

Paving the Way for Tourism: A Systematic Literature Review of Road Infrastructure's Impact

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Abstract. This article examines the influence of road infrastructure on the tourism sector, emphasizing its economic, social, and environmental ramifications through a comprehensive literature review. Utilizing Google Scholar, an initial compilation of the 100 most significant papers was refined to 52 for a thorough examination. The results indicate that road infrastructure significantly contributes to tourism by stimulating local economic development, generating employment opportunities, and minimizing transportation expenses. From a social perspective, it enhances the quality of life within communities, diminishes income inequality, and encourages increased engagement in tourism development initiatives. Nonetheless, from an environmental standpoint, road construction disrupts ecological systems, elevates emissions, and accelerates the degradation of natural resources, underscoring the necessity for sustainable infrastructure planning to reconcile tourism expansion with environmental preservation.

Keywords: Road; Tourism; Infrastructure

1 Introduction

Tourism is unequivocally one of the foremost sectors of the economy, with road infrastructure being indispensable for its enhancement and evolution. Inferior road conditions may hinder accessibility and diminish the aesthetic appeal of tourist destinations. Sufficient infrastructure facilitates unobstructed access to tourist attractions, thereby amplifying business activities within the region, which can significantly uplift livelihoods and enhance the standard of living within the local community [1]. A plethora of scholars have emphasized that the role of road infrastructure extends beyond merely supporting existing tourism initiatives, as it also plays a critical role in the formation of new tourist destinations. Furthermore, the advancement of infrastructure generates employment opportunities for low-skilled laborers and promotes spatial inclusivity [2]. There exists a favorable correlation between road infrastructure and tourism activities, directly influencing the growth and momentum of tourism development [3]. However, challenges persist, including the urgent need for road enhancements, the implementation of road safety measures, and the upkeep of road infrastructure [4].

Road transportation is anticipated to augment cultural, economic, and social exchanges. Tourism is regarded as a leisure pursuit that generally transpires in recreational areas and incorporates both leisure and tourism activities. It has emerged as a significant global leisure endeavor, constituting a segment of a service-oriented industry that encompasses both tangible and intangible components. Tangible components encompass vital infrastructure such as transportation, accommodation, and tourist attractions, whereas intangible facets involve education, culture, and relaxation. In the absence of fundamental infrastructure such as well-

maintained roadways, tourism experiences may become precarious and less gratifying, resulting in tourists receiving inferior services that do not align with their expectations [5].

Road infrastructure plays a pivotal role within both the economic and social spheres. The transportation process, which involves the movement of goods and individuals to fulfill human requirements, facilitates commercial transactions and economic undertakings. A robust road infrastructure is crucial for promoting regional economic development. Essential elements of road infrastructure include quality, ease of mobility, connectivity among urban centers and tourist destinations, minimal disruptions, safety, accessibility to various locations and points of interest, and timeliness. Evidence of regional economic development is manifested through increases in income, employment opportunities, entrepreneurial ventures, revenue growth, as well as advancements in education and healthcare [6]. Various forms of infrastructure, along with factors such as tourist expenditure, distance, and comparative pricing, considerably affect the dynamics of tourism demand. Infrastructure is a fundamental component of the overall tourism offering. For example, road infrastructure improves accessibility, allowing tourists to effortlessly reach a variety of locations within a designated destination [7], [8], [9].

The evolution of the tourism sector is intrinsically associated with the enhancement of infrastructure alongside a robust transportation network. An improved transportation infrastructure culminates in reduced transportation expenditures, which in turn results in diminished variable costs related to commerce, and effectively narrows the distance between countries of origin and destination, thereby promoting the flow of international tourism. Notable advancements in the accessibility of general transportation infrastructure (such as roadways), among other factors, possess the potential to significantly influence inbound tourism from foreign nations [10], [11].

The interconnection between roadway infrastructure and the tourism industry unveils both beneficial outcomes and inherent constraints. Currently, the mutual effects of roadway infrastructure on tourism and vice versa are becoming increasingly apparent. The tourism industry propels the development of roadway infrastructure through substantial construction and modernization of road systems, the enhancement of transportation modes, an increase in the movement of passengers and goods, and the adoption of innovative transportation organizational strategies. Improved roadway infrastructure enables more efficient travel across extensive distances, thereby significantly reducing travel times for tourists [12]. In the absence of sufficient roadway connectivity, the ability of tourists to access attractions and services is severely limited, ultimately affecting the overall effectiveness of tourism initiatives. As a result, the improvement of roadway infrastructure is essential to enhance tourism opportunities and promote sustainable development within the sector [13]. Inadequate roadway accessibility may lead to increased travel costs [14].

Extensive academic inquiries emphasize the paramount importance of resilient infrastructure and essential services in the development of tourism destinations [15]. Insufficient infrastructure combined with a lack of necessary services can significantly impede the evolution of even the most exceptional tourist attractions. Essential services such as accessibility, transportation, communication, and waste management are vital for the progress of tourism, with transportation infrastructure being particularly critical [16]. The advancement of tourism requires the support of adequate infrastructure to facilitate various tourism activities. Infrastructure serves as a conduit that enables tourists to navigate more effectively and swiftly to their desired destinations. Well-established infrastructure is essential to attract tourists and to enable more seamless traffic flow as the influx of visitors increases [40, 49]. The quality of accessibility infrastructure is determined by the condition of roads leading to tourist attractions, the comfort level of the thoroughfares within the tourist area, and the modes of transportation

utilized to reach the destination. An improvement in the quality of amenity infrastructure can greatly enhance tourist satisfaction [17]. In order for a destination to establish a competitive position, it is crucial that it has an adequate network of roadways [18].

This study seeks to investigate the ramifications of road infrastructure on tourism by evaluating its economic, social, and environmental consequences through a systematic literature review. By scrutinizing a diverse array of sources and case studies, this research aims to furnish a comprehensive insight into the function that road infrastructure fulfills in the development of tourism. Furthermore, policy recommendations will be proposed to inform future infrastructure investments and enhancements to foster sustainable tourism growth, grounded in the outcomes of this inquiry.

2 Method

In conducting my literature review, I utilized Google Scholar as the primary database to identify relevant academic papers on the impact of road infrastructure on tourism. To narrow my findings, I employed the keywords “road infrastructure” AND “tourism development,” utilizing the Boolean feature to refine my search results. Initially, I selected the top 100 papers based on their citation counts and relevance to my research topic. From this initial selection, I excluded 12 papers due to the unavailability of full-text publications and one paper that was not published in English. Additionally, I excluded 35 papers because they were deemed irrelevant to my topic. After considering the relevance of the remaining papers to my study, I narrowed my selection down to 52 papers that will serve as the foundation for my literature review. This systematic approach ensured a comprehensive and focused examination of the existing literature in my area of research.

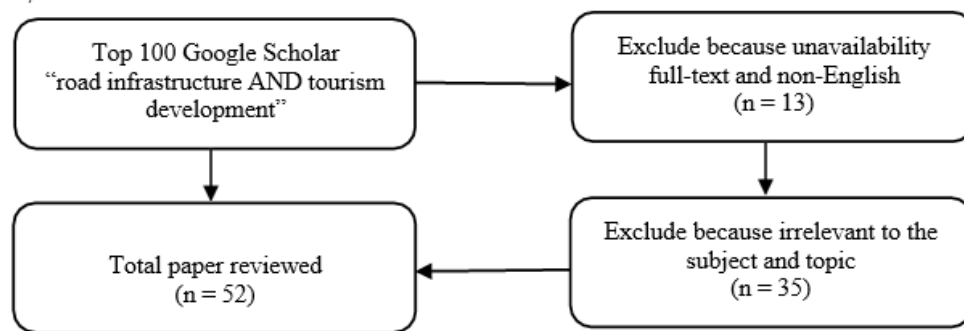


Figure 1. Review Methodology Process

3 Results

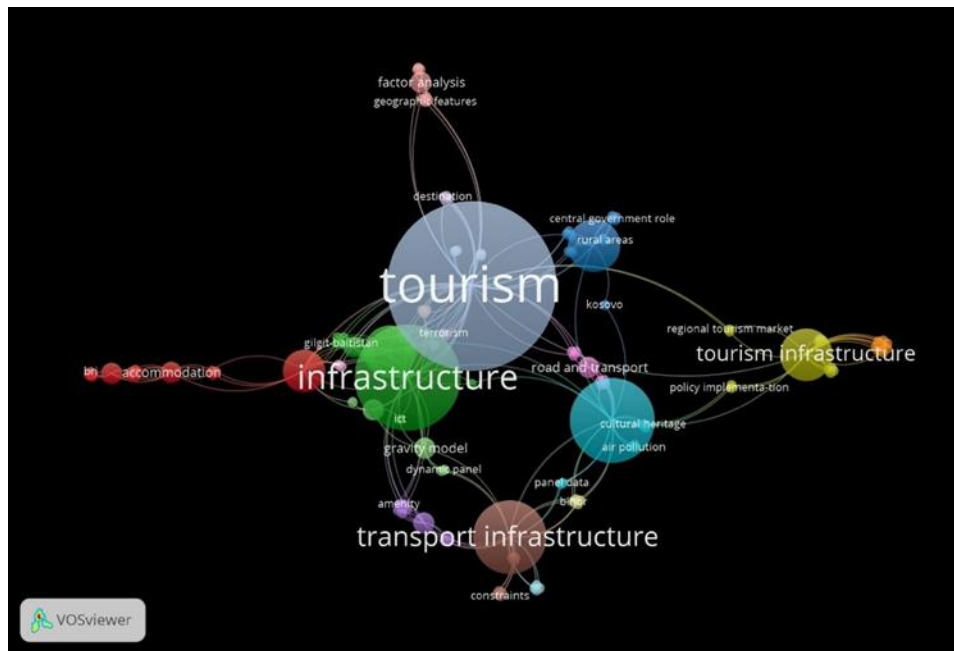


Figure 2. Network Visualization of Key Concepts in Tourism and Infrastructure

The VOSviewer visualization showcases the interconnectedness between key concepts in the study of tourism and infrastructure. At the center of the diagram is “tourism,” which is closely linked to “infrastructure” and “transport infrastructure.” This indicates that tourism heavily relies on various types of infrastructure, particularly transportation networks, to facilitate travel and enhance accessibility to tourist destinations. The prominence of related terms such as “economic development,” “policy implementation,” and “regional tourism” highlights the multifaceted role infrastructure plays in shaping tourism dynamics, suggesting that effective infrastructure development can lead to improved economic outcomes for regions.

Additionally, the presence of terms like “environmental impact,” “socio-economic factors,” and “cultural heritage” suggests that the relationship between tourism and infrastructure extends beyond mere accessibility. It encompasses social and environmental considerations, emphasizing the need for sustainable infrastructure development that respects local cultures and ecosystems. The connections drawn between these concepts in the VOSviewer output illustrate the importance of adopting a holistic approach in research and policy-making to ensure that tourism development benefits local communities while minimizing adverse environmental effects.

The term infrastructure refers to a physical framework that supports essential transportation, irrigation, drainage, construction, and other public services crucial for satisfying basic human needs in both social and economic contexts. Additionally, the infrastructure paradigm involves a process marked by the amalgamation of diverse elements, requiring a comprehensive, interdisciplinary, and multisectoral methodology. A notable challenge in infrastructure design is the evaluation of the interrelations among systems, emphasizing their interconnectedness and consequent effects [19].

Tourism infrastructure is essential to the tourism product of any region. It encompasses

the physical and institutional components necessary for effective economic and community management [20]. Tourism infrastructure is a crucial element of the tourism resource system. It includes a complex network of businesses, institutions, and services aligned with tourist expectations. The development of tourism infrastructure is characterized by: 1) businesses that serve tourists exclusively; 2) entities that serve both tourists and locals; 3) comprehensive regional infrastructure [21].

A “tourist destination” is a location that draws visitors through attractive offerings and developed infrastructure, ensuring a pleasant experience [22]. Tourism relies on two key factors: the intention to travel and the ability to do so. The first factor involves a desire for specific destinations, motivating travel when time and financial means are available. The second factor pertains to the ability to reach these destinations, aided by transportation and information resources. Thus, improving transportation infrastructure is crucial for enhancing the appeal and competitiveness of tourism destinations [23]. Travel motives are shaped by diverse interests, including economic, social, cultural, political, religious, health-related, and curiosity-driven factors, as well as the pursuit of experiences or knowledge [24].

The appeal of a tourist destination is greatly affected by its accessibility, with higher accessibility leading to increased attractiveness and tourist options. The implementation of transport infrastructure projects significantly impacts tourism, depending on their closeness to major attractions. Accessibility is a crucial element for any destination, reflecting mobility regarding individuals, goods, or information. A robust transport infrastructure and an effective transportation system ensure high accessibility, whereas underdeveloped systems reflect lower accessibility levels [25].

The road infrastructure is integral to the economic model, reflecting the accessibility and quality of domestic transport systems. This integration aims to highlight the importance of transport in tourism, encompassing attractions, accommodations, and retail, while ensuring services are secure, comfortable, competitively priced, and efficient [1]. A robust traffic network is crucial for the progress of both economic and tourism sectors, as it underpins various human activities. Conversely, poorly planned traffic development can hinder comprehensive growth. Tourists prefer travel experiences marked by comfort, efficiency, security, and affordability, as their leisure journeys should be memorable and extraordinary, creating “unforgettable” experiences.

The interrelationship between tourism and transport infrastructure is mutually beneficial, with both sectors fostering each other’s advancement. Enhanced road networks not only facilitate tourism by rendering destinations more accessible but also stimulate economic benefits for nations. The sustainable development of tourism is contingent upon the amalgamation of economic, social, environmental, and cultural factors, wherein road infrastructure assumes a pivotal role in attaining favorable results for both tourists and local communities [26].

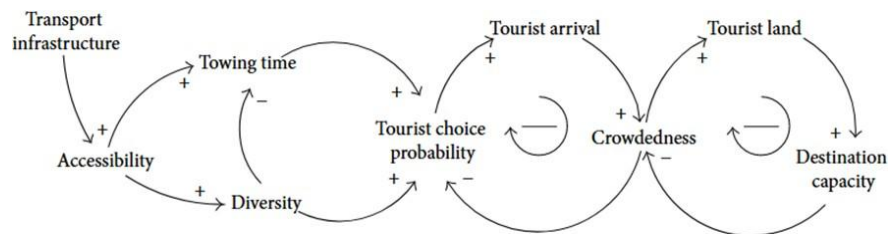


Figure 3. Dynamic Process of Tourism

The interaction between roadway infrastructure and the enhancement of tourist destinations represents a dynamic phenomenon. The beneficial externalities linked to roadway infrastructure regarding various tourism locales are manifest through cyclical feedback mechanisms. Typically, tourist destinations vie for improved transportation infrastructure to elevate their market visibility. Significantly, empirical research indicates that both competitive and collaborative approaches to roadway infrastructure investments can lead to increased tourist attraction for these locales. This dualistic strategy highlights the complexities of infrastructure development, wherein strategic partnerships among destinations may bolster competitive initiatives, ultimately promoting comprehensive tourism growth [27]. The expansion of regional tourism is fundamentally reliant on the enhancement of inter-regional connectivity. A vital prerequisite for achieving this connectivity is the existence of extensive road and rail infrastructures that effectively link various regions. The absence of such infrastructures impedes seamless transit between different destinations, consequently limiting the potential for tourism development in rural and underdeveloped areas [28].

3.1 Economic Dimensions

Infrastructure assets, particularly road infrastructure, are essential for economic growth. The quality of a nation's infrastructure significantly impacts its competitiveness. In tourism, effective road infrastructure is crucial for a sustainable industry. However, inadequate road conditions stem from underinvestment, poor maintenance, and budget constraints, leading to an infrastructure deficit [5]. Tourism is a vital economic sector for nations and their citizens. Enhancing a country's sociocultural image can improve its global standing. The growth of the tourism sector is increasingly essential for national development. Local tourism revenues can greatly bolster economic growth and the regional economy [16].

The implications of tourism on economic growth have led to the establishment of "tourism-driven development." Recently, the tourism sector has seen significant growth, becoming a key player in global economic advancement. The competitive nature of the tourism industry is a vital factor influencing growth and development, especially in developing countries. The increase in job opportunities is one of the many benefits linked to tourism development. As a labor-intensive field primarily involving unskilled labor, tourism provides various advantages for local communities, including poverty reduction and acting as a crucial sector for local economic advancement [28], [29]. The enhancement of road and transport infrastructure provides substantial economic benefits to local communities. Research indicates that improved roadways and transportation systems promote greater commercial activities and attract more tourism to the region [30].

Tourism is necessitated to assume a critical function in alleviating regional and local income inequalities. In theory, tourism possesses a significant impact on the distribution of income due to its ability to create a multitude of employment prospects across diverse sectors and income levels. Furthermore, a contributing factor that is likely to influence income inequality is the state of transportation infrastructure. Transportation infrastructure serves an essential function in enabling the movement of goods and individuals, thereby exerting a favorable effect on regional economic advancement and income augmentation [31].

The execution of proficient tourism strategies within an emergent economy possesses the capacity to yield considerable revenue prospects (taxation revenues) and promote sustainable employment for individuals equipped with semi-skilled or unskilled labor. To augment the economic efficacy of the tourism sector, it is essential to intensify efforts directed towards the enhancement of tourism infrastructure, which includes physical assets such as road networks and transportation systems [2].

Enhanced transportation infrastructure may yield economic advantages, including greater fuel efficiency and diminished travel expenses, while concurrently rendering destinations more attractive. Moreover, tourists tend to favor travel experiences characterized by comfort and convenience, and deficiencies within transportation systems may compel them to opt for alternative locations. The enhancement of road infrastructure catalyzes the development of regional specialization by lowering transportation expenditures [40]. Consequently, transportation infrastructure is indispensable for fostering tourism growth and preserving the competitive edge of destinations [1]. The economic infrastructure recognized as the foremost priority necessitated advancement [24].

The primary determinant of economic-tourism progression within the region is the transportation infrastructure. This assertion is particularly pertinent with respect to the growth of the tourism sector and the selection of tourist destinations. The transportation infrastructure functions as a vital external factor influencing the development of tourism; simultaneously, it represents a significant attraction element that impacts the decision-making process regarding the selection of tourist destinations [32].

The infrastructure associated with roadways and transportation facilitates accessible ingress to tourist destinations and stimulates commercial activities within the region, thereby exerting a beneficial impact on the living standards of the local populace. The enhancement of road and transport infrastructure engenders employment opportunities, amplifies business operations, and produces numerous additional benefits for the local community. Consequently, the advancement of road and transport infrastructure possesses the capacity to nurture positive perceptions within the local community concerning the advantages of tourism, which may, in turn, engender supportive attitudes towards tourism initiatives within the region. Furthermore, the benefits related to the development of road and transport infrastructure may further augment the overall satisfaction of the community [33].

3.2 Social Dimensions

Numerous investigations underscore the significance of road infrastructure in mitigating income disparity, enhancing communal contentment, and fostering environmentally beneficial tourism-related initiatives [26]. The provision of road infrastructure is of paramount importance in rural regions, contributing positively to the enhancement of their inhabitants' livelihoods. Members of rural communities continue to encounter challenges in accessing transportation due to deteriorating road networks, which pose a substantial threat to their economic well-being [34]. The advancement of road infrastructure represents an essential element in improving the overall quality of life for community members. Consequently, such infrastructural enhancements are crucial in creating employment prospects and alleviating the rising levels of poverty that are prevalent among rural populations [34].

Road networks are integral to the sustenance of local communities and are vital to the promotion of tourism, especially as the hospitality sector is dependent on the presence of adequate infrastructure. It is imperative to evaluate the readiness and willingness of the community to participate in tourism development, as such assessments should reflect the interests and involvement levels of local residents. Policymakers must remain cognizant of the priorities of the populace and tailor their strategies to the distinctive characteristics of each locale to ensure successful development [35]. Furthermore, the progress of transport infrastructure has emerged as a critical factor in enhancing accessibility, thereby facilitating transformations in social inclusion and socio-political frameworks.

The local populace is instrumental in bolstering tourism initiatives, and it is essential to comprehend how transportation infrastructure influences their overall disposition towards

tourism development. A favorable correlation exists between the visibility of the community, its enhanced image, infrastructure development, urbanization, and their general outlook. Nonetheless, issues related to traffic adversely impact this perception. Notably, environmental concerns exert minimal influence on the community's overall attitude. The favorable disposition of the community is also significantly associated with their endorsement of tourism, with economic advantages further reinforcing this connection [30].

3.3 Environmental Dimensions

The examination of the interaction between natural attractions and the governance of tourism has constituted a significant topic of academic inquiry for a multitude of years. The implications of tourism permeate all dimensions of the natural environment. The degree of influence is dependent upon various determinants, including the quantity of tourists, the ecological resilience to the pressures imposed by tourism, temporal variables, emerging tourism patterns, and the inherently transformative nature of tourism itself. In the realm of terrestrial transportation, railways and roadways detrimentally impact wildlife and habitats when traversing natural landscapes, thereby establishing barriers within an otherwise unbroken ecosystem. Emissions resulting from road and air transport are prominent contributors to the proliferation of greenhouse gases, and the intensification of industrial endeavors has not appreciably alleviated these sources. Excessive accessibility leads to an influx of individuals that may aggravate degradation levels, diminish visitor experiences, and negatively influence the natural integrity of resources. Conversely, the latter argument considers the ratio of visitors to the resident population in conjunction with the nature and magnitude of impacts produced [36].

Tourism, whilst economically advantageous, presents a considerable threat to the very environments it aspires to promote, particularly in delicate and sensitive regions. In areas rich in biodiversity, particularly within the developing world, the equilibrium between economic dependency on natural resources and environmental conservation is precariously balanced [12]. As the demand for nature tourism escalates, governments frequently perceive it as both an economic and conservation strategy, although this can be a double-edged sword. Governments occasionally endorse development projects that compromise the environment, underscoring the necessity for more stringent regulations to protect these natural locales. The process of road construction generates environmental pollution, disrupts natural habitats, and modifies hydrological flow patterns, which may subsequently lead to soil erosion [37].

Numerous tourist destinations, including heritage sites and national parks, have endured adverse effects due to heightened visitor traffic and the absence of sustainable transportation alternatives. Consequently, alternative visitor management strategies are being investigated to mitigate environmental impacts. Nonetheless, the challenge persists in identifying sustainable transportation solutions that accommodate the increasing number of visitors while ensuring the conservation of these vulnerable ecosystems. Meticulous planning and regulation are imperative to safeguard these destinations for future generations [38].

Conversely, the advancement of road and transportation infrastructure possesses the potential to engender detrimental environmental consequences, as traffic congestion, overcrowding, noise pollution, air quality degradation, and harm to the natural landscape are plausible adverse outcomes associated with the establishment of such infrastructure. Consequently, a perceived negative environmental impact may exhibit an inverse correlation with community support for tourism development [33].

4 Discussion

Transportation infrastructure investments are instrumental in shaping the trajectory of tourism development, influencing both mass tourists and individual tourists in markedly different ways. Mass tourists, who are generally accompanied by travel agencies, prioritize cost-effectiveness and temporal efficiency in their journeys to destinations. Improved accessibility, such as enhanced road systems or efficient public transportation options, reduces these costs, thereby enabling agencies to offer a wider array of services and integrate additional locations into their travel itineraries. Mass tourists demonstrate a predilection for swift visits to various sites, focusing on amenities such as accommodation and dining rather than engaging in immersive cultural experiences. In contrast, individual tourists tend to gravitate towards culturally rich, serene, and less crowded destinations. For these travelers, the convenience of transportation has a lesser impact, as they place a premium on experiential quality and are inclined to prolong their stays at fewer locations. Thus, while improvements in accessibility provide advantages for mass tourists, individual tourists exhibit greater sensitivity to overcrowding compared to the benefits of transportation convenience. Accessibility serves as an indicator of the ratio of actual to potential tourists, with enhancements in infrastructure improving this ratio by facilitating external transportation, thereby making destinations more attractive to prospective visitors [39].

The tourism industry is a multifaceted domain that encompasses various components and stakeholders that collectively shape the overall tourism experience. Given its intricacy, a multi-sectoral approach is essential for the development and management of tourist destinations. Transportation, in particular, is of paramount importance to tourism development, serving as the principal link between tourists and their intended destinations. Effective access and seamless movement within a destination are crucial for ensuring sustainable growth and enhancing a region's competitiveness and economic prosperity [4].

The planning and advancement of local tourism present a complex array of challenges. Numerous regions undertake tourism initiatives to achieve sustainability across economic, social, and environmental dimensions. Local governmental entities must leverage their natural and human resources, including the tourism sector, to catalyze development. The research indicates that specific issues and challenges related to infrastructure and services require attention in order to meet visitor expectations. Addressing these infrastructure-related challenges is vital for the successful development of tourism initiatives [40].

In the realm of tourism infrastructure, the majority of scholars focus on four distinct classifications: (1) lodging establishments, (2) culinary (catering) services, (3) transportation networks (including roads and public transit systems), and (4) ancillary facilities (such as recreational and informational services, etc.). These components are essential, as their absence would hinder any substantial discourse concerning economic advancement predicated on tourism. In the absence of adequate transport infrastructure (including roads, rail systems, air travel, etc.), tourists would encounter considerable barriers in accessing their desired destinations [41].

While the importance of tourism in fostering economic progress is widely recognized, the dialogue concerning its impact on poverty alleviation remains relatively underdeveloped. The assumption that tourism inherently produces economic growth, which in turn alleviates poverty, is overly simplistic. In reality, establishing a link between tourism development and poverty reduction at the household level has proven to be riddled with challenges. Critics argue that, instead of reducing poverty, tourism can in certain contexts exacerbate it contingent upon specific circumstances. Nonetheless, a burgeoning discourse has arisen among scholars,

policymakers, and non-governmental organizations concerning the efficacy of tourism as a tool for poverty alleviation. The assertion that tourism can aid in poverty reduction is predominantly predicated on two interconnected premises: first, that the advancement of tourism intrinsically fosters economic growth, and second, that such economic growth can proficiently mitigate poverty [42].

5 Recommendation

Transport infrastructure has been widely recognized as a key determinant of tourism competitiveness. The accessibility and availability of well-maintained road networks are fundamental for attracting both domestic and international tourists, particularly in border regions [21] argue that improvements in road infrastructure not only stimulate tourist activities but also influence tourist behavior by making destinations more accessible, which enhances the overall appeal of a region. Therefore, policymakers must prioritize investments in transport infrastructure to harness the economic benefits that arise from a well-integrated tourism sector. Moreover, the multinomial logit choice model, as highlighted in [26], underscores the importance of accessibility in tourists' decision-making processes when selecting destinations. By improving road infrastructure, policymakers can ensure that their regions are competitive in the tourism market, thereby driving economic growth.

However, while investment in infrastructure is crucial, planning must be done responsibly. Tourism development without adequate planning, and without considering local environmental and cultural contexts, can lead to adverse sociocultural, environmental, and economic impacts. As pointed out by [43], responsible tourism development should also enhance the aesthetic appeal of the environment and infrastructure for both tourists and locals. This dual focus enhancing infrastructure while maintaining environmental sustainability presents an opportunity for policies that support long-term, responsible tourism growth.

[38] emphasize the role of rural road enhancement in fostering tourism development. In rural areas, road quality, density, and transport service accessibility are critical for opening up new tourism destinations. Policymakers should focus on rural road networks to promote tourism expansion in underdeveloped areas. This approach not only strengthens rural tourism but also improves the living conditions of local communities by facilitating better access to markets and essential services. Furthermore, the development of integrated transport systems, as suggested by [44], could offer a comprehensive solution. An integrated national transportation system that ensures secure, efficient, and comfortable travel would facilitate regional development and improve accessibility to tourist destinations. In turn, this will foster stronger linkages between the tourism sector and other sectors, such as agriculture, education, and health, further boosting local economies.

Investments in transport infrastructure must go hand-in-hand with tourism development strategies. [12] highlights that when synchronized investments are made in both transport and tourism infrastructures, the financial returns are significantly greater than when these sectors are developed in isolation. This insight provides policymakers with a compelling case for coordinating investments in road development with broader tourism infrastructure projects, ensuring that both sectors contribute to sustainable regional economic growth.

To optimize infrastructure investment, the government should engage with a broad range of stakeholders, including private sector actors, local communities, and tourism service providers. Public-private partnerships, as noted by [34], are crucial for mobilizing the necessary resources for infrastructure projects. These partnerships allow for shared risks and responsibilities, while also ensuring that infrastructure meets both public and commercial needs.

For example, local entrepreneurs and agricultural producers, who benefit from improved road access, should be involved in planning processes. Their involvement would ensure that road infrastructure is aligned with the specific needs of the region, thus fostering broader socio-economic development.

Sustainable tourism planning requires a nuanced approach that incorporates local socio-economic and environmental contexts. [45] stress that community profiling is an essential tool in aligning tourism development with the needs and values of the local population. By adopting policies that reflect local particularities, governments can avoid oversimplified, one-size-fits-all development models that may harm local communities and environments.

Moreover, [1] argue that the effectiveness of tourism investments is contingent upon having a robust transportation infrastructure in place. Therefore, to unlock the full potential of tourism, resources must also be allocated to improve access to these destinations through well-maintained road networks. [46] emphasize that road infrastructure is not only pivotal for tourism but also for broader regional development. The condition of transport infrastructure directly impacts economic and social growth. Therefore, tourism development strategies should be integrated with national and regional planning efforts that encompass transport, spatial planning, and energy policies, ensuring the infrastructure serves a broader societal function.

Policymakers can leverage these insights to create a policy framework that simultaneously promotes road infrastructure development and tourism sector growth. By engaging multiple stakeholders, pursuing public-private partnerships, and integrating transport systems with national development goals, governments can ensure sustainable, long-term economic growth. Incorporating environmental and social considerations into these projects will further solidify tourism as a critical driver of regional development while safeguarding local communities and ecosystems.

6 Conclusion

The economic impact of road infrastructure development on tourism is profound, as it directly enhances accessibility to tourist destinations, leading to increased local tourism revenues and job creation. Improved roads support the growth of tourism by reducing transportation costs and enhancing regional specialization, which further stimulates local economies. Additionally, better infrastructure leads to cost reductions in travel and fuel, making destinations more attractive, which in turn boosts economic activity and development.

Socially, road infrastructure contributes to improving the quality of life, especially in rural areas, by providing better access to economic opportunities and services. It plays a critical role in reducing income disparities and fostering social inclusion. Enhanced roads not only support tourism but also help create employment opportunities, alleviating poverty in underserved regions. The local community's engagement in tourism development is positively influenced by better infrastructure, as it improves their participation and willingness to support tourism-related activities.

Environmentally, road infrastructure development can lead to significant negative consequences. It disrupts ecosystems by fragmenting habitats and increasing greenhouse gas emissions. The influx of tourists in sensitive areas can exacerbate environmental degradation, reducing the natural appeal of destinations. Additionally, road construction leads to pollution and alters natural landscapes, which may further endanger fragile ecosystems. Despite these challenges, sustainable transportation planning and regulation are essential to mitigate the adverse environmental impacts associated with road infrastructure and tourism development.

References

- [1] A. J. Khadaroo and B. Seetanah, "Does Transport Infrastructure Matter in Overall Tourism Development? Evidence from a Sample of Island Economies," *Tourism Economics*, vol. 13, no. 4, pp. 675–687, Dec. 2007, doi: 10.5367/000000007782696069.
- [2] R. Saner, L. Yiu, and M. Filadoro, "Tourism Development in Least Developed Countries," in *Sustainable Tourism*, IGI Global, 2019, pp. 94–120. doi: 10.4018/978-1-5225-7504-7.ch006.
- [3] J. A. Wendt *et al.*, "Transport Infrastructure and Political Factors as Determinants of Tourism Development in the Cross-Border Region of Bihor and Maramureş. A Comparative Analysis," *Sustainability*, vol. 13, no. 10, p. 5385, May 2021, doi: 10.3390/su13105385.
- [4] M. Luthuli, Z. Qwatekana, N. Zondi, and T. Ndlovu, "Interconnectedness of road infrastructure and tourism development: Perspectives from residents and enterprises," *Turkish Online Journal of Qualitative Inquiry*, vol. 12, pp. 2719–2739, Jul. 2021.
- [5] K. O. Odeku, "Poor road infrastructure: An impediment to tourism in Nigeria," *African Journal of Hospitality, Tourism and Leisure*, vol. 9, no. 2, 2020, [Online]. Available: <https://api.semanticscholar.org/CorpusID:268099557>
- [6] R. P. Tanjung, A. Purwoko, J. Tarigan, and Badaruddin, "Analysis of Tourism Sector Development on Regional Development Through Road Infrastructure in Lake Toba National Tourism Strategic Area in Indonesia," *Journal of Law and Sustainable Development*, vol. 12, no. 1, p. e2174, Jan. 2024, doi: 10.55908/sdgs.v12i1.2174.
- [7] A. Kimbu, "The Role of Transport and Accommodation Infrastructure in the Development of Eco/Nature Tourism in Cameroon," *Tourism Analysis*, vol. 16, no. 2, pp. 137–156, Jun. 2011, doi: 10.3727/108354211X13014081270323.
- [8] S. K. Das and K. Naskar, "Nexus between Infrastructure and Tourism Development," *SocioEconomic Challenges*, vol. 2, no. 2, pp. 6–12, Jun. 2018, doi: 10.21272/sec.2(1).6-12.2018.
- [9] Rokicki Tomasz, "The Influence of Road Transport Infrastructure on Tourist Movement in Selected European Union Countries," *Logistyka: Czasopismo Dla Profesjonalistów*, vol. 4, pp. 3672–3680, 2014.
- [10] G. Gołembski and J. Majewska, "The Impact of Transport Infrastructure on International Inbound Tourism – A Gravity Model for Poland," *International Journal of Contemporary Management*, vol. 14, no. 4, pp. 135–154, 2018, doi: 10.4467/24498939IJCM.18.040.10026.
- [11] P. J. Cárdenas-García and M. Sánchez-Rivero, "Tourism and economic development: analysis of geographic features and infrastructure provision," *Current Issues in Tourism*, vol. 18, no. 7, pp. 609–632, Jul. 2015, doi: 10.1080/13683500.2013.860954.
- [12] Ramadan Mazrekaj, "Impact of Road Infrastructure on Tourism Development in Kosovo," *International Journal of Management*, vol. 11, no. 4, pp. 466–474, 2020.
- [13] P. Bonsu, R. Mensah, E. Attah, A. Frimpong, and E. Ewusi, "Infrastructure and Tourism Development at Lake Bosomtwe in the Ashanti Region of Ghana," vol. 6, pp. 89–100, Jul. 2021.
- [14] M. Olusola, "Infrastructure for Tourism and Hospitality: A Tool for Employment Creation in Lagos State," Jun. 2016.
- [15] J. Khadaroo and B. Seetanah, "Transport infrastructure and tourism development," *Ann Tour Res*, vol. 34, no. 4, pp. 1021–1032, Oct. 2007, doi: 10.1016/j.annals.2007.05.010.
- [16] A. P. Abundabar and M. A. Pongpong, "Assessing the Local Tourism Infrastructure and

- Services towards Tourism Development of San Jose,” *International Journal of Applied Research in Tourism and Hospitality*, vol. 1, no. 2, pp. 97–116, Feb. 2023, doi: 10.52352/ijarthy.v1i2.805.
- [17] A. Sugiana, H. Oktavia, and M. Karlina, *The Effect of Tourism Infrastructure Asset Quali-ty on Tourist Satisfaction: A Case on Forest Tourism in Tasikmalaya Regency*, vol. 6. 2022. doi: 10.31940/ijaste.v6i1.65-71.
- [18] M. Costea, C. V. Hapenciuc, and G. Arionesei, “THE GENERAL TRANSPORT INFRASTRUCTURE - A KEY DETERMINANT OF COMPETITIVENESS OF TOURISM IN ROMANIA AND CEE-EU COUNTRIES,” *CBU International Conference Proceedings*, vol. 5, pp. 79–85, Sep. 2017, doi: 10.12955/cbup.v5.906.
- [19] B. Lukić *et al.*, “Tourism Infrastructure in the Function of Sustainable Tourism Development: The Case Study of the City of Kruševac, Republic of Serbia,” in *6th International Thematic Monograph: Modern Management Tools and Economy of Tourism Sector in Present Era*, Association of Economists and Managers of the Balkans; Faculty of Tourism and Hospitality, 2021, pp. 289–313. doi: 10.31410/tmt.2021-2022.289.
- [20] H. A. Rani, M. Afifuddin, and H. Akbar, *Tourism infrastructure development prioritization in Sabang Island using analytic network process methods*, vol. 1903. 2017. doi: 10.1063/1.5011570.
- [21] A. Damulienė, “Tourism infrastructure in Lithuania: theoretical and practical aspects,” *Management of Organizations: Systematic Research*, vol. 26, pp. 77–87, 2006.
- [22] I. Storonyanska, A. Dub, O. Graftska, I. Hrynchyshyn, O. Bilanyuk, and A. Piersceniak, “The tourist infrastructure of local communities in Ukraine: current state and impact on local economic development,” *Agricultural and Resource Economics: International Scientific E-Journal*, vol. 7, no. 2, pp. 102–118, Jun. 2021, doi: 10.51599/are.2021.07.02.06.
- [23] O. Ouariti Zerouali and E. M. Jebrane, “The impact of transport infrastructure on tourism destination attractiveness: A case study of Marrakesh City, Morocco,” vol. 9, Mar. 2020.
- [24] D. Y. Dalimunthe, D. Valeriani, F. Hartini, and R. S. Wardhani, “The Readiness of Supporting Infrastructure for Tourism Destination in Achieving Sustainable Tourism Development,” *Society*, vol. 8, no. 1, pp. 217–233, Jun. 2020, doi: 10.33019/society.v8i1.149.
- [25] O. Marius, Ciangă, Giurgiu, and L. Bruckner, “The impact on tourism of transport infrastructure development in Transylvania,” *Studia Universitatis -- seria Geographia*, vol. 1, pp. 163–171, May 2012.
- [26] V. Ivankova, B. Gavurova, R. Bačík, and M. Rigelský, “Relationships between road transport infrastructure and tourism spending: A development approach in European OECD countries,” *Entrepreneurship and Sustainability Issues*, vol. 9, no. 2, pp. 535–551, Dec. 2021, doi: 10.9770/jesi.2021.9.2(35).
- [27] J. Li, W. Zhang, H. Xu, and J. Jiang, “Dynamic Competition and Cooperation of Road Infrastructure Investment of Multiple Tourism Destinations: A Case Study of Xidi and Hongcun World Cultural Heritage,” *Discrete Dyn Nat Soc*, vol. 2015, pp. 1–10, 2015, doi: 10.1155/2015/962028.
- [28] B. Hidayat, Y. Hesna, A. Suraji, B. Istijono, and D. T. Ophiyandri, “Challenges for tourism infrastructure development in West-Sumatra province of Indonesia,” *International Journal of Civil Engineering and Technology*, vol. 8, pp. 1009–1016, Oct. 2017.

- [29] Tatjana Janovac and Sasa Jovanovic, *7th International Thematic Monograph: Modern Management Tools and Economy of Tourism Sector in Present Era*, vol. 7. Association of Economists and Managers of the Balkans; Faculty of Tourism and Hospitality, Ohrid, North Macedonia, 2022. doi: 10.31410/tmt.2022-2023.
- [30] Y. Feng, A. H. Pitafi, and C. Zhang, "Support for tourism development in Pakistan: A study of road and transportation infrastructure development," *Heliyon*, vol. 9, no. 7, p. e18014, Jul. 2023, doi: 10.1016/j.heliyon.2023.e18014.
- [31] J. Zhang and Y. Zhang, "Tourism, transport infrastructure and income inequality: A panel data analysis of China," *Current Issues in Tourism*, vol. 25, no. 10, pp. 1607–1626, May 2022, doi: 10.1080/13683500.2021.1928012.
- [32] Ace Milenkovski, Mijalce Gjorgievski, and Dejan Nakovski, "Interconnectedness of Road Infrastructure and Tourism Development: Perspectives from residents and enterprises," *UTMS Journal of Economics*, vol. 11, no. 1, pp. 43–47, 2020.
- [33] S. Kanwal, M. I. Rasheed, A. H. Pitafi, A. Pitafi, and M. Ren, "Road and transport infrastructure development and community support for tourism: The role of perceived benefits, and community satisfaction," *Tour Manag*, vol. 77, p. 104014, Apr. 2020, doi: 10.1016/j.tourman.2019.104014.
- [34] R. M. Pillay, "The Impact of Road Infrastructure on Rural Development in South Africa," *International Journal of Social Science Research and Review*, vol. 6, no. 7, Jul. 2023, doi: 10.47814/ijssrr.v6i7.1539.
- [35] C. Chan Santana, S. F. Bertolucci, C. B. Sloth, A. Egholm, and M. Ingvorsen, "The potential of disruptive transport infrastructure for tourism development in emerging island destinations: Research project in the Faroe Islands," *Island Studies Journal*, 2022, doi: 10.24043/isj.387.
- [36] E. Sorupia, "Rethinking the role of transportation in tourism," *Proceedings of the Eastern Asia Society for Transportation Studies*, vol. 5, Jan. 2005.
- [37] E. Kuncoro, R. N. Wurarah, and I. E. Erari, "The impact of road infrastructure development on ecosystems and communities," *Social, Ecology, Economy for Sustainable Development Goals Journal*, vol. 1, no. 2, Jan. 2024, doi: 10.61511/seesdgi.v1i2.2024.336.
- [38] Augustine Micheal Imikan and Kotchikpa Justin Ekpo, "Infrastructure and Tourism Development in Nigeria: The Case Study of Rivers State," 2012. [Online]. Available: <https://api.semanticscholar.org/CorpusID:198993391>
- [39] Jie Jiang, Jun Li, and Honggang XU, "System Dynamics Model for Transportation Infrastructure Investment and Cultural Heritage Tourism Development: A Case Study of Xidi and Hongcun Historical Villages," in *Proceedings of the 28th International Conference of the System Dynamics Society*, Tae-Hoon Moon, Ed., Seoul: System Dynamics Society, Jul. 2010.
- [40] A. M. M. Mustafa, "The Impact of Infrastructure on Tourism: The Case of Sri Lanka," *Asian Soc Sci*, vol. 15, no. 7, p. 174, Jun. 2019, doi: 10.5539/ass.v15n7p174.
- [41] M. Jędruch, M. Furmankiewicz, and I. Kaczmarek, "Spatial Analysis of Asymmetry in the Development of Tourism Infrastructure in the Borderlands: The Case of the Bystrzyckie and Orlickie Mountains," *ISPRS Int J Geoinf*, vol. 9, no. 8, p. 470, Jul. 2020, doi: 10.3390/ijgi9080470.
- [42] A. Giampiccoli and M. Saayman, "Community-based tourism, responsible tourism, and infrastructure development and poverty," *African Journal of Hospitality, Tourism and Leisure*, vol. 6, pp. 1–28, Apr. 2017.
- [43] Ayeni Dorcas A., "Promoting Sustainable Tourism through Tourism Infrastructure

- Development in Nigeria,” *International Journal of Arts and Social Science*, vol. 9, no. 1, pp. 3–14, 2013.
- [44] Diana Lisa, “Performance Assessment Tool for Transportation Infrastructure and Urban Development for Tourism,” 2012.
- [45] Aldira Pratama, “Analysis of Tourism Village development infrastructure in Five Super Priority Destinations on Tourist Satisfaction. ADRI International Journal of Civil Engineering,” *ADRI International Journal of Civil Engineering*, vol. 7, no. 1, pp. 118–123, 2022.
- [46] V. Hrushka, N. Horozhankina, Z. Boyko, M. Korneyev, and N. Nebaba, “Transport infrastructure of Spain as a factor in tourism development,” *Journal of Geology, Geography and Geoecology*, vol. 30, pp. 429–440, Oct. 2021, doi: 10.15421/112139.