

Literature reviews

Determinants of visitation in natural parks: a systematic review and proposal for an integrated framework

Determinantes da visitação em parques naturais: uma revisão sistemática e proposta de framework integrado

Determinantes de la visita a parques naturales: una revisión sistemática y propuesta de marco integrado

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Palavras-chave:

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Palabras clave:

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Abstract

Understanding the factors that influence visitor flow variation in natural parks is essential to improving the management of these territories and strengthening their economic, environmental, and social performance. This study aimed to identify the determinants of visitation in natural parks through a systematic review of the literature in articles indexed in the Web of Science and Scopus databases, following the SPAR-4-SLR protocol for data collection, organisation, extraction and analysis. The review identified about 300 factors, later synthesised into twelve dimensions, grouped into three categories: internal determinants (natural characteristics of the park, climate, infrastructure and services supporting visitation in the park, trails and attractions in the park), external determinants (access to the park, socioeconomic characteristics of the surrounding area, infrastructure and services supporting visitation in the surrounding area and alternative protected areas), and cross-cutting determinants (park management, park visibility, and demand characteristics). These dimensions comprise an integrated framework that offers a strategic view of the elements that shape visitation in natural parks. The results have practical implications, including a framework-guided flow of actions, and discuss gaps, limitations, and directions for future research, contributing to the advancement of knowledge about natural park management and planning.

Resumo

Compreender os fatores que influenciam a variação do fluxo de visitação em parques naturais é fundamental para aprimorar a gestão desses territórios e fortalecer seus desempenhos econômico, ambiental e social. Este estudo teve como objetivo identificar os determinantes da visitação em parques naturais por meio de uma revisão sistemática da literatura em artigos indexados nas bases *Web of Science* e *Scopus*, seguindo o protocolo SPAR-4-SLR para coleta, organização, extração e análise dos dados. A revisão identificou cerca de 300 fatores, posteriormente sintetizados em doze dimensões, agrupadas em três categorias: determinantes internos (características naturais do parque, clima, infraestrutura e serviços de apoio à visitação no parque, trilhas e atrativos no parque), determinantes externos (acesso ao parque, características socioeconômicas do entorno, infraestrutura e serviços de apoio no entorno e áreas protegidas alternativas), e determinantes transversais (gestão do parque, visibilidade do parque e características da demanda). Essas dimensões compõem um *framework* integrado que oferece uma visão estratégica dos elementos que moldam a visitação em parques naturais. Os resultados apresentam implicações práticas, incluindo um fluxo de ações orientado pelo *framework*, além de discutir lacunas, limitações e direções para futuras pesquisas, contribuindo para o avanço do conhecimento sobre gestão e planejamento de parques naturais.

Resumen

Comprender los factores que influyen en la variación del flujo de visitas a los parques naturales es fundamental para mejorar la gestión de estos territorios y fortalecer su rendimiento económico, medioambiental y social. Este estudio tuvo como objetivo identificar los factores determinantes de la

Determinantes de la visitación;
Atractividad de destino;
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visitación en parques naturales, mediante una revisión sistemática de la literatura en artículos indexados en Web of Science y Scopus, siguiendo el protocolo SPAR-4-SLR para la recopilación, organización y análisis de datos. Se identificaron alrededor de 300 factores de visitación, organizados en doce dimensiones, agrupadas en determinantes internos (características naturales del parque, clima, infraestructura y servicios de apoyo a la visitación dentro del parque, senderos y atractivos del parque); externos (acceso al parque, características socioeconómicas del entorno, infraestructura y servicios de apoyo en entorno y áreas protegidas alternativas); y transversales (gestión del parque, visibilidad del parque y características de la demanda). Estas dimensiones conforman un marco integrado que ofrece visión estratégica de los factores que influyen en la visitación. Los resultados incluyen implicaciones prácticas y una propuesta de flujo de acciones basada en dicho marco, de identificar lagunas y limitaciones que orientan una agenda futura de investigación para avanzar el conocimiento sobre parques naturales.



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1 INTRODUCTION

Understanding the factors that influence visitor flow variation in natural parks is essential for the planning and management of these areas (Castro et al., 2015; Heagney et al., 2018; Neuvonen et al., 2010; Puustinen et al., 2009; Li et al., 2023), contributing to the mitigation of visitation impacts in these areas (Garcia & Smith, 2013; Manley & Egoh, 2022; Weststrate et al., 2025) and to increasing visitor numbers (Clark et al., 2020; Heagney et al., 2018; Wichman, 2024). In addition, natural parks are strategic territories for biodiversity conservation and income generation for traditional communities (Castro et al., 2015; Heagney et al., 2018; Weststrate et al., 2025).

Direct contact with nature raises environmental awareness among visitors, promoting changes in their behaviour (Andrade & Vieites, 2025; Castro et al., 2015; Clark et al., 2020). In this context, it is essential to understand the determinants that influence visitation in natural parks in order to encourage organised and sustainable tourism visitation (Bhalla et al., 2022), thereby enabling the reconciliation of tourism attractiveness, nature conservation, and socioeconomic benefits for local communities (Chung et al., 2018; De Vos et al., 2016; Weststrate et al., 2025).

Regarding public policy on visitation in protected areas (Law No. 15.180/2025) referred in Brazil as Conservation Units (CUs), the increase in visitors to natural areas requires actions and investments that compete with other priority areas, such as endangered wildlife rescue and land tenure regularisation (Alger, 2023). Natural parks are part of a category of protected area predominantly managed by the public sector, requiring recruitment, investment, and the establishment of partnerships aimed at improving infrastructure and services supporting visitation (Spenceley et al., 2017; Silva & Raimundo, 2021), thereby contributing to the enhancement of visitation quality (Castro et al., 2015; Heagney et al., 2018; Wang et al., 2022).

Recently, the concession of services supporting visitation in Brazilian national parks to the private sector has expanded, with the aim of attracting investment and improving the quality of services provided to visitors (Silva & Raimundo, 2021). However, such improvements have not proved sufficient to increase visitor numbers in these protected areas (Koga et al., 2025). In this context, there is a need for a better understanding of which park and surrounding area characteristics are associated with higher visitor numbers in order to better direct resources.

Against this backdrop of challenges and opportunities emerging from the relationships between visitation planning and management and protected area conservation (Mandić & McCool, 2022; Weststrate et al., 2025), the present study seeks to contribute through research focused on the determinants of visitation volume in natural parks open to visitation (Balmford et al., 2015; Castro et al., 2015; Heagney et al., 2018; Neuvonen et al., 2010; Puustinen et al., 2009; De Vos et al., 2016; among others). Accordingly, the aim of this study was to identify the factors that influence visitor numbers in natural parks. To this end, a systematic literature review (SLR) was conducted (Paul & Menzies, 2023), based on international scientific articles, seeking to answer the following questions: What are the determinants of visitor numbers in natural parks? What is the relevance of these factors to visitor flow in natural parks?

The SLR was selected as the research technique due to its ability to synthesise existing knowledge on the subject and support theoretical development in this field (Paul & Menzies, 2023; Ribeiro et al., 2023). Although there are studies that seek to verify the association between visitation volume and various characteristics of natural parks, these are generally focused on a specific country (Balmford et al., 2015; Hadwen et al., 2011; Heagney et al., 2018). There is a lack of a compilation of these experiences and of an integrated framework capable of supporting theoretical development on the subject, as well as underpinning empirical studies similar to those already conducted

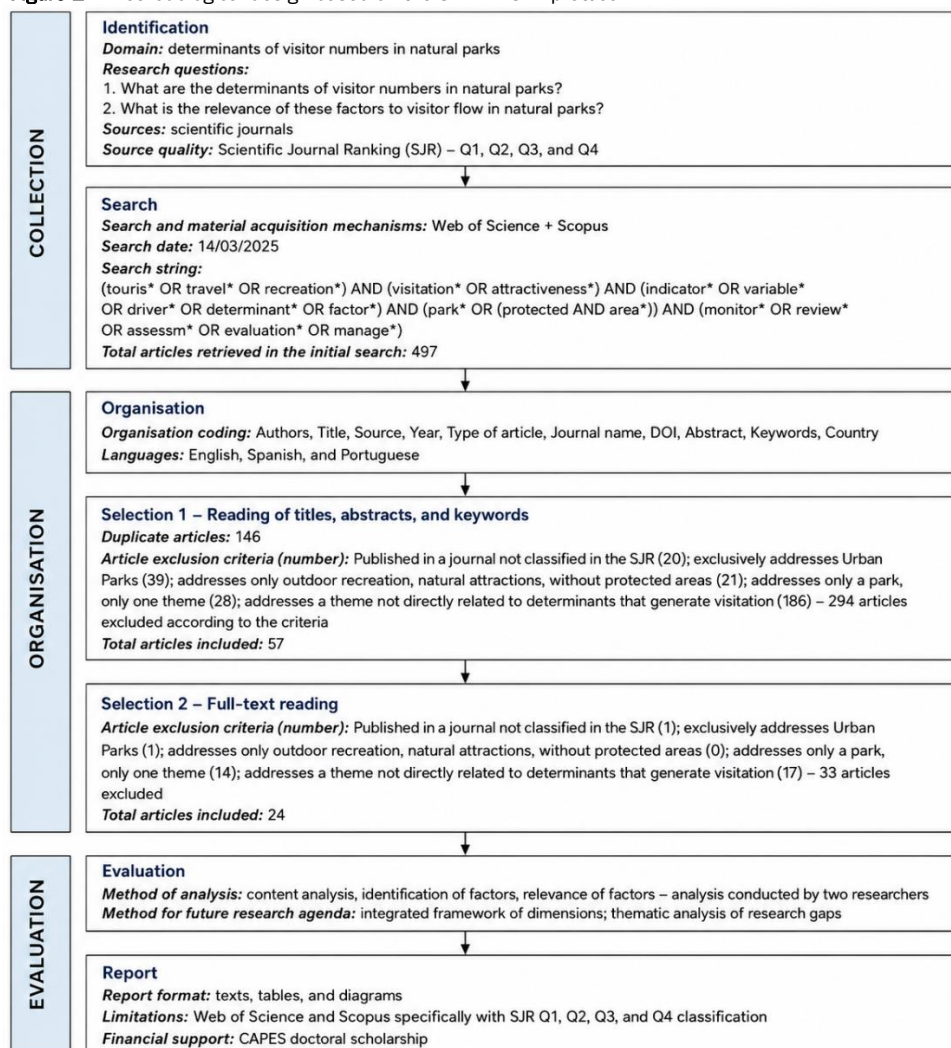
(Balmford et al., 2015; Castro et al., 2015; Smith et al., 2018). Furthermore, other studies examining the influence of specific themes on visitation, such as climate and climate change (Jedd et al., 2018; Manley & Egoh, 2022; Weststrate et al., 2025), tend not to be integrated into the existing theoretical body of knowledge, despite also contributing to the understanding of visitor levels in natural parks.

Thus, in addition to presenting an analytical synthesis of the literature on the subject, this article seeks to offer theoretical and practical contributions to the planning and management of public use in natural parks. In discussing the results of this literature review, a section on practical implications is presented, developed from the proposal of a framework flow to foster visitation in natural parks. This structure innovates by designing a visitation management cycle, identifying and discussing each of the following stages: baseline conditions, attraction attributes, complementary conditions, and strategic management.

2 METHODOLOGY

This study adopted a systematic literature review (SLR) as the methodological strategy to analyse the scientific production on the investigated topic. Systematic literature reviews follow a structured, transparent, and replicable process for the identification, selection, and analysis of relevant studies, contributing to the consolidation of existing knowledge and the identification of research gaps (Paul & Menzies, 2023). The review process involved the definition of search strategies, the application of inclusion and exclusion criteria, and the analysis of the selected studies. The SLR conducted in this study was based on the procedures of the SPAR-4-SLR protocol (Paul et al., 2021) and was carried out through a survey of international scientific articles indexed in the Web of Science (WoS) and Scopus databases. The stages of the protocol and the number of articles reviewed at each phase are summarised in Figure 1.

Figure 1 – Methodological design based on the SPAR-4-SLR protocol



Source: prepared by the authors, 2026.

Figure 1 presents the flow of the SLR adopted in this study, organised into three stages: collection, organisation, and evaluation. During the collection phase, the research questions were defined, and searches were conducted in the Web of Science and Scopus databases on 14 March 2025 using a structured search string containing terms related to tourism, visitation, determinants, and protected areas, resulting in 497 initial records.

During the organisation stage, 146 duplicate articles were removed, and a screening process was conducted through the reading of titles, abstracts, and keywords, applying thematic and journal classification exclusion criteria. This process resulted in the exclusion of 294 studies and the selection of 57 articles. Subsequently, a full-text reading led to the exclusion of 33 articles, resulting in a final sample of 24 studies. Finally, during the evaluation stage, the selected articles were analysed by two researchers through content analysis, focusing on the identification and relevance of the determinants of visitation in natural parks.

2.1 Data collection procedures

The databases used for the search were WoS and Scopus. Data collection took place on 14 March 2025. No publication time frame was established. Searches in the databases focused on the title, keyword, and abstract fields of the articles, using the following search terms: (touris* OR travel* OR recreation*) AND (visitation* OR attractiveness*) AND (indicator* OR variable* OR driver* OR determinant* OR factor*) AND (park* OR (protected AND area*)) AND (monitor* OR review* OR assessm* OR evaluation* OR manage*). At this stage, 497 articles were retrieved.

2.2 Data organisation procedures

The scientific articles were retrieved and systematised in a database to facilitate the material selection phase. Inclusion and exclusion criteria for articles were defined based on the research questions. A first stage of reading was conducted, limited to the title, abstract, and keywords of the articles. The number of articles excluded according to each exclusion criterion is presented in Figure 1, within the box “Selection 1 – Reading of titles, abstracts, and keywords”, totalling 440 articles excluded due to duplication (146) and the established criteria (294). Among the exclusion criteria, 186 articles were excluded because they addressed themes not directly related to the determinants of visitation, such as: impacts of visitation in natural areas, visitor profiles in parks, visitor perceptions of climate change, animal and plant behaviour in response to visitation, visitation monitoring, and impact management in attractions such as trails, among others. At this stage, 57 articles were accepted.

A second phase involved full-text reading of the articles. The same exclusion criteria used in the previous phase were applied. The number of articles excluded according to the criteria is presented in Figure 1, within the box “Selection 2 – Full-text reading”, totalling 33 excluded articles. In this second phase, 24 articles were accepted (Balmford et al., 2015; Baum et al., 2017; Bhalla et al., 2022; Castro et al., 2015; Chung et al., 2018; Clark et al., 2020; De Vos et al., 2016; Garcia & Smith, 2013; Hadwen et al., 2011; Hausmann et al., 2017; Heagney et al., 2018; Jedd et al., 2018; Li et al., 2023; Manley & Egoh, 2022; McIntosh & Wilmot, 2011; Neuvonen et al., 2010; Norman & Pickering, 2019; Puustinen et al., 2009; Smith et al., 2018; Souza et al., 2017; Wang et al., 2022; Weststrate et al., 2025; Wichman, 2024; and Xiao et al., 2017), which are analysed in the following sections.

2.3 Data extraction procedures

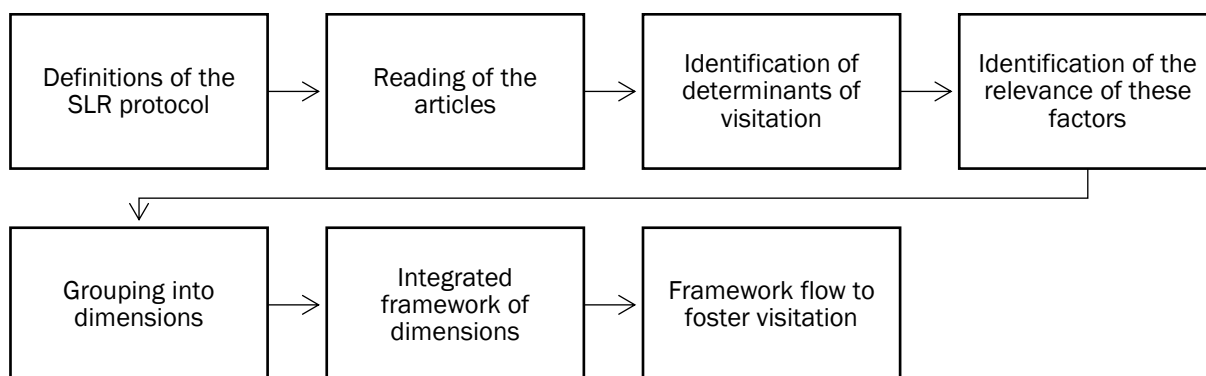
During the full-text reading of the articles, an effort was made to identify which factors are associated with visitor numbers in parks and the relevance of these factors to visitor flow in parks, according to the indications provided by the authors of each analysed article. A database was created containing the identified factors and the relevance classification assigned to each of them. A second evaluator read each article in full and reassessed the article inclusion and exclusion criteria, also verifying whether data extraction had been conducted appropriately. The identified divergences were resolved collectively.

2.4 Data analysis procedures

The organisation of factors associated with visitation volume in parks was carried out through two rounds of evaluation conducted by two different researchers. This procedure was undertaken to ensure the identification of all factors in the analysed articles, standardise the identified factors, and organise these factors into broader dimensions. Figure 2 presents the methodological pathway of this study. The grouping of factors into dimensions, the

integrated framework of these dimensions, and the framework flow to foster visitation will be presented in the following section.

Figure 1 - Methodological pathway of the study



Source: prepared by the authors, 2026.

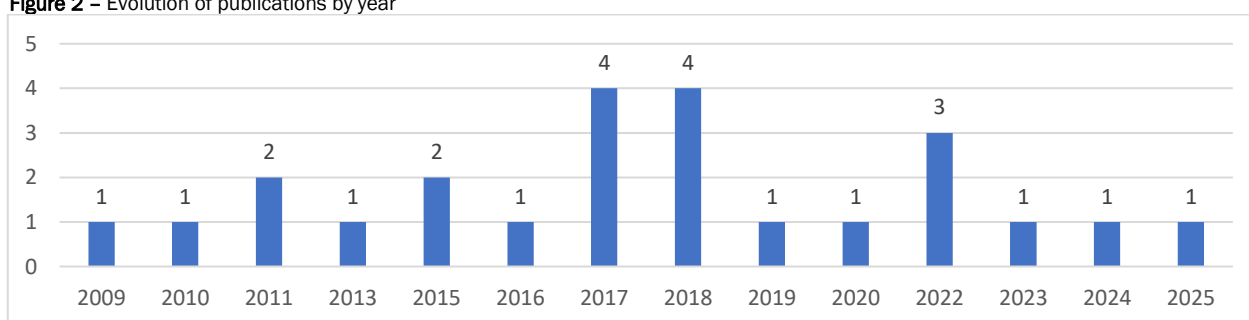
3 RESULTS AND DISCUSSION

The results are presented in three sections: the first presents general aspects of the analysed studies, such as the locations investigated and publication years; the second section presents the factors that influence visitation, organises these factors into broader dimensions, and presents an integrated framework of dimensions; and the third and final section analyses the relevance of each of these dimensions.

3.1 General aspects of the publications

Studies proposing models to identify factors influencing visitor flow in natural parks have shown an almost constant progression over the years (Figure 3). The first identified study, published in 2009, analysed the relationship between indicators related to natural characteristics, recreation services within the park, and tourism services in surrounding communities, and the number of visitors in 35 national parks in Finland (Puustinen et al., 2009). A brief peak in publications was identified in 2017 and 2018, with four articles published in each year. A notable example is the study conducted by Souza et al. (2017), which proposes a tourism attractiveness index for Brazilian national parks and national forests, considering internal and external variables based on the Recreation Opportunity Spectrum for Protected Areas (ROVUC).

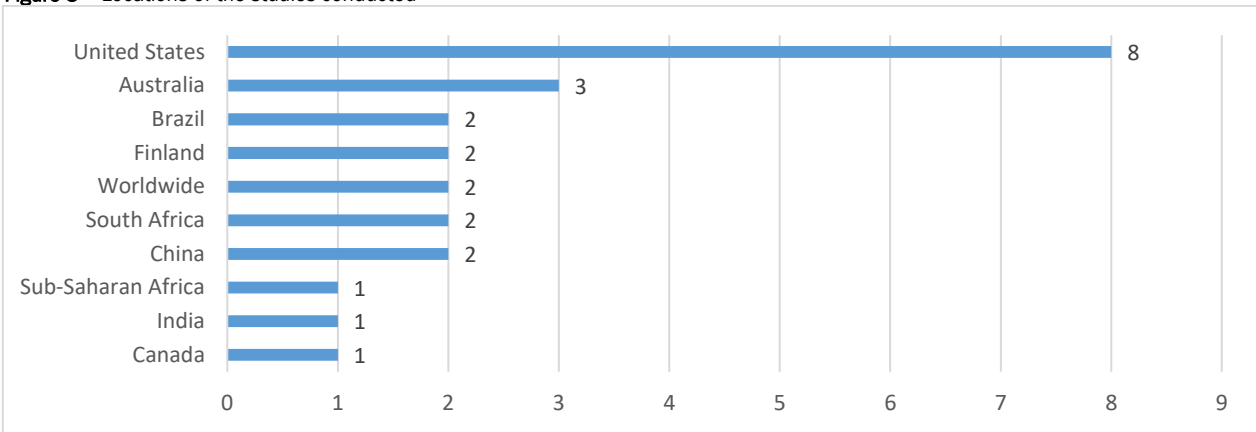
Figure 2 – Evolution of publications by year



Source: prepared by the authors, 2026.

The countries addressed in the analysed articles were also identified (Figure 4). The United States is the country with the highest number of studies. For example, there are studies on visitor flow in state parks (Garcia & Smith, 2013; Smith et al., 2018), on how visibility on social media stimulates increased visitation to national parks (Wichman, 2024), and studies using big data (Manley & Egoh, 2022). Research conducted in parks in Australia (Hadwen et al., 2011; Heagney et al., 2018; Norman & Pickering, 2019), Finland (Neuvonen et al., 2010; Puustinen et al., 2009), Brazil (Souza et al., 2017; Castro et al., 2015), South Africa (Baum et al., 2017; De Vos et al., 2016), and China (Li et al., 2023; Wang et al., 2022) also stands out.

Figure 3 – Locations of the studies conducted



Source: prepared by the authors, 2026.

3.2 Determinants and dimensions of visitation in natural parks

From the reading of the 24 selected articles, approximately 300 factors were identified, comprising an extensive list of park-related aspects that may influence visitation. Figure 5 presents a word cloud in which the most frequently mentioned factors in the analysed articles stand out, such as: trails (Bhalla et al., 2022; Clark et al., 2020; Heagney et al., 2018; Li et al., 2023; Manley & Egoh, 2022; Neuvonen et al., 2010; Norman & Pickering, 2019; Puustinen et al., 2009); accommodation (Bhalla et al., 2022; De Vos et al., 2016; Heagney et al., 2018; Neuvonen et al., 2010; Puustinen et al., 2009); water bodies (De Vos et al., 2016; Heagney et al., 2018; Manley & Egoh, 2022); temperature (Clark et al., 2020; Chung et al., 2018; Hadwen et al., 2011; Manley & Egoh, 2022; Smith et al., 2018; Weststrate et al., 2025), among others. Some factors appeared in more than one study and were therefore more recurrent, whereas others were identified in only a single study.

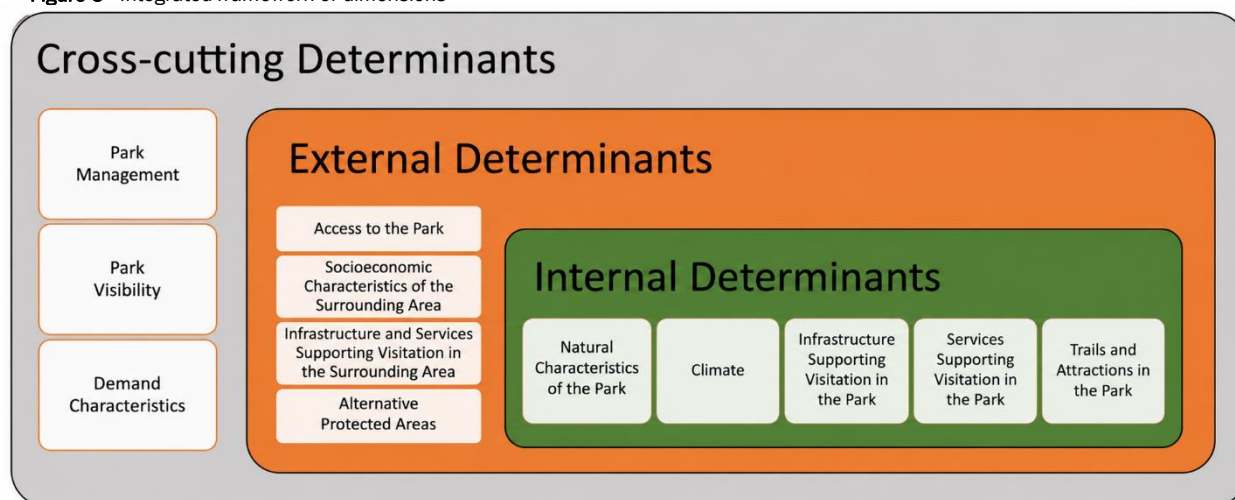
Figure 4 - Word cloud of the determinants of visitation



Source: prepared by the authors, 2026.

The factors identified in the articles were grouped into twelve dimensions that broadly encompass the diversity of aspects related to parks and their surrounding areas. The definition of these dimensions aimed to aggregate the main determinants of visitation by organising them into cohesive groups. This enables a strategic perspective to support actions aimed at enhancing visitation and guiding future research. Figure 6 presents the resulting integrated framework, composed of the dimensions that influence visitor numbers in natural parks. These factors were classified as internal, external, or cross-cutting determinants of parks, based on criteria adopted from studies on recreational use (Heagney et al., 2018), public use (Castro et al., 2015), and visitation in natural parks (Puustinen et al., 2009).

Figure 5 - Integrated framework of dimensions



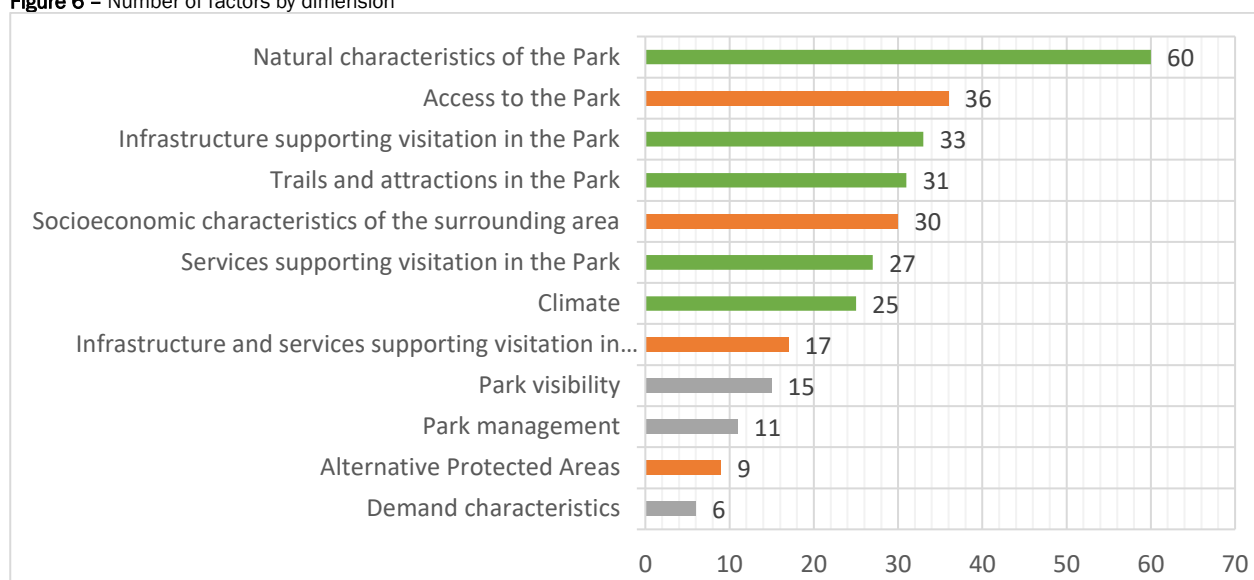
Source: prepared by the authors, 2026.

Within the internal determinants, the dimensions “natural characteristics of the park” and “climate” of the region were defined, whose distinction is relevant due to the different managerial implications involved in managing their respective factors. Items related to “infrastructure supporting visitation in the park”, “services supporting visitation in the park”, and “trails and attractions in the park” were also grouped, seeking to differentiate between physical structures and services directly associated with the tourism experience.

Regarding the external determinants, factors linked to the park’s surrounding area that directly influence visitation were grouped into the following dimensions: “access to the park”, “socioeconomic characteristics of the surrounding area”, “infrastructure and services supporting visitation in the surrounding area”, and the presence of “alternative protected areas”.

Additionally, two cross-cutting dimensions were identified: “park management” and “park visibility”. Both simultaneously affect the internal functioning and external perception of parks, albeit indirectly. Finally, the dimension “demand characteristics” emerged, bringing together elements associated with visitor profiles. Although this does not constitute the main focus of this study, which concerns the influence of supply-side factors on the decision to visit natural parks, its distinction arises from some studies exploring the interaction between supply and demand jointly, such as those by Neuvonen et al. (2010) and Baum et al. (2017).

Figure 7 presents the distribution of the number of factors identified in the analysed studies according to dimension. The colours of each bar correspond to the colours of the determinants presented in Figure 6.

Figure 6 – Number of factors by dimension

Source: prepared by the authors, 2026. Note: green, orange, and grey bars are related, respectively, to internal, external, and cross-cutting determinants. The numbers in this figure represent the total number of times that factors related to each dimension appeared in the analysed articles. This means that the same factor was counted more than once if it appeared repeatedly within the same article or across different articles.

The dimension “natural characteristics of the park” (60) brings together the largest group of factors used to determine visitation, with a considerable difference compared to the other dimensions. The remaining dimensions of the internal determinants, together with most of the external determinants, form an intermediate group in terms of the incidence of their factors. Finally, the dimensions classified as cross-cutting determinants appear with the lowest number of mentions.

It is important to note that the number of times a factor is used in the consulted studies does not necessarily mean that this factor is more or less important than others in determining visitation. Most likely, the recurrence in the use of a particular type of factor may be better explained by the availability of data to support the studies.

The articles, dimensions, and factors analysed within each determinant are presented and discussed below (Tables 1, 2, and 3).

3.2.1 Internal determinants

Table 1 – Analysed articles on internal determinants

Dimensions	Number of articles	References
Natural characteristics of the Park	14	Balmford et al., 2015; Baum et al., 2017; Bhalla et al., 2022; Chung et al., 2018; De Vos et al., 2016; Hausmann et al., 2017; Heagney et al., 2018; Li et al., 2023; Manley & Egoh, 2022; McIntosh & Wilmot, 2011; Neuvonen et al., 2010; Norman & Pickering, 2019; Puustinen et al., 2009; Smith et al., 2018.
Climate	7	Chung et al., 2018; Clark et al., 2020; Hadwen et al., 2011; Jedd et al., 2018; Manley & Egoh, 2022; Smith et al., 2018; Weststrate et al., 2025.
Infrastructure supporting visitation in the Park	10	Souza et al., 2017; Bhalla et al., 2022; Clark et al., 2020; Castro et al., 2015; De Vos et al., 2016; Garcia & Smith, 2013; Heagney et al., 2018; Neuvonen et al., 2010; Puustinen et al., 2009; Wang et al., 2022.
Services supporting visitation in the Park	10	Baum et al., 2017; Souza et al., 2017; Castro et al., 2015; De Vos et al., 2016; Garcia & Smith, 2013; Heagney et al., 2018; Neuvonen et al., 2010; Puustinen et al., 2009; Wang et al., 2022; Xiao et al., 2017
Trails and attractions in the Park	11	Bhalla et al., 2022; Clark et al., 2020; Castro et al., 2015; Garcia & Smith, 2013; Heagney et al., 2018; Li et al., 2023; Manley & Egoh, 2022; Neuvonen et al., 2010; Norman & Pickering, 2019; Puustinen et al., 2009; Wang et al., 2022

Source: prepared by the authors, 2026.

3.2.1.1 Natural characteristics of the park

Among the evaluated articles, 14 identified factors within the dimension of natural characteristics of the park, making it the most recurrently used dimension for understanding visitor flow. Collectively, the articles reveal that natural park features, such as hydrography, relief, park area, and species richness, were used in the studies as possible determinants of visitation.

Within this dimension, 60 determinants of visitation in natural parks were categorised, with the four most recurrent factors identified in these studies being: water bodies (Baum et al., 2017; Bhalla et al., 2022; De Vos et al., 2016; Heagney et al., 2018; Manley & Egoh, 2022); land cover and vegetation (De Vos et al., 2016; Hausmann et al., 2017; Li et al., 2023; Manley & Egoh, 2022; Norman & Pickering, 2019); park area or territorial extent (Balmford et al., 2015; Chung et al., 2018; De Vos et al., 2016; Heagney et al., 2018; Li et al., 2023; Neuvonen et al., 2010; Norman & Pickering, 2019; Puustinen et al., 2009); and animal species (Balmford et al., 2015; Baum et al., 2017; Chung et al., 2018; De Vos et al., 2016; Hausmann et al., 2017; Neuvonen et al., 2010).

The factors identified within this dimension reinforce the importance of biodiversity and water resources as components of environmental and tourism value. Overall, the analysis demonstrates that the literature tends to concentrate on spatial, topographical, and ecological factors that structure the physical and environmental basis upon which the remaining dimensions of visitation in parks are built.

Studies such as those by Puustinen et al. (2009) and Neuvonen et al. (2010) show that parks with remarkable natural characteristics are capable of attracting visitors even when located in remote regions. Findings from more recent studies (Hausmann et al., 2017; Bhalla et al., 2022; Smith et al., 2018; Li et al., 2023) reinforce this trend, although not all hydrological or topographical variables demonstrate statistical significance. Overall, the literature converges on the understanding that natural characteristics constitute the ecological foundation that shapes attractiveness and conditions the potential for leisure and tourism use in parks.

3.2.1.2 Climate

Seven of the evaluated studies include climate among the determinants of visitation to natural parks. Of the 25 climate-related factors identified, temperature and precipitation are notably the most frequently used, although the specific definition of the measured factor varies among the studies.

Hadwen et al. (2011) identified that the seasonality of visitation to protected areas in Australia was more strongly related to climatic factors (precipitation and minimum and maximum temperatures) than to holiday and vacation periods. Mean temperature and precipitation volume were also used in the study by Chung et al. (2018), who concluded that visitors prefer protected areas with milder temperatures and lower rainfall levels. Weststrate et al. (2025) identified a positive correlation between park visitation and temperature, coinciding with visitation peaks occurring precisely during summer. A negative correlation was observed between visitation and precipitation volume; however, the effect of rainfall was considerably weaker than that of temperature.

Jedd et al. (2018) identified that visitation to four national parks in the United States is more adversely affected under conditions of extreme drought than under conditions of extreme rainfall. Clark et al. (2020), in a study examining factors that lead users to revisit trails in the United States, tested but did not identify the influence of maximum temperature and rainfall occurrence on the day of the trail visit, both at visitors' place of residence and at the trail location.

According to Manley & Egoh (2022), mean maximum temperatures, together with trail density, are the variables that best explain visitor numbers in protected areas in California. Climatic zone, wind speed, and precipitation were not found to be relevant. Complementarily, the study by Smith et al. (2018) identified that the mean maximum temperature across all days of the month is the best predictive variable of visitation in five parks in the United States among climatic variables related to precipitation and other temperature, snow, and vapour pressure metrics.

Overall, the studies, conducted mainly in regions with high thermal variation, demonstrated a direct impact of temperature on visitor flow, which tends to increase under higher temperatures and decrease under extreme temperatures, suggesting that temperature is a relevant factor for public use in natural parks. In comparison, rainfall exerts a smaller influence on visitor flow. Taken together, these findings indicate that climate constitutes an important element for year-round planning and management in natural parks, particularly in contexts characterised by greater variability in temperature and precipitation.

3.2.1.3 Infrastructure supporting visitation in the park

A total of 33 factors were identified in the highlighted articles, with the most frequent grouped into four blocks: general provision of internal facilities; accommodation and basic facilities (such as toilets); day-use areas (such as picnic sites and other leisure areas); and visitor centres, information structures, and various services. In this context, the three most frequently mentioned specific factors were: accommodation (Puustinen et al., 2009; Neuvonen et al., 2010; De Vos et al., 2016; Heagney et al., 2018); basic visitation infrastructure, such as toilets and visitor centres (Castro et al., 2015; De Vos et al., 2016; Heagney et al., 2018; Souza et al., 2017; Clark et al., 2020); and viewpoints (De Vos et al., 2016; Heagney et al., 2018; Bhalla et al., 2022).

Part of the identified studies uses aggregated infrastructure measures as supply-side factors. Puustinen et al. (2009) and Neuvonen et al. (2010) demonstrate that parks with better provision of internal facilities tend to record higher visitation levels, especially when this provision is combined with tourism services in the surrounding area. De Vos et al. (2016) detail this effect by considering, for example, the number of available accommodation units and the total length of internal roads as central infrastructure components, which proved significant in explaining both visitor numbers and generated revenue.

Heagney et al. (2018) further refine the analysis by distinguishing facilities such as trails and roads, viewpoints and boardwalks, camping areas, day-use areas, car parks, retail outlets, toilets, and built accommodation, allowing observation of how different combinations of structures relate to visitation. At a more localised scale, Clark et al. (2020) analyse the presence of visitor centres, toilets, picnic areas, and playgrounds at trail access points, exploring how these arrangements of facilities are connected to visitors' intentions to revisit. Neuvonen et al. (2010) and Wang et al. (2022) highlight the importance of restaurants and snack bars.

In studies conducted in diverse contexts, such as those by Garcia & Smith (2013), Castro et al. (2015), Souza et al. (2017), Wang et al. (2022), and Bhalla et al. (2022), internal infrastructure appears articulated with location factors, natural characteristics, and services, serving to distinguish parks with greater investment in leisure facilities from those with more basic support for visitation.

In summary, this dimension demonstrates that it is not merely the isolated presence of a structure that determines visitation patterns, but rather the density, combination, and overall set of internal facilities, which may enhance or limit leisure and tourism use in parks according to visitor type (day visitors or overnight visitors) and the public use model adopted in each protected area. Thus, internal infrastructure emerges as a determinant dimension for improving visitor experience and expanding the park's capacity for use.

3.2.1.4 Services supporting visitation in the park

This dimension encompasses 27 factors, indicating its relevance for understanding how parks structure the visitor experience. Among these factors, the following stand out: recreational activities (Puustinen et al., 2009; Neuvonen et al., 2010; Castro et al., 2015; De Vos et al., 2016; Baum et al., 2017; Heagney et al., 2018; Souza et al., 2017); accommodation, food services, parking, entrance fees, and transport (De Vos et al., 2016; Garcia & Smith, 2013; Wang et al., 2022; Xiao et al., 2017); and guiding and visitor orientation services (Neuvonen et al., 2010; Wang et al., 2022). Overall, the studies analyse how the available services influence both attractiveness and visitor satisfaction and flow.

The main identified services are related to the provision of leisure and tourism activities, such as hiking, outdoor sports, and interpretative experiences. These factors are particularly frequent in Puustinen et al. (2009), De Vos et al. (2016), and Wang et al. (2022), which emphasise the diversity of activities as a factor contributing to attraction and the enhancement of the visitation experience.

Subsequently, visitor services such as information provision, logistical support, visitor centres, and basic facilities are identified by Garcia & Smith (2013), Heagney et al. (2018), and Xiao et al. (2017) as central elements for ensuring positive experiences and supporting visitor decision-making. Another important set of factors concerns costs associated with visitation, addressed mainly by Neuvonen et al. (2010), Baum et al. (2017), and Souza et al. (2017), which demonstrate that entrance fees, accommodation, transport, and food costs influence demand and perceptions of accessibility.

In summary, the articles demonstrate that services supporting visitation play a decisive role in visitor experience, tourism demand, and the positioning of parks as competitive destinations. Whereas the provision of recreational activities and direct services improves attractiveness and visitor satisfaction (Castro et al., 2015; Puustinen et al.,

2009; Wang et al., 2022), costs may operate as barriers to access (Baum et al., 2017; De Vos et al., 2016; Xiao et al., 2017).

The presence of elements such as guides, information services, cleanliness, and safety appear as indicators of quality (Castro et al., 2015; Wang et al., 2022), reinforcing that the set of services provided contributes directly to the construction of safe, enjoyable experiences aligned with the expectations of different visitor profiles (De Vos et al., 2016; Heagney et al., 2018).

The results converge with the findings of Oliveira et al. (2021), who identified that visitors with environmentally oriented profiles present higher levels of satisfaction with the visitation experience in parks characterised by high intensity of public use and a strong concentration of infrastructure and services supporting visitation when compared with visitors presenting less environmentally oriented profiles.

3.2.1.5 Trails and attractions in the park

Within this dimension, 31 factors were identified, with trails being the most recurrent factor (Puustinen et al., 2009; Neuvonen et al., 2010; Heagney et al., 2018; Norman & Pickering, 2019; Clark et al., 2020; Manley & Egoh, 2022; Bhalla et al., 2022; Li et al., 2023). Trail-related variables synthesise the existence, length, and density of routes, including different uses (hiking, running, and mountain biking), their physical conditions (slope), and the natural and landscape elements available along the route.

Trails are described not merely as physical elements, but as support structures for different experiences, influencing visitor numbers, the type of activity undertaken, and perceptions of experience quality (Neuvonen et al., 2010; Heagney et al., 2018; Norman & Pickering, 2019; Clark et al., 2020; Wang et al., 2022).

Natural and cultural attractions complement this set by expanding the variety of experiences available in parks. Studies such as those by Bhalla et al. (2022), Garcia & Smith (2013), and Souza et al. (2017) demonstrate that unique landscapes, geological formations, cultural points of interest, and events reinforce attractiveness and diversify the visitor groups served.

Thus, the literature demonstrates that trails and natural and cultural attractions constitute an integrated arrangement that supports experiences related to contemplation, adventure, environmental interpretation, and events, among others, playing a central role in shaping visitation patterns and promoting the expansion and diversification of visitor profiles.

3.2.2 External determinants

Table 2 – Analysed articles on external determinants

Dimensions	Number of articles	References
Access to the Park	17	Balmford et al., 2015; Baum et al., 2017; Souza et al., 2017; Bhalla et al., 2022; Chung et al., 2018; Clark et al., 2020; Castro et al., 2015; De Vos et al., 2016; Garcia & Smith, 2013; Hausmann et al., 2017; Heagney et al., 2018; Li et al., 2023; Manley & Egoh, 2022; Neuvonen et al., 2010; Norman & Pickering, 2019; Wang et al., 2022; Xiao et al., 2017.
Socioeconomic characteristics of the surrounding area	11	Balmford et al., 2015; Souza et al., 2017; Bhalla et al., 2022; Chung et al., 2018; Garcia & Smith, 2013; Hausmann et al., 2017; Li et al., 2023; McIntosh & Wilmot, 2011; Neuvonen et al., 2010; Smith et al., 2018; Castro et al., 2015.
Infrastructure and services supporting visitation in the surrounding area	7	Baum et al., 2017; Souza et al., 2017; Bhalla et al., 2022; Li et al., 2023; Neuvonen et al., 2010; Puustinen et al., 2009; Castro et al., 2015.
Alternative Protected Areas	5	Baum et al., 2017; Bhalla et al., 2022; De Vos et al., 2016; McIntosh & Wilmot, 2011; Neuvonen et al., 2010.

Source: prepared by the authors, 2026.

3.2.2.1 Access to the Park

Access to the park is a commonly used aspect for understanding visitor flow, based on indicators related to park location, travel time, and the difficulty or ease of reaching the park from visitors' places of origin. The study by Puustinen et al. (2009), for example, demonstrated that in southeastern Finland, the region with the highest population density in the country, an increase of 10 km in the distance between the park and a major city reduces visitation by 3% or 4%.

Within this dimension, 36 factors were identified, with the most commonly used being: distance to urban areas or highways (Chung et al., 2018; Clark et al., 2020; Heagney et al., 2018; Manley & Egoh, 2022; Neuvonen et al., 2010; Norman & Pickering, 2019; Castro et al., 2015); travel time to the airport (Baum et al., 2017; De Vos et al., 2016); and travel time to urban areas (Balmford et al., 2015; Hausmann et al., 2017; Wang et al., 2022; Xiao et al., 2017). The study by Norman & Pickering (2019) used an index to evaluate the physical effort required to reach the park, while Wang et al. (2022) included the presence or absence of public transport.

Depending on the type of visitor, access to the park may exert different influences on visitor numbers. Baum et al. (2017) used variables such as travel time to the nearest city, to the national highway, to the airport, and to the nearest coastal point as location indicators, but identified that these variables did not influence overall visitation in South African parks, being significant only in explaining visitation by international tourists.

This finding differs from the study conducted by De Vos et al. (2016), in which factors such as distance to the nearest city, travel time to other protected areas, highways, airports, and the coast were significant in relation to visitor numbers in South African national parks, exerting a greater effect on day visitors than on visitors staying overnight in the park.

Access to the park is a dimension that produces varying results depending on the choice of variable used to relate accessibility to visitor flow. Li et al. (2023) used highway density in the park surroundings, distance to the nearest urban area, number of railway stations, bus stops, and bus routes in the surrounding area to assess accessibility to parks in a study conducted in Shenzhen Province, China. Bhalla et al. (2022), in turn, used the presence of paved and unpaved roads leading to the park to analyse spatial and temporal factors influencing visitation in parks in India.

Thus, access to the park can be understood as an external determinant composed of different factors that directly influence visitor flow. This occurs mainly because natural parks are generally located in remote areas characterised by difficult access, limited transport options, and greater distance from the main visitor-generating centres. Given the diversity of natural destinations, access should be considered an essential element in the management and planning of investments and programmes aimed at encouraging public use.

3.2.2.2 Socioeconomic characteristics of the surrounding area

Visitation in parks plays an important role in fostering activities both within the natural area and throughout the surrounding production chain, involving local communities and contributing to economic and social impacts. Thus, several studies consider the relationship between socioeconomic characteristics of the surrounding area and visitation. There is considerable variability in this aspect, ranging from regions with little or no influence from visitation to regions strongly influenced by it, where the park acts as an important driver of attractiveness.

Within this dimension, 30 factors were identified, the main ones being: population density (Chung et al., 2018; Garcia & Smith, 2013; Hausmann et al., 2017; Li et al., 2023) and population size (Balmford et al., 2015; Neuvonen et al., 2010; Castro et al., 2015), followed by population age group (Neuvonen et al., 2010) and GDP – Gross Domestic Product (Balmford et al., 2015; Chung et al., 2018; Hausmann et al., 2017).

Studies using economic indicators were also identified, such as unemployment rate (Clark et al., 2020; Neuvonen et al., 2010), income (McIntosh & Wilmot, 2011), education of the population (Clark et al., 2020; Neuvonen et al., 2010), urbanisation (Li et al., 2023), and HDI – Human Development Index (Hausmann et al., 2017; Castro et al., 2015).

Some factors appeared in only one study: agricultural area and agricultural income (Chung et al., 2018), importance of employment in tourism (Neuvonen et al., 2010), exchange rate (Smith et al., 2018), and settlements (Bhalla et al., 2022). The factors composing this dimension may act both as drivers of demand for visitation to natural areas and as socioeconomic indicators associated with regional development driven by park visitation dynamics.

3.2.2.3 Infrastructure and services supporting visitation in the surrounding area

Complementary to the dimension of access to the park, the existence of cities with a good supply of infrastructure and services supporting visitation in the surrounding area may contribute to the consolidation of visitation in natural parks. Within this dimension, 17 factors were identified.

A natural park may constitute the primary destination of a trip or serve as a complementary attraction within a journey motivated by other purposes. It may also function as a place of appreciation for residents from nearby or moderately distant surrounding areas, provided that excursion travel is feasible. Regardless of the reason for travel, the existence of cities or urban centres with infrastructure and services supporting visitors in the surroundings of parks is a component identified in highly relevant studies for understanding visitor flow (Neuvonen et al., 2010; Puustinen et al., 2009).

A study conducted in parks in Finland (Puustinen et al., 2009) found that high levels of visitation occur in mountainous parks and remote areas due to the complementarity between good support structures both inside and around the park, in addition to trails and other cultural attractions located outside the park.

Parks also contain cultural and religious attractions that attract visitors from specific segments, mostly domestic visitors who use accommodation facilities, hospitals, visit temples, and engage in other recreational activities in surrounding cities (Bhalla et al., 2022). A study conducted with 71 Brazilian national parks (Castro et al., 2015) corroborates this relationship, showing that external park factors such as regional, cultural, and natural attractions, as well as accommodation and restaurants in the surrounding area, are strong predictors of visitation.

The interdependence between natural parks and their surrounding regions in increasing visitation becomes more representative in terms of visitor-oriented services and infrastructure, such as accommodation, restaurants, and tourist attractions, than the socioeconomic characteristics of these cities themselves. This effect was identified in studies conducted in Finland (Puustinen et al., 2009), Brazil (Castro et al., 2015), China (Li et al., 2023), South Africa (Baum et al., 2017), and India (Bhalla et al., 2022).

3.2.2.4 Alternative protected areas

Another investigated aspect concerns the influence of the proximity of other protected areas on visitor numbers. Initially, it may be assumed that the existence of another nearby protected area constitutes competition, thereby exerting a negative effect on visitation. However, protected areas may also play a complementary role, fostering regional visitation that integrates different attractions and experiences for the same audience.

Within this context, some studies include factors related to nearby protected areas in order to assess their impact on visitor flow (Baum et al., 2017; Bhalla et al., 2022; De Vos et al., 2016; McIntosh & Wilmot, 2011; Neuvonen et al., 2010). Nevertheless, among the external determinants, this is the dimension with the lowest number of factors, comprising only nine.

A study conducted in protected areas in the United States indicated that there is a positive and complementary effect when a park is located near other protected areas within a radius of up to 160 km. This variable was significant and presented a positive coefficient, meaning that when other protected areas exist nearby, the park also benefits from increased visitation. Apparently, the protected areas in the surrounding region do not compete with one another, but instead produce a complementary effect associated with simultaneous increases in visitation, particularly in parks that already experience high demand (McIntosh & Wilmot, 2011).

3.2.3 Cross-cutting determinants

Table 3 – Analysed articles on cross-cutting determinants

Dimensions	Number of articles	References
Park Management	7	Baum et al., 2017; Chung et al., 2018; Clark et al., 2020; Heagney et al., 2018; Li et al., 2023; Neuvonen et al., 2010; Castro et al., 2015.
Park Visibility	9	Baum et al., 2017; Souza et al., 2017; De Vos et al., 2016; Garcia & Smith, 2013; McIntosh & Wilmot, 2011; Neuvonen et al., 2010; Castro et al., 2015; Wang et al., 2022; Xiao et al., 2017.
Demand Characteristics	3	Clark et al., 2020; Hadwen et al., 2011; Wang et al., 2022.

Source: prepared by the authors, 2026.

3.2.3.1 Park management

Seven articles introduce elements related to park management as possible determinants of visitation. These factors address diverse themes, without any single dominant aspect. The age of protected areas is used in three studies (Chung et al., 2018; Neuvonen et al., 2010; Castro et al., 2015). Baum et al. (2017) use two factors related to the

number of partnerships established by the protected area, one concerning external entities and another concerning other protected areas. The category of the protected area according to the classification of the International Union for Conservation of Nature (IUCN) is used in two studies (Chung et al., 2018; Heagney et al., 2018).

The remaining variables are each used only once. Castro et al. (2015) include in their model of determinants of visitation in Brazilian national parks the number of planning and management documents existing in each unit, in addition to the percentage of the park area under government ownership. Clark et al. (2020) considered the effect of the type of park management (whether privately managed or not) and the level of public administration to which the park is linked. A numerical indicator related to park shape, calculated as the relationship between the area and the perimeter of the protected area polygon, was used by Li et al. (2023).

The limited presence of management-related factors suggests a lack of evidence concerning the adoption of different management models, strategies, and tools and their implications for visitor numbers. This aspect requires further investigation given the demand for theoretical and empirical evidence to support the planning of concessions and other types of partnerships in the management of public use in natural areas.

3.2.3.2 Park visibility

This dimension groups 15 factors used across nine studies. The themes addressed are diverse but fundamentally centred on aspects related to the popularity of protected areas. Only the study by Baum et al. (2017) considered the adoption of active marketing strategies in its research on the determinants of visitation in private conservation areas in South Africa.

The most recurrent theme within this dimension is the park's presence in the Google search engine. This was measured through the magnitude and variance of park presence in Google Trends (De Vos et al., 2016) and by the number of mentions of the park and its main attractions in Google search results (Souza et al., 2017; Castro et al., 2015). Park popularity on social media was also used as a factor (Wichman, 2024).

Studies analysing individual-level data included the importance of advertising for the attractiveness of Chinese marine parks (Wang et al., 2022) and whether the level of awareness of national parks in the United States, among other factors, influenced ethnic and racial minority populations to visit these parks (Xiao et al., 2017).

Different historical visitation indicators were used, such as annual visitation levels and visitation during the same month in the previous year (McIntosh & Wilmot, 2011), popularity for school excursions (Garcia & Smith, 2013), and visitor density (Souza et al., 2017; Garcia & Smith, 2013). McIntosh and Wilmot (2011) also considered the effect of terrorism among the determinants of visitor numbers in parks in the United States due to the potential negative effects of past events and the level of perceived risk during the visitation period.

Park visibility constitutes a cross-cutting factor that may influence increases in visitation. However, its management should be conducted cautiously, since depending on the level of exposure, dissemination strategies, and the profile of the target audience, it may result in disorganised visitor flow or attract visitors whose motivations are not aligned with the objectives of a protected natural area.

3.2.3.3 Demand characteristics

The dimension concerning demand characteristics is composed of only six factors derived from three studies. Wang et al. (2022) use people's attitudes towards travel and travel frequency as elements comprising the attractiveness index of marine parks. In turn, Hadwen et al. (2011) include a variable indicating holiday periods to assess whether these exert a more relevant effect on visitation seasonality than climatic variables.

Clark et al. (2020) used three variables related to visitor profiles (education level, unemployment rate, and percentage of women who are heads of household) in their study on the propensity to revisit trails. This latter study focused on dimensions related to the provision of services, infrastructure, and park management, rather than on demand-related factors, whereas some studies considered both scenarios influencing visitor flow.

3.3 Relevance of the dimensions and factors

Throughout the data extraction process from the analysed articles, in addition to recording the factors used to measure visitation in parks (Figure 7), an assessment was conducted regarding whether these factors were considered

relevant or not according to the conclusions of the studies themselves. The criterion adopted for this classification was the explicit or implicit mention of the relevance of the variables in the text of the analysed articles.

This strategy sought to privilege the interpretations of the original authors while also accommodating the different analytical strategies adopted across the studies, whose conclusions were based on statistical evidence, theoretical support, and knowledge of the investigated object. From the reading of these conclusions, the variables that the authors themselves highlighted as relevant or non-relevant were identified, even when the term “relevance” was not explicitly used.

This classification did not result from the interpretation of the authors of the present study regarding the statistical tests presented in the analysed articles. The process of classifying variable relevance occurred during data extraction (described in Section 2.3.), in which one of the researchers examined excerpts from the abstracts, results, discussion, and conclusion sections (or equivalent sections) of the analysed articles in order to verify whether the authors conclusively indicated which variables were relevant for explaining visitation levels in the protected areas studied.

Based on this analysis, each variable was classified as either relevant or non-relevant. Subsequently, a second researcher reviewed this initial classification, and any divergences were discussed until consensus was reached.

It is important to emphasise that the present study did not aim to measure the effect size of each variable on visitation, which is the characteristic purpose of a meta-analysis, but rather to verify whether the variables used in the selected articles were considered by their own authors to be relevant as determinants of visitation in the analysed areas.

Table 4 summarises the total number of factors identified for each dimension and the number of factors considered relevant and non-relevant in the studies. The percentage of relevant factors relative to the total number of factors was calculated in order to obtain a relevance percentage for each dimension, whose column is presented in descending order.

Table 4 – Relevance of factors by dimension

Dimensions	Total Factors	Factors considered in the studies as:		Relevance (Relevant / Total)
		Relevant	Non-relevant	
Infrastructure and services supporting visitation in the surrounding area (ED)	17	13	4	76.5%
Services supporting visitation in the Park (ID)	27	20	7	74.1%
Infrastructure supporting visitation in the Park (ID)	33	24	9	72.7%
Park visibility (CD)	15	10	5	66.7%
Climate (ID)	25	14	11	56.0%
Access to the Park (ED)	36	20	16	55.6%
Demand characteristics (CD)	6	3	3	50.0%
Socioeconomic characteristics of the surrounding area (ED)	30	15	15	50.0%
Park Management (CD)	11	5	6	45.5%
Trails and attractions in the Park (ID)	31	14	17	45.2%
Alternative Protected Areas (ED)	9	4	5	44.4%
Natural characteristics of the Park (ID)	60	24	36	40.0%
Total	300	167	134	55.7%

Source: prepared by the authors, 2026. Note: “ID” refers to Internal Determinants, “ED” to External Determinants, and “CD” represents Cross-cutting Determinants.

Overall, 55.7% of the factors used were considered relevant according to the studies. The minimum relevance percentage was 40% in the category natural characteristics of the park. It was observed that the studies employed a wide diversity of factors composing different dimensions, highlighting the need for discussions regarding which factors are the most relevant for producing evidence-based studies.

From the results, it can be inferred that visitors primarily demand infrastructure and services supporting visitation. Note in Table 4 the three dimensions with relevance above 70%, so that their trips to natural areas may occur

appropriately, making these elements fundamental and necessary for promoting visitor flow in natural parks (Balmford et al., 2015). It is also assumed that the structures and services provided within parks may not be sufficient to meet all visitor needs, or that visitors seek complementary attractions and services in the surrounding region during trips to natural parks (Koga et al., 2025).

It was also observed that visibility and reputation on social media (66.7% relevance) affect visitation levels, despite the limited number of studies including variables related to this dimension (De Vos et al., 2016; Castro et al., 2015). Climate (56.0%) constitutes a dimension that is difficult to manage directly, yet its impact on visitation was identified, particularly in locations with low temperatures, such as parks in Canada (Weststrate et al., 2025) and the United States (Jedd et al., 2018; Smith et al., 2018). Access to the park (55.6%) also proved relevant as a dimension influencing visitor flow, demonstrating its considerable importance as a predictor (De Vos et al., 2016; Xiao et al., 2017).

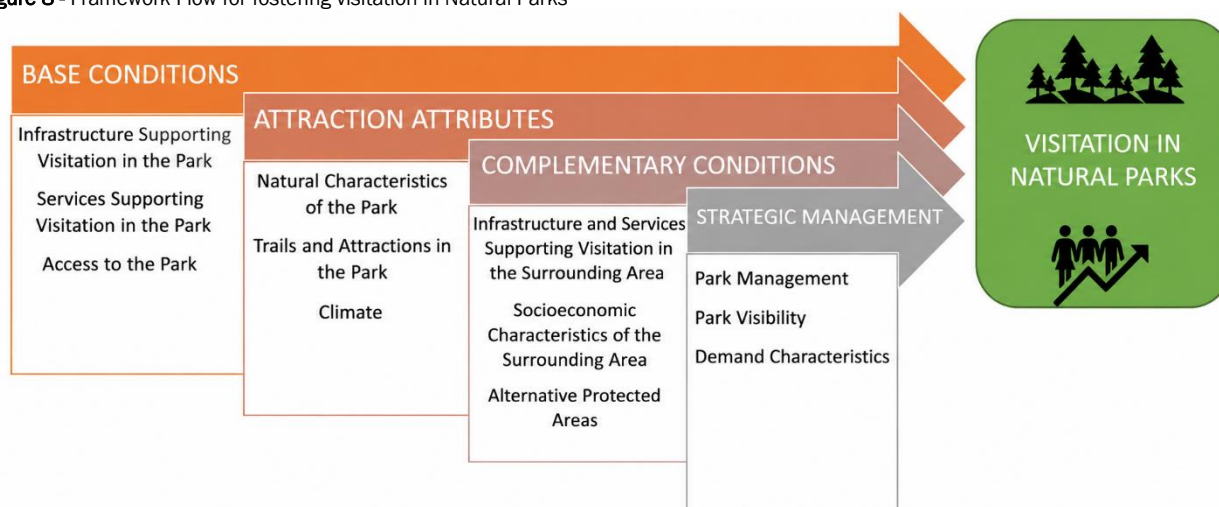
In contrast, the dimension natural characteristics of the park, which groups the largest number of factors used (60), presents the lowest relevance percentage (40%). Since this dimension encompasses natural attributes commonly associated with the attractiveness potential of natural parks, it would be reasonable to assume that these would constitute relevant indicators for visitor numbers. However, the results do not confirm this assumption.

The low relevance percentage of natural characteristics, contrasted with their high frequency in the studies, suggests that these attributes function as a necessary condition, that is, as an expected basic attraction, but do not constitute the principal predictors of variation in tourist flow in natural areas, which appears to be determined primarily by infrastructure and accessibility.

4 PRACTICAL IMPLICATIONS FOR FOSTERING VISITATION IN NATURAL PARKS

Based on the twelve dimensions that emerged from the determinants of visitation in parks and the analysis of their relevance in scientific studies, a framework flow was proposed to assist in understanding how visitation is structured and developed in natural parks (Figure 8).

Figure 8 - Framework Flow for fostering visitation in Natural Parks



Source: prepared by the authors, 2026.

The dimensions identified in this study were organised according to their relevance and the dynamics required for visitors to experience natural parks. This framework may serve as a reference to guide strategic actions by managers of natural areas and tourism destinations. Such a flow is consistent with and reinforces previous proposals for fostering and structuring public use in protected areas (Castro et al., 2015; Neuvonen et al., 2010; Souza et al., 2017).

Based on the visitation flow in natural parks, it is proposed that base conditions should be prioritised. These dimensions are fundamental for enabling visitor interest. Without adequate minimum infrastructure (toilets, signage, visitor centres, parking areas, accommodation, restaurants, entrance gates), basic services (cleaning, safety, guides), and staff, visitation cannot be sustained (Heagney et al., 2018; Wang et al., 2022). Access is an essential factor for enabling visitor arrival, depending on distance, travel conditions, and travel time from visitor-generating centres.

Without base conditions, it is as if the park were closed to visitation and existed exclusively for biodiversity conservation purposes.

In this sense, several strategies and actions are proposed: public-private investment in infrastructure and basic services supporting visitation; improvement and maintenance of access roads; partnerships with local businesses to provide tourism services; and qualification of the local workforce for visitor assistance, orientation services, monitoring, and guiding.

Once the base conditions are structured, attraction attributes represent the reason for visitation among users of natural areas. Trails and other attractions within the park may attract different visitor groups during different periods and events. Climate may interfere with the seasonality of the use of attraction attributes and may constitute a potential factor for specific events and activities.

Accordingly, some actions are outlined: promoting specific services, activities, and experiences according to park characteristics; creating narratives that transform natural and cultural attributes into identity-based park brands grounded in local histories and traditions and developed through community consultation; fostering specific groups of sports practitioners (mountaineers, cyclists, hikers); and establishing public-community and private-sector partnerships to manage these attraction attributes together with the base conditions, ensuring their maintenance and funding.

Visitor flow is strengthened by complementary conditions. The surrounding area exerts a moderating effect on visitation, potentially enhancing or inhibiting it depending on aspects related to safety, hospitality, community income, and competitiveness with other areas. Within an integrated and regionalised perspective, surrounding cities, their infrastructure, and attractions comprise elements that add value to visitation in natural parks through complementary infrastructure such as accommodation, restaurants, markets, petrol stations, pharmacies, and similar services.

Thus, the following actions are proposed: fostering tourism regionalisation; strengthening community-based tourism; creating local productive arrangements; developing regional tourism itineraries; expanding cooperation among nearby parks to attract complementary visitor flows; enhancing investments and professional qualification within the region; involving the park management council and the municipal tourism council (COMTUR); structuring participatory governance; and consolidating relationships with the tourism industry.

Finally, in a cross-cutting manner throughout the entire flow, strategic management integrates all previous factors and should consider visitor types, adapt services and strategies, and articulate relationships with different stakeholders. Park visibility broadens the reach of these attributes and may diversify visitor groups. Therefore, the following measures are suggested: implementing participatory management and visitation plans; monitoring visitor profiles and preferences through surveys; encouraging co-management partnerships between the public sector, communities, and the private sector; and maintaining an active presence on social media and partnerships with travel influencers.

5 FINAL CONSIDERATIONS

This study aimed to identify the determinants of visitation in natural parks through a systematic literature review. Based on the 24 selected articles, according to the SPAR-4-SLR protocol, approximately 300 factors promoting visitation in natural parks were identified. These factors were divided and organised into twelve dimensions: access to the park, alternative protected areas, demand characteristics, natural characteristics of the park, socioeconomic characteristics of the surrounding area, climate, park management, infrastructure supporting visitation in the park, infrastructure and services supporting visitation in the surrounding area, services supporting visitation in the park, trails and attractions in the park, and park visibility. In turn, these dimensions were grouped into internal determinants (ID), external determinants (ED), and cross-cutting determinants (CD).

By mapping the factors structuring the supply of attractions and services both within and around parks, an analytical framework was outlined that may guide the promotion of visitation and also serve as a basis for future studies aimed at developing models for measuring demand in protected areas. When analysing the relevance of the different dimensions (determinants) in light of the reviewed literature, the following order of importance was obtained: infrastructure and services supporting visitation in the surrounding area (ED); services supporting visitation in the park (ID); infrastructure supporting visitation in the park (ID); park visibility (CD); climate (ID); access to the park (ED); demand characteristics (CD); socioeconomic characteristics of the surrounding area (ED); park management (CD); trails and attractions in the park (ID); alternative protected areas (ED); and natural characteristics of the park (ID).

Based on the results, an integrated framework was organised, synthesising the main dimensions and attributes associated with visitation in parks and tourism regions. It is considered that this framework contributes to theoretical advancement regarding the evolutionary cycles of visitation in natural destinations, while also offering practical support for the planning, management, and organisation of protected areas. Based on the variables identified as relevant, an operational flow of this framework is also proposed, indicating strategic arrangements for visitation management and more effective decision-making processes.

The systematic review presents limitations arising from the indexing databases used (WoS and Scopus), being restricted to scientific publications. From a geographical perspective, there is a gap regarding applied investigations in other regional and national contexts.

As a future research agenda, the development of visitation measurement models applicable to Brazilian parks at state and municipal levels, as well as to other emerging countries, is proposed, since these contexts frequently lack systematised data on visitor flow and other associated variables. The need for studies evaluating the importance of infrastructure planning and the qualification of park supply is also highlighted, reinforcing the relevance of investments capable of increasing visitation, improving visitor experience, strengthening environmental education, and ensuring the economic viability of natural destinations.

Cluster analysis based on the supply of services and public use infrastructure is also recommended in order to understand more strategically how such variables relate to and drive visitation growth. Studies incorporating the monthly dynamics of demand, considering seasonality, as well as segmented analyses between tourists, surrounding residents, excursionists, and domestic and international visitors, also appear essential for improving protected area management and guiding more effective public policies.

Finally, the development of robust empirical analyses regarding visitation in natural parks and its determinants depends on data availability. This study contributes to the development of diagnostic assessments on this topic, providing essential support for encouraging initiatives that promote continuous monitoring within natural parks of the factors identified in this study, thereby supporting decision-making and future research.

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Data availability statement

Data must be requested from the author at kogadinapoli@gmail.com

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