisfaction scores that directly translate in competitive advantage through an improved experience. The literature review by Lukoseviciute and Panagopoulos (2024) of participatory development methods in tracking management found out that development of signage systems with multilingual information, cultural background, and unambiguous directional signs was more effective to enhance visitor participation and satisfaction at the sustainable tourism sites. The signage systems and level of quality and thoroughness were proven to be distinguishing variables in influencing destination selection among the adventure tourists wishing to experience safe, instructive and fulfilling destinations.

Signage system investments have economic and competitive impacts that are not limited to visitor satisfaction in the short term, but also market positioning and reputation management. According to Panagopoulos et al. (2022), systematic review has reported that recreational trails that have detailed signage systems attract more visitors and have more economic effects than poorly marked trails. In their analysis, they found that signage investments lower perceived risk in potential visitors, increase the size of the addressable market to less experienced adventurers, and increase repeat visitation by positive word of mouth referral. Chen et al. (2024) examined the efficiency of

tourism and the factors that impact tourism in the coastal provinces and found that information infrastructure such as signage systems are influential factors that determine tourism efficiency and competitiveness. Their empirical evidence showed that destinations that invested in full visitor information systems such as trail signs scored higher in tourism efficiency and competitive positioning in the regional and international markets.

Infrastructure signage systems are also important safety measures that minimize the liability risks, promote the destination image and facilitate the development of sustainable tourism. Mutinda and Mayaka (2022) discovered that lack of proper signage at the Mount Kenya National Park led to disorientation of the visitors, safety accidents, and poor reviews of the experience, which weakened the competitive position of the destination. They found that the shortage of signage was found to be disproportionately experienced by international visitors who are not well acquainted with local geography and conditions, which led to the loss of market opportunities in high value tourist segments. Marion and Wilkins (2024) suggested that signage systems that assist in maintaining the trail should not only convey directional messages, but also convey environmental conservation messages, proper use instructions, and cultural sensitivity expectations. This multifunctional strategy of signage investment generates competitive advantages by branding destinations as professionally operated, safety aware and environmental friendly. Wu et al. (2024) mentioned the information accessibility as a determinant of destination competitiveness, and the signage systems are the main information delivery tools that influence visitor perceptions and decision making during the tourism experience.

Support Facilities Integration

The combination of support facilities and trail infrastructure is a very important aspect of competitiveness in adventure tourism, as it has a direct impact on visitor comfort, safety, and the quality of the experience. In a systematic literature review of tourism infrastructure investments, Corbos and Bunea (2024) discovered that there is consistent evidence regarding the importance of integrated support facilities such as rest areas, sanitation facilities, emergency response stations, and visitor centers in increasing destination attractiveness and competitiveness. They found that the integration of support facilities can turn simple trail infrastructure into full-fledged tourism products that can appeal to the diverse visitor segments and command a high price. Empirically, Zhang et al. (2022) have shown that multiplicative effects of integrated infrastructure investments, including primary trails and supporting amenities, on tourism competitiveness are caused by the fact that these investments will cater to the entire range of visitor needs and expectations.

Integration of support facilities specifically tackles the major obstacles to adventure tourism participation, expanding the market base and competitive edge. Lee, Kim and Choi (2024) have utilized natural resource based view theory to nature based tourism destinations and established that strategic integration of support amenities with natural resource establishes unique competitive advantages by lowering barriers to participation and increasing accessibility to a wide range of visitor types. Their study showed that destinations that were well integrated in terms of support facilities attracted wider demographic groups, had higher visitor satisfaction rating, and had better economic payoffs than destinations that provided basic trails access. Mutinda and Mayaka (2022) reported that the lack of appropriate support facilities at the Mount Kenya National Park limited visitor experiences, reduced overnight visits, and weakened the competitiveness of the destination with other mountain tourism destinations in the world that integrated all the facilities. The lack of combined support facilities compelled visitors to bring large supplies and posed safety threats that discouraged the potential visitors.

The competitive impacts of support facilities integration can be extended to the destination reputation, repeat visitation, and market positioning in the global adventure tourism business. The systematic review by Panagopoulos et al. (2022) revealed that recreational trails with support facilities had much greater economic effects due to longer visitor duration, greater on site spending and higher repeat visitation rates. They have analyzed that facility integration opens the possibility of generating ancillary revenue and at the same time enhancing visitor experiences and safety outcomes. The study by Wu et al. (2024) revealed that the quality of facilities and integration are the main factors of destination competitiveness, and adventure tourists are more demanding of the provision of a complex infrastructure that allows them to have a comfortable, safe, and memorable experience. Marion and Wilkins (2024) also highlighted that sustainable trail development must have integrated support facilities that have minimum environmental impact and maximum visitor satisfaction, which generate competitive advantages through responsible tourism positioning. Empirical data given by Zhao et al. (2025) demonstrated that integrated infrastructure investment involving support facilities enhance tourism growth by enhancing the overall destination quality, visitor perceptions, and competitive positioning in a growing adventure tourism markets. The support facilities integration therefore comes out as a strategic necessity to destinations that want to gain sustainable competitive advantages in the changing adventure tourism environment.

Effect of trail quality enhancement investment on competitive advantage in adventure tourism sector.

Surface Maintenance

Basic quality improvement tactics like surface maintenance investment directly influences visitor experience, safety performance and destination competitiveness in adventure tourism. To generalize the definition of trail sustainability, Marion and Wilkins (2024) identified surface integrity as a major factor in sustainability and well-kept trail surfaces add to the quality of the environment, visitor safety, and total experience. Their empirical research revealed that destinations that were oriented towards systematic maintenance of their surfaces were more successful in sustainability performance and in addition, these destinations could improve their competitive positioning through offering high quality visitor experiences periodically. Mutinda and Mayaka (2022) conducted research on the mountain tourism infrastructure in the Mount Kenya National Park and found that the satisfaction of the visitors, safety risks, and unfavorable remarks caused by the inability to maintain the surface led to a decrease in the competitiveness of the destination in the world mountain tourist markets. Their findings revealed that the effect of surface degradation on perceptions of quality of destination among visitors was disproportionately high in that decayed trails were a signal of poor management that deterred prospective visitors.

The economic effect of surface maintenance investments does not just affect the destination in terms of immediate satisfaction of the visitors but also long term sustainability of the destination and market positioning. The summary presented by Corbos and Bunea (2024) highlights a vast amount of literature that indicates that consistent investments into the maintenance of the trail surface provide tangible benefits in the shape of higher visitor counts, longer periods of stay, and improved destination reputation. They determined the surface quality to be a critical threshold variable in choice of destination and that adventure tourists are ready to avoid poor trail conditions in destinations despite the quality of natural resources. Zhang et al. (2022) provided empirical data on the infrastructure maintenance in China, such as trail surface maintenance, which has a strong influence on the competitiveness of the tourism industry as it guarantees stable delivery of the experience and reduces negative word of mouth. They concluded that the payoffs of maintenance

investments are higher than those on the development of new infrastructure in mature tourist destinations, and the quality preservation strategic value is high.

Surface maintenance investment can also serve as risk management tools which can protect the destination image and retaining competitive advantage in the long run. According to a report by Marion and Wilkins (2024), low maintenance of the surface increases the pace of environmental degradation, accidents, and costly remediation processes more expensive than the cost of preventive maintenance. They found out that proactive surface maintenance strategies result in competitive advantages because they ensure the life of the trails, that the time of closures is minimized, and the accessibility is seasonally and weather condition unchanged. As it was demonstrated by Wu et al. (2024), the quality of infrastructure was revealed to be a key determinant of destination competitiveness, and surface conditions were adopted as the manifestations of the quality of destination management that affect the impressions and choice decisions of the visitor. Lukoseviciute and Panagopoulos (2024) found out that participatory destinations trail management approaches that entailed frequent surface care enhanced the sustainability of destinations and strengthened the support of the community towards tourism development. Their study has determined that the well-kept trail surfaces had good spillover effects of an increased local pride, increased environmental custodianship and increased community tourism relations that added up to increased destination competitiveness. Zhao et al. (2025) have made empirical evidence that infrastructure investments such as surface maintenance improve tourism development because it reveals the commitment of the destination to visitor satisfaction and long term sustainability.

Safety Features

Investments in safety features are critical quality improvement initiatives that have direct impacts on destination choice decisions, liability management and competitive positioning in adventure tourism markets. Marion and Wilkins (2024) stressed that the presence of the complex safety infrastructure with barriers, handrails, warning signs, and emergency access points are the key elements of sustainable trail development that positively affect the confidence of visitors and real safety indicators. Their study revealed that destinations that invested in safety features in a systematic manner had lower rates of accidents, less liability and better market positioning with the safety conscious adventure tourists. Mutinda and Mayaka (2022) reported that poor safety equipment in the Mount Kenya National Park was among the factors that led to accidents among visitors, emergency evacuations, and adverse publicity that hurt the competitiveness of the destination and discouraged potential visitors in major international markets. Their results indicated that safety deficits generated perception gaps between the quality of the natural assets of the destination and its professional management capacity, which compromised competitiveness.

The competitive benefits created by the investment in safety features are reflected in the ability to access a wider market, increase reputation, and price at a premium. Wu et al. (2024) found that safety infrastructure is one of the main factors that contribute to destination competitiveness, with adventure tourists becoming more focused on destinations that show an evident concern about visitor safety through the extensive investment in the safety infrastructure. They found that safety features are market signals that decrease perceived risk, increase the size of addressable markets to include families and older adventurers, and warrant premium pricing by increasing value propositions. In their literature synthesis, Corbos and Bunea (2024) discovered that safety infrastructure investments have asymmetric competitive implications, where sufficient safety features act as threshold conditions whereas exceptional safety infrastructure produces unique competitive advantages. Their review reported that destinations with safety excellence reputations

received more visitor loyalty, positive word of mouth referrals, and competitive edges even in economic downturns where price sensitive tourists dominated the markets.

The investments in safety features also generate competitive advantages in terms of liability management, operational efficiency and sustainable tourism development. Marion and Wilkins (2024) have reported that extensive safety infrastructure lowers the cost of emergency response, limits the duration of trail closures after accidents, and shields the reputation of destinations against litigation publicity. Their study showed that proactive safety investments provide high returns as opposed to reactive incident management in terms of accident prevention, lowering insurance premiums, and continuity of operations. In their systematic review, Panagopoulos et al. (2022) discovered that recreational trails with extensive safety measures had increased economic effects due to lower accident related closures, increased visitor confidence, and increased market accessibility. Lee et al. (2024) used natural resource based view theory to show that the investments in safety infrastructure generate unique competitive advantages by converting natural resources into safely accessible tourism products that appeal to risk averse market segments. Their empirical study found that destinations that combined safety elements with natural attractions gained better competitive positioning because of low barriers of participation and increased inclusive tourism. Zhang et al. (2022) presented the evidence that investments in infrastructure with the primary focus on the safety improvement have a substantial effect on the tourism competitiveness through the increase of the destination quality perceptions and the reinforcement of the market positioning among high value tourist groups that prioritize secure adventure experiences.

Accessibility Standards

The accessibility standard investments are the transformational quality improvement initiatives that enhance market accessibility, social responsibility, and develop unique competitive advantages in adventure tourism. Marion and Wilkins (2024) defined trail sustainability as having accessibility considerations that balance environmental protection with visitor accessibility, and contend that destinations with high accessibility standards gain competitive advantages in terms of broader market demographics and increased social legitimacy. Their study reported that the accessibility investments such as grade adjustments, surface enhancements and assistive infrastructure allow the involvement of visitors with various physical abilities and make adventure tourism not an exclusive experience but an inclusive one. Lukoseviciute and Panagopoulos (2024) studied the methods of participatory trail development and discovered that the adoption of accessibility standards increased the competitiveness of destinations through attraction of underserved market segments, the creation of a positive social impact recognition, and the differentiation of destinations in saturated tourism markets. In their analysis, they found out that accessibility investments produce positive results involving both commercial benefit and social equity development.

Accessibility standard investments do not only have competitive implications in the form of market expansion, but also reputation building, regulatory compliance, and sustainable competitive positioning. According to Wu et al. (2024), accessibility infrastructure is one of the determinants of destination competitiveness, as international adventure tourists are increasingly considering destinations in terms of inclusive tourism facilities and universal design features. The study by them revealed that destinations that met or surpassed accessibility criteria received a better competitive positioning based on better brand image, favourable media coverage and conformity to world tourism sustainability models. Corbos and Bunea (2024) reviewed the literature that

indicated that accessibility investments yield disproportionate competitive returns by serving previously locked-out market segments and at the same time increase the overall visitor experience quality by improving trail design and infrastructure quality. Their review reported that the destinations that were made more accessible attracted not only visitors with disabilities but also families with young children, elderly adventurers, and those who wanted comfortable experiences, not challenging ones, which dramatically increased the total addressable markets.

The accessibility standard investments are also strategic positioning tools that match the destinations with the changing norms and expectations of the tourism industry. Clark et al. (2025) used the holistic resource based theory to nature based destinations and it was shown that accessibility infrastructure investments generate sustainable competitive advantages through the combination of natural resource access and social responsibility credentials, which appeal to conscious consumers. Their empirical study showed that destinations with the excellence of accessibility had superior positioning in the sustainable tourism markets and also received a wide range of visitor demographics. Lee et al. (2024) established that the accessibility investments that facilitated the nature based tourism developed unique competitive advantages because it minimized the participation barriers and allowed everyone to enjoy the natural attractions. As stressed by Marion and Wilkins (2024), accessibility and sustainability are complementary and not competing goals and well-designed accessible trails tend to show better environmental performance in terms of controlled visitor flow and minimized off trail effects. The empirical data presented by Zhao et al. (2025) has shown that infrastructure quality investments including accessibility improvement enhance tourism development by enhancing destination inclusivity, increasing market reach, and enhancing competitive positioning in tourism markets that are already mature and have a well-developed infrastructure. This utilization of stringent accessibility criteria therefore becomes a strategic necessity to adventure tourism destinations that are interested in differentiation, market growth, and sustainable competitive advantage in growing competitive global markets.

Conceptual Framework

The conceptual framework demonstrates the association between competitive advantage and trail infrastructure investment in the adventure tourism industry in Kenya. The independent variable will include integrated trail infrastructure investment (trail network connectivity, signage systems, integration of support facilities) and trail quality improvement investment (surface maintenance, safety features, accessibility standards).

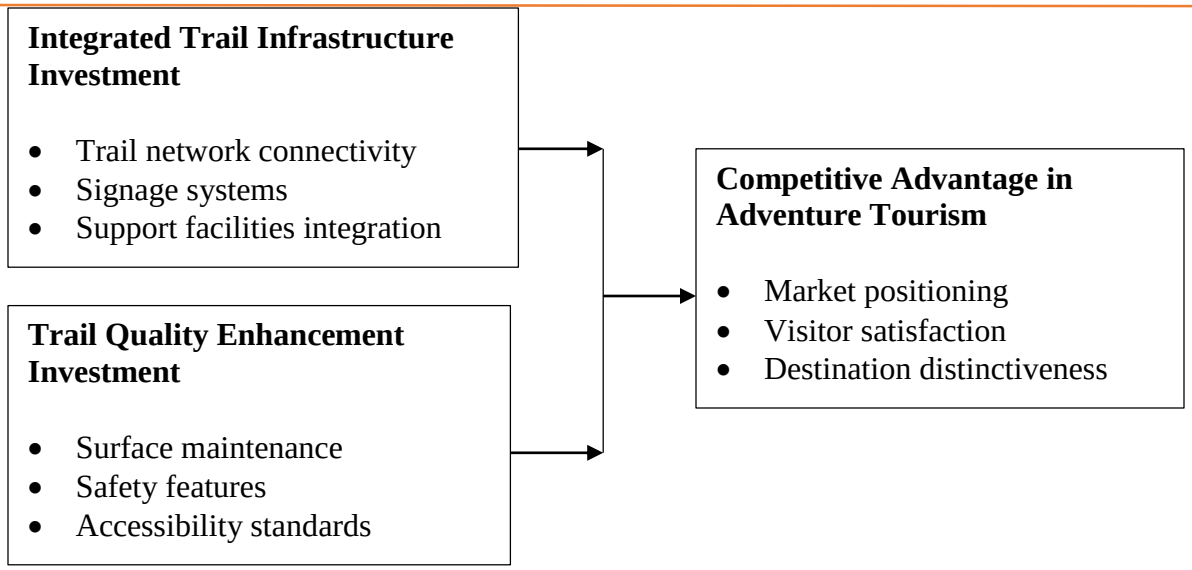

Figure 1: Conceptual Framework

5. CRITIQUE OF LITERATURE REVIEW AND SUMMARY OF RESEARCH GAPS

The reviewed literature provides substantial evidence on relationships between trail infrastructure investment and competitive advantage in adventure tourism, yet several critical limitations warrant examination. The majority of studies employ cross sectional designs that capture infrastructure competitiveness relationships at single points in time, limiting understanding of how these relationships evolve as destinations mature or competitive environments shift (Zhang et al., 2022; Wu et al., 2024). Longitudinal studies examining infrastructure investment effects over extended periods remain scarce, constraining ability to assess sustainability of competitive advantages generated through infrastructure development. Furthermore, many studies rely heavily on secondary data and aggregate measures of infrastructure quality, potentially obscuring nuanced relationships between specific infrastructure components and particular dimensions of competitive advantage (Corbos & Bunea, 2024).

The literature exhibits significant geographic concentration, with empirical evidence predominantly derived from developed tourism markets in Europe, North America, and East Asia (Marion & Wilkins, 2024; Panagopoulos et al., 2022). This geographic bias raises questions about applicability of findings to developing country contexts where institutional frameworks, resource constraints, governance structures, and market conditions differ substantially. African adventure tourism destinations, particularly Kenya, remain critically underrepresented in empirical literature despite the continent's substantial natural assets and growing tourism importance (Kamau & Waudo, 2021). Studies examining infrastructure investment in resource constrained environments where competing development priorities exist are notably absent, limiting practical guidance for destinations facing similar challenges to Kenya.

While Resource Based View and Destination Competitiveness theories provide valuable frameworks, their application to trail infrastructure remains underdeveloped. The literature insufficiently addresses how infrastructure investments create inimitable competitive advantages

rather than simply replicable improvements that competitors can easily match (Clark et al., 2025). The temporal dimension of competitive advantage sustainability receives inadequate attention, specifically how long infrastructure based advantages persist before requiring reinvestment or innovation to maintain competitiveness. Additionally, interaction effects between different infrastructure components remain poorly theorized, with most studies examining components in isolation rather than as integrated systems (Lukoseviciute & Panagopoulos, 2024).

Competitive advantage operationalization varies considerably across studies, creating challenges for synthesis and comparison. Some studies emphasize market share and visitor numbers (Zhang et al., 2022), others focus on visitor satisfaction and experience quality (Mutinda & Mayaka, 2022), while still others examine economic indicators like tourism revenue and expenditure (Panagopoulos et al., 2022). This measurement inconsistency obscures understanding of which infrastructure investments generate which types of competitive outcomes. Furthermore, attribution challenges persist as isolating infrastructure investment effects from other factors influencing competitiveness proves methodologically difficult, and few studies employ rigorous approaches to address this challenge (Corbos & Bunea, 2024).

The literature demonstrates a pronounced disconnect between infrastructure investment research and implementation realities. Studies effectively document what infrastructure investments matter for competitiveness but provide limited guidance on how resource constrained destinations should prioritize investments, sequence development, or navigate governance challenges in implementation (Wu et al., 2024). The role of institutional factors including governance structures, public private partnerships, regulatory frameworks, and community participation mechanisms in determining infrastructure investment success receives insufficient attention. Additionally, the literature inadequately addresses the policy practice gap evident in many developing destinations where ambitious strategies exist but implementation remains fragmented and inconsistent (Kenya Ministry of Tourism and Wildlife, 2025). While recent literature increasingly acknowledges sustainability concerns (Marion & Wilkins, 2024; Lee et al., 2024), tension between infrastructure development and environmental conservation remains underexplored, and the literature provides limited guidance on optimal infrastructure intensity and trade offs between different investment priorities.

Based on the critical literature review, six major research gaps emerge that this study addresses in the context of Kenya's adventure tourism sector. First, the literature lacks empirical and conceptual research examining trail infrastructure investment and competitive advantage relationships in African contexts, particularly Kenya. Existing evidence derives predominantly from developed markets with substantially different institutional, resource, and market conditions, creating uncertainty about applicability of global findings to Kenya's specific circumstances including fragmented governance between national and county governments, limited public infrastructure budgets competing with other development priorities, and nascent adventure tourism market development. This study addresses this gap by synthesizing global evidence and explicitly contextualizing findings for Kenya's adventure tourism development challenges, institutional realities, and competitive positioning needs.

Second, the literature examines infrastructure components largely in isolation, with limited research on how connectivity, signage, facilities, maintenance, safety, and accessibility function as integrated systems to create competitive advantages. The synergistic effects of combining multiple infrastructure investments remain poorly understood, as do optimal configurations and sequencing of investments. This study addresses this gap by examining integrated trail

infrastructure investment as a holistic system and exploring how integration itself becomes a source of competitive advantage distinct from individual component improvements. Third, while infrastructure development receives substantial attention, quality enhancement investments are treated as operational concerns rather than strategic competitive tools. The literature inadequately examines how systematic quality enhancement creates sustainable competitive advantages, particularly in destinations with existing but underdeveloped infrastructure. This study addresses this gap by positioning trail quality enhancement investment as a distinct strategic dimension with specific mechanisms through which it generates competitive advantages, providing particular relevance for Kenya where basic trail networks exist but quality standards fall short of international expectations.

Fourth, the literature documents strong theoretical and empirical relationships between infrastructure investment and competitiveness but provides limited insight into why many destinations including Kenya fail to translate this knowledge into effective implementation. The gap between policy articulation and on ground development remains underexplored, with insufficient examination of institutional barriers, governance challenges, resource allocation mechanisms, and coordination requirements for effective infrastructure investment. This study addresses this gap by explicitly examining Kenya's policy implementation disconnect and developing recommendations that acknowledge institutional realities and propose mechanisms to bridge the gap between strategic intent and operational execution. Fifth, the literature establishes that infrastructure investments create competitive advantages but inadequately examines sustainability of these advantages over time, including how long infrastructure based advantages persist, what reinvestment patterns maintain competitiveness, and how destinations prevent infrastructure advantages from eroding as competitors invest in similar improvements. This study addresses this gap by examining how different infrastructure investment types contribute to sustainable rather than temporary competitive advantages, with particular attention to inimitability and continuous improvement requirements.

Sixth, destination managers and policymakers in resource constrained environments require evidence based frameworks for prioritizing infrastructure investments, yet the literature provides limited practical guidance on trade offs between competing investment priorities, optimal sequencing of development phases, and resource allocation strategies. This study addresses this gap by developing a conceptual framework that links specific infrastructure investment dimensions to competitive advantage outcomes, enabling stakeholders to understand which investments generate which types of competitive benefits and thereby supporting more strategic resource allocation decisions in Kenya's adventure tourism development.

6. FINDINGS

Effect of Integrated Trail Infrastructure Investment on Competitive Advantage in Adventure Tourism Sector

The literature review indicates that integrated trail infrastructure investment has a great impact on competitive advantage in adventure tourism by means of three important processes. Connection to trail networks became a core source of destination competitiveness, and empirical studies have shown that well connected trail networks positively influence visitor satisfaction, allow development of a variety of tourism products, and provide unique market positioning (Lukoseviciute and Panagopoulos, 2024; Zhang et al., 2022). Linked networks allow access to a variety of attractions easily, promote longer visitor durations, and produce increased economic

returns than single trail segments (Panagopoulos et al., 2022). Signage systems are the vital elements of the infrastructure that improve the quality of visitor experience, decrease the perceived risks, and broaden the range of the target market to cover the less experienced adventurers (Marion and Wilkins, 2024; Wu et al., 2024). Signage investments are comprehensive, which directly leads to competitive advantage by creating better safety outcomes, visitor confidence, and better access to information. Support facilities integration converts simple trail infrastructure into holistic tourism products that can appeal to a wide range of visitor groups and have a high premium position (Corbos and Bunea, 2024; Lee et al., 2024). Integrated support facilities lower the barriers of participation, allow longer adventures and facilitate ancillary revenue generation and improve the overall destination quality perceptions.

Effect of Trail Quality Enhancement Investment on Competitive Advantage in Adventure Tourism Sector

Investment in trail quality improvements has shown significant impacts on competitive advantage by systematic increase in maintenance of surfaces, safety measures, and accessibility levels. Surface maintenance was found to be a core quality factor that has a direct impact on visitor satisfaction, destination reputation, and long term competitiveness (Marion and Wilkins, 2024; Corbos and Bunea, 2024). Professional destination management is indicated by well maintained trail surfaces, lower rates of accidents, consistent experience delivery, and higher returns than the new infrastructure development in mature destinations (Zhang et al., 2022). The creation of competitive advantages by safety feature investments in the form of increased market access, reputation, and lessened liability exposure and the extensive safety infrastructure as market signals that perceived risk is reduced and premium pricing is warranted (Wu et al., 2024; Marion and Wilkins, 2024). Transformative quality investments include accessibility standard investments, which increase the market reach beyond the traditional adventure tourists to cover families, elderly visitors, and persons with disabilities (Lukoseviciute and Panagopoulos, 2024; Clark et al., 2025). Destinations that are highly accessible gain competitive advantages by diversifying their markets, having social responsibility credentials, and conforming to global sustainable tourism models. Together, quality improvement investments generate sustainable competitive advantages by providing a stable experience delivery, increasing the number of markets to address, and making destinations professionally managed, safety conscious, and socially responsible (Zhao et al., 2025).

7. CONCLUSION

This conceptual review establishes that strategic trail infrastructure investment is fundamental to achieving sustainable competitive advantage in Kenya's adventure tourism sector. Integrated infrastructure investments encompassing trail network connectivity, comprehensive signage systems, and support facilities integration transform natural assets into distinctive tourism products that deliver superior visitor experiences and enable premium market positioning. Quality enhancement investments in surface maintenance, safety features, and accessibility standards prove equally critical by ensuring consistent experience delivery, expanding addressable markets, and signaling professional destination management. The synthesized evidence demonstrates that natural endowments alone are insufficient for competitive positioning; rather, systematic infrastructure development converts resource potential into inimitable competitive advantages. Kenya's current infrastructure deficits constrain its ability to capitalize on growing global demand and compete effectively with regional destinations like Tanzania, Rwanda, Uganda, and South Africa that prioritize trail development. The persistent policy implementation gap, characterized

by ambitious national strategies but fragmented on ground execution due to governance challenges between national and county levels, resource allocation constraints, and weak coordination mechanisms, continues to undermine Kenya's competitive positioning. Addressing these gaps through comprehensive investment frameworks that bridge strategic intent and operational execution represents a strategic imperative for achieving sustainable competitive advantage in the evolving adventure tourism market.

8. RECOMMENDATIONS

The review recommends that strategic trail infrastructure investment should be prioritized by tourism stakeholders in Kenya to achieve sustainable competitive advantage. The Ministry of Tourism and Wildlife and Kenya Tourism Board should develop holistic investment frameworks that incorporate connectivity planning, signage standardization, and support facilities development while establishing clear coordination mechanisms between national and county governments to address the persistent policy implementation gap. Destination managers should implement systematic quality enhancement programs encompassing surface maintenance schedules, comprehensive safety feature installations, and accessibility standard compliance, supported by monitoring and evaluation systems ensuring consistent delivery. Private investors should recognize infrastructure investment as strategic rather than discretionary expenditure, with potential returns including enhanced visitor satisfaction, expanded market segments, premium pricing opportunities, and sustained competitive positioning. Policymakers should establish investment incentives including tax breaks for trail infrastructure development, streamlined approval processes for adventure tourism projects, and regulatory standards ensuring quality benchmarks across destinations. Public private partnership mechanisms should be formalized through clear frameworks defining roles, responsibilities, and risk sharing arrangements that mobilize private capital while ensuring public interest protection. Finally, capacity building initiatives should be implemented to strengthen institutional capabilities for trail infrastructure planning, development, and management at both national and county levels, addressing the root causes of the policy practice disconnect that has historically constrained Kenya's adventure tourism competitiveness.

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