

TOWARDS THE DEVELOPMENT OF ECOTOURISM IN THE OULED-NAIL MOUNTAINS: A CASE STUDY OF THE DJELFA MUNICIPALITY IN ALGERIA

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Abstract: Algeria's tourism sector plays a critical role in its economy, especially as the country faces an economic crisis due to its reliance on fossil fuels. However, despite its potential, the tourism industry has remained limited to coastal and desert tourism in the north and south, respectively. Therefore, diversifying the tourism product by exploring inland regions is necessary to restore regional balance and create geographical homogeneity. Djelfa, a city located in the central highlands of the Atlas Mountains, offers unique natural resources and cultural heritage, making it an ideal destination for ecotourism. This study evaluates the potential of Djelfa for tourism planning purposes, using scientific documentation, field survey techniques, and analytical methods like SWOT analysis. In addition, a survey was conducted amongst tourists to collect their opinions on the city's attraction characteristics. The data was processed using principal component analysis (PCA) in SPSS software. The study emphasizes the importance of tourism planning in the area and proposes suitable tourism projects for ecotourism and investment in the Senelba forest site. These projects will positively influence the environment, local population, and lead to real development at the local and national levels while preserving the area's cultural and natural heritage.

Key words: Djelfa, Senelba forest, ecotourism, desert regions, natural and cultural heritage, local development, tourism development

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INTRODUCTION

Tourism is considered one of the fastest-growing industries in the world, as it is among the most vital economic sectors that contribute to providing hard currency and enhance local development by creating job opportunities and attracting investors (Boulhila et al., 2022). The interest in this activity has increased because of competition between tourist destinations, technological development, transportation development, and the reduction of effort and time. Tourism faces issues due to its incompatibility with the local environment and communities (McCool, 1995). Based on the report of United Nation World Tourism Organization, ecotourism covers 10-15% of the tourism industry share (Nigatu and Tegegne, 2021).

By its nature ecotourism relied on natural resources and the driving force of environmental education, conservation of local culture and natural environment, ensure economic benefit of the local and the sustainable development of the areas (Golubeva et al., 2016). Ecotourism is essential for developing countries as it generates income and protects the environment and cultural heritage (Tardif, 2003). It is considered one of the most important forms of modern tourism and makes up about 20% of international tourism (Self et al., 2010). Ecotourism activities can be conducted through individual visits to geological sites or guided tours (Newsome and Dowling, 2010), as well as geotourism itineraries (Newsome et al., 2012). Geosites represent a valuable asset for local communities, providing them with opportunities to enhance their economy by capitalizing on their geodiversity, biodiversity, and culture (Lazzari et al., 2014). Algeria possesses a strategically important geographical location due to its proximity to all global and European destinations, and it has many natural resources such as mountains, deserts, and cultural characteristics that enable it to become an excellent ecotourism destination. Moreover, Algeria has shown interest in promoting ecotourism by establishing natural reserves and joining numerous international agreements and organizations that support this sector. Despite being ranked as the fourth tourist

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destination in Africa, according to the World Tourism Organization's report for 2014, it is only ranked 111th in the global tourism industry (Belkhiri, 2018). Djelfa Province is in central Algeria and has the fourth-highest population in the country.

It connects the north and south and has 36 municipalities, including Djelfa municipality, known as the capital of the desert. The region has forests that help combat desertification, and it's home to diverse plant and animal life, including the largest national sheep population. Djelfa is famous for its hospitality, openness, and cultural festivals. However, providing alternative income sources has been a challenge due to cultural and spiritual reasons (Michaelidou et al., 2002). Djelfa has archaeological sites, rock stations, and important structures, making it an ideal destination for ecotourism. Despite recording 31,604 overnight stays in hotels in 2011, including 346 by foreigners, the tourism industry has not flourished.

Most visits are for work, trade, livestock markets, or medical treatment, with few tourists visiting the region's attractions, mainly university students and researchers. This article aims to transform Djelfa from a business area with weak tourism activity to a sustainable and responsible destination that supports other economic sectors. It evaluates the region's potential and explores opportunities to address deficiencies hindering tourism. The focus is on creating a local model for ecotourism, which balances economic development and natural resource preservation (Aneseyee et al., 2022).

Ecotourism is a potential approach for addressing environmental and economic issues in many destinations (Sahani, 2019). Developing ecotourism in Djelfa can preserve its resources, protect its fragile ecosystem, and conserve its cultural heritage. In summary, this article attempts to create an organized, sustainable, responsible, and complementary tourism industry in Djelfa. Developing ecotourism is a key strategy for achieving this transformation and ensuring real sustainable development at the local and regional levels. The aim of this study is to highlight the importance of developing ecotourism in the municipality of Djelfa, by proposing strategies and guidelines for the development of this type of tourism, and achieving a balance between the exploitation of natural resources and the preservation of environmental diversity and cultural heritage. This is intended to have a positive impact on the environment and the local population, with the goal of ensuring economic sustainability and achieving genuine tourism development.

LITERATURE REVIEW

1. The role of mountain ecotourism in local development

Algeria is implementing major projects to revive its tourism industry and increase non-oil export earnings. Properly planned and managed, tourism can play a crucial role in the economic development of countries; contribute to sustainable development, environmental protection, poverty reduction, and rural exodus (UNEP Tourism, 2007). It is increasingly used as a sustainable development strategy to improve the social and economic well-being of the poorest mountainous populations and preserve cultural and natural heritage (Asker et al., 2010). Territorial communities in France have developed new forest spaces that are highly appreciated by residents (Pascal and Dodier, 2011). Encouraging community participation in development processes (Idziak et al., 2015). In 2019, the global ecotourism sector was valued at 181.1 billion US dollars. It was projected that the industry would reach 333.8 billion US dollars by 2027, with a compound annual growth rate of 14.3% (Rajashree and Madhusmita, 2023). Developing ecotourism can be an effective strategy for preserving natural resources, improving economic opportunities for local communities, and promoting sustainable development.

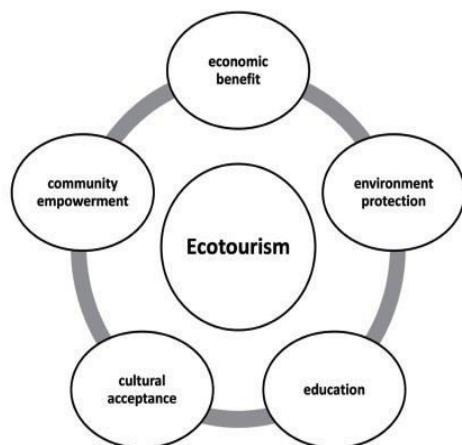


Figure 1. Five core elements of ecotourism (Source: Ties, 2012; Honey, 2008)

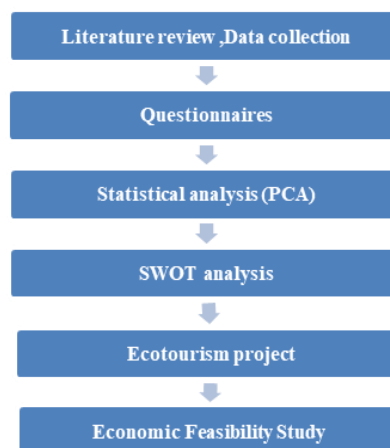


Figure 2. Flowchart illustrating the methodology adopted in this research. (Source: Authors, 2023)

2. Ecotourism in the mountains as a model for a new economic resource for the Djelfa municipality

Ecotourism involves travel and visitation for enjoying nature and culture while respecting the environment and promoting conservation (Freude, 2019). It represents a set of interests based on environmental, economic, and social concerns (Baksir, 2010). The Global Environment Facility defines it as "travel to natural areas that are not polluted and have not been disrupted in their natural balance, in order to enjoy their scenery, plants, wild animals, and civilizations of the past and present" (Blamey, 2001). Algeria is expected to direct its tourism offerings towards ecotourism, especially in mountainous areas. Ecotourism represents more than 20% of the global tourism market, but it is new to Djelfa province (SDATW, 2013). Developing ecotourism in the Senalba forest can provide employment opportunities for local people and improve their living conditions (FAO, 2013). Ecotourism links investment and productive projects with the protection of

the environment, biodiversity, and culture of tourist areas. It emphasizes creative and entertaining tourist practices without affecting the environment (Temar and Kerrouche, 2020). Ecotourism aims to make various resources beneficial and useful as an economic return (Kaymaz et al., 2021). Ecotourism has emerged as a crucial element in the tourism industry for increasing environmental awareness, reducing negative effects of tourism and ensuring sustainable use of natural and cultural tourism assets (Kaymaz et al., 2021). The main aspects of ecotourism are based on five fundamental elements (Figure 1) environment protection, economic benefit, community empowerment, education, cultural acceptance (Ties, 2012; Honey, 2008).

METHODOLOGY AND OBJECTIVE OF THE STUDY

This study aims to develop ecotourism in Djelfa by highlighting its cultural and natural heritage while ensuring preservation (Julie, 2013). The goal is to revitalize tourism, enhance Djelfa's image as a destination, and protect certain areas while involving local populations (Das and Chatterjee, 2015). The study involved literature review, data collection, field visits, questionnaires, personal interviews, and gathering documentary research from various departments. We used the SWOT analysis method to assess the quantitative and qualitative potential of the study area for ecotourism (Valentin, 2001). Field surveys of tourists and visitors identified attraction characteristics and their evolution. Statistical analysis using Principal Components Analysis showed a positive relationship between ecotourism development and availability of tourism services, emphasizing the need to develop infrastructure and services (Kherrou et al., 2018). We proposed an ecotourism project for Senalba forest using ArcGIS, AutoCAD, Google Earth, and GIS Geographic Information System to ensure sustainable local and regional development. This study aims to answer the following questions:

- 1- How can the existing tourism potential in the Djelfa region be improved and enhanced to develop ecotourism and achieve sustainable local development?
- 2- What are the suitable tourism projects and facilities to develop ecotourism in the region?

1. Study area

The Djelfa municipality is located on the slopes of the Saharan Atlas in the central highlands of Algeria. It is bordered by several municipalities and is crossed by National Highway (N 1), which connects the north and south of the country. The municipality covers an area of 514.58 square kilometers and is located 300 km south of Algiers, 100 km north of laghouat, and 100 km west of Boussaada (Figure 3).

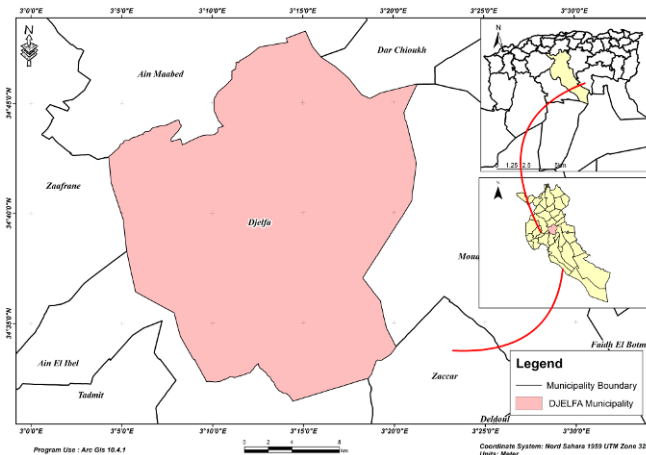


Figure 3. Location of Djelfa municipality in Djelfa Province (Source: Authors, 2023)

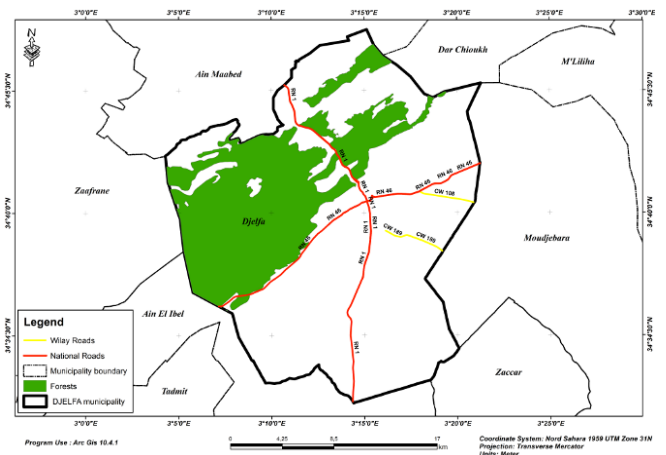


Figure 4. Forest sites in the territory of the municipality of Djelfa (Source: Authors, 2023)



Figure 5. The forest of the Senalba a – d (Source: DTA)

2. Tourism Resources of the Djelfa Municipality (2023.DTA)

A. Natural Resources

Forest Wealth: The Djelfa province has significant forest wealth, which plays a crucial role in protecting against desertification and pushing the desert northwards (Bencherif, 2010). The Senalba forest in Djelfa municipality is one of the most prominent forests in the area (Figure 4). **Senalba Forest:** The Senalba forest, located approximately 5 km northwest of Djelfa city, covers an estimated area of 19,500 hectares on the slopes of Mount Senalba, the primary incline of the Saharan

Atlas Mountains (Bencherif, 2010). The forest is characterized by a semi-arid zone with a cold climate, dominated by Aleppo pine, green oak, and juniper vegetation cover (Figure 5). The forest is an ideal environment for sports, relaxation, and entertainment (Figure 4.d). It was officially designated as an expanded tourist area in 1988 (Decree No. 88/232 on November 5, 1988), covers an area of 12.5 hectares, and is home to diverse wildlife, including wild boars, gazelles, rabbits, insects, reptiles, foxes, and eagles. Mount Hadjar Al-Maleh: rock salt mountain is a major géotourism attraction, featuring the world's third-largest salt mountain, towering at 100 m (Figure 6). Located approximately 30 km north of Djelfa city and 15 km from the Zahrz Plateau in the Ain Maabed municipality, it holds significant geological importance.

The site offers a captivating visual spectacle with salt formations amidst the rocky continental landscape, transitioning in colors from yellow to green, purple, and occasionally red, making it a unique destination for tourists (Figure.7)

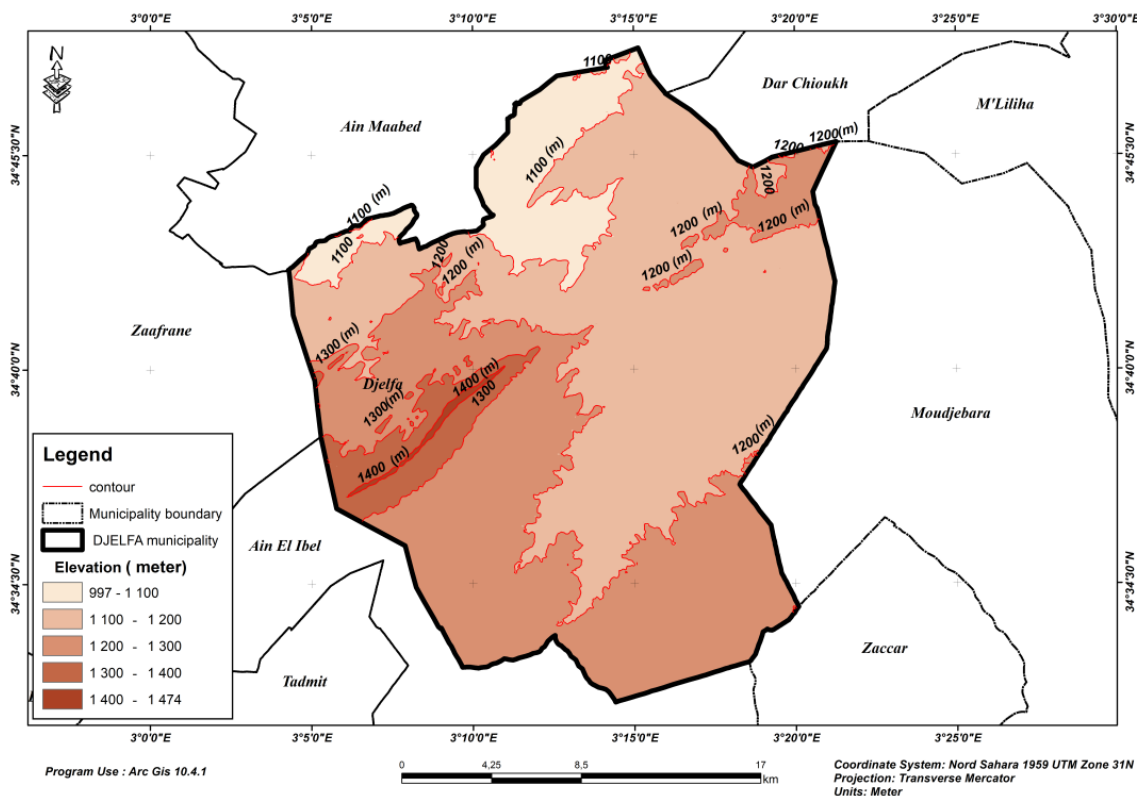


Figure 6. Elevation Map (Source: Authors, 2023)



Figure 7. Rock salt mountain (geosite), located 30 km north of Djelfa, Coordinates: 3°05'37"E34°50'00"N (Source: Authors, 2023)



Figure 8. Sand Dunes Strip (geosite), located 40 km north of Djelfa, Coordinates: 3°06'47"E34°55'12"N (Source: DTA)

Sand Dunes Strip: The Sand Dunes Strip in Djelfa is a popular destination for desert tourism, located just 250 km from the capital and conveniently adjacent to National Road N 01 (Figure 8). Situated 40 km north of Djelfa city, the sand dunes offer accessible pathways for exploration and a vast expanse of sand dunes, epitomizing the grand essence of the Sahara. Visitors can also enjoy sand baths, which offer relaxation and potential medicinal benefits for rheumatism.

The Wetland

Areas: The Eastern Chott and Western Chott are two natural wetland regions located approximately 25 km north of Djelfa city, designated as Ramsar sites in 2003 to ensure their permanent protection and preservation of their crucial roles in the economy, culture, science, and tourism. **Hot Springs:** Djelfa province has three notable hot springs, with Hammam Charef being the primary one located 50 km west of Djelfa city and 7 km east of the Charef municipality. Situated at an

altitude of 1150 meters above sea level, it exhibits chemical and therapeutic qualities that effectively treat conditions such as rheumatism, nerve diseases, and skin ailments. This hot spring has a flow rate of 70 liters per second and maintains a water temperature of 42°C. **Hunting Reserve:** The hunting reserve in Djelfa is located 20 km north of Djelfa city and encompasses the Ain maabed and Dar Chioukh municipalities. Its establishment was formalized by decree No. 116/83 on February 5, 1983. The reserve covers a vast expanse of 31,886.25 hectares, comprising both natural forest and afforestation areas. Its primary purpose is to protect and conserve endangered animal species, monitor and preserve animals, conduct wildlife inventories, and undertake research and experimentation concerning predators. Visitors can immerse themselves in the reserve's natural wonders and encounter rare animal species, making it an ideal destination for ecotourism.

B. Cultural potential

Historical and Civilizational Elements: The Djelfa region is rich in historical and civilizational elements, particularly from the prehistoric and early history eras, evident through its numerous archaeological sites and rock art stations. The region has been continuously inhabited since the earliest migrations of ancient humans to North Africa during the ancient Stone Age, as documented by a substantial number of archaeological sites (Aberkane and Belkacemi, 2016). The area has 37 locations showcasing rock art, displaying remarkable diversity with a prominent focus on rock art found in the Ouled Nail mountains and its surrounding areas. Many of these sites and stations have been designated as national heritage sites due to their significance. **The Ain El Naga Site:** is a national heritage site classified since 1979 (Figure 9a), located approximately 33 km southeast of the provincial capital. It is in close proximity to the urban area of Ain El Naga village, which falls under the administrative jurisdiction of the El Moudjbara ebrah municipality. This site is home to six remarkable mural paintings and a collection of 71 rock engravings.

Zaccar Site: The Zaccar Site, also known as Deir El Dqawen, is a national heritage site classified since 1982 (Figure 9b). It is located 33 km southeast of the provincial capital and 2km southeast of the Zakar municipality. This site takes the form of a rock shelter, showcasing a magnificent artistic panel depicting a hunting scene. The artwork vividly captures the dynamic relationship between predator and prey, with a lion chasing a deer. Additionally, a variety of animals, including ostriches, elephants, rhinoceroses, cattle, and a pregnant sheep, are depicted. The Zaccar Site features 37 rock engravings. **The Kheng El Hilal Site (Figure 9c)** is located 40 km southwest of Djelfa city, within the Ain El Ibel municipality. It is also known as Kheng Guelen and features a sizable vertical rock mural adorned with seven rock engravings depicting a group of animals.



Figure 9. Rock art from prehistoric eras located south of Djelfa, Ain El Naga Site (a), The Zaccar site(b), Kheng El Hilal Site(c) (Source: DTA)

Sidi Bou Bakr Site: is located 35 km from Djelfa city within the Ain El Ibel municipality, approximately 1.2 km northeast of the El Amara village. This site is characterized by a large mushroom-shaped rock mural with rock engravings on all four of its faces. In total, there are 25 rock engravings at this site.

Berber Presence: The Djelfa region has a long history of human settlement by Berber tribes dating back to 1500 BC to 1000 AD. Among the tribes that resided in the area was the "Al-Jitoul" tribe.

Roman Presence: The Roman presence in Djelfa was concentrated in specific areas, marked by fortifications and palaces erected for defense against external threats. Numerous Roman structures, including palaces and remnants of cities, have been discovered between Ain Melh and Djelfa. **Islamic Presence:** The Djelfa region witnessed the arrival of Arab Muslim tribes, such as the Bani Hilal, who embraced Islam in 704 AD. However, they were later displaced by the Ouled Nail tribe, as they were unable to remain in Ain El Rich, the place where their ancestors had lived.

Ottoman Presence: The Beylik of Tiaret was established in 1547 by Hassan Pasha Ben Khairuddin, and its borders expanded to encompass the laghouat region in 1727. During this period, the Ouled Nail tribe paid taxes after each wheat purchase and a collective annual tax. Some remnants from this period include the Turkish fortress in Ain El Ibel and the dome of Sidi Mohammed Ben Ali in the northern part of Jebel Sahari Wad Boustania.

French Colonial Presence: Djelfa, the capital of the Ouled Nail tribes, was established in 1852 as a military site during the French colonial period and officially founded in February 1861 under the rule of Napoleon III. Despite its relatively young age, Djelfa boasts a rich heritage comparable to that of ancient cities throughout Algeria. The city's historical significance is evident in several well-preserved buildings, including the town hall (1860), the church (1861), the eastern fortress, the powder magazine (1872), the guesthouse (1863), the northern fortress (Gaffarilli) which presently houses Ben Ayad High School, the gendarmerie barracks (1873), the mosque in Al-Burj neighborhood (1874), the weather station (1874), the railway station (1921), the post office and telecommunications center (1936), and the southern tower (built in 1952 and currently serving as military barracks). These buildings serve as tangible evidence of Djelfa's rich history and cultural significance.

C. Traditional Industry and Handicrafts (2013 SDATW)

Handicrafts in the Djelfa region are a family activity that utilizes raw materials produced by the families themselves, such as wool, camel hair, and skin. This traditional craft is not only a source of livelihood but also holds immense cultural significance. It highlights the history and daily life of the local population and is deeply intertwined with the regional and national cultural heritage. This makes it an integral part of the rich tapestry of the community's traditions and customs. Weaving is of paramount importance in the Djelfa region, particularly as a women's activity, as depicted in (Figure 10b,c) Carpets are the predominant craft, featuring intricate patterns composed of geometric figures primarily in two dominant colors: dark red and black. These colors symbolize the renowned hospitality of the Ouled Nail community. Artisans in the region employ natural dyes in their weaving process, favoring them over chemical alternatives. For instance, they extract yellow hues from tea and saffron, obtain black shades from juniper bark, and derive orange tones from henna. The emphasis on natural dyes adds an authentic touch to the carpets, further displaying the artisan's dedication to their craft.

Flat-woven carpets are a specialty of the entire Djelfa region, with the best produced in Djelfa and Charef. Another notable traditional craft is the nomadic tent, also known as "Beit El Hamra," which is typically red and black, symbolizing the nomads of the Ouled Nail of Djelfa and their legendary hospitality. These tents can accommodate 5 to 10 people, and larger tents can hold over a hundred people, making them ideal for festivals, weddings, and other gatherings. The Flidj is a woven strip on a fixed meter on the ground, made of goat hair and wool. It is a specialized craft in the nomadic environment and can be modernized for use as a carpet in halls, corridors, and even hotels. Ferache is a type of carpet from Djebel Amour, while Ferachia is a smaller carpet used for daily use and decorated with different colors. Hayek is a fine woolen covering usually in white and blue, while El Hanbel is a woolen cover characterized by its thickness and floral and striped decoration. These crafts showcase the region's rich cultural heritage and are a testament to the artisans' dedication and skill.

D. CLOTHING PIECES

The camel hair burnous: The camel hair burnous is a highly sought-after specialty of the Messaâd region, as shown in (Figure 10a). Crafted primarily by women, this traditional craft is renowned for its exceptional quality, exquisite finesse and is exclusively practiced by women (Figure 10c). The burnous serves as a shield against the cold and a statement of the wearer's individuality. Weighing no more than 900 grams, the "camel hair" burnous is meticulously woven with finesse and is recognized and cherished by connoisseurs. White burnous: In the northern part of Wilaya, particularly in Zaccar, Hassi Bahbah, and AinOussera, artisans produce the white burnous using white wool and embellishing it with delicate strips of white or bluish silk. Originally, a traditional garment, the white burnous has been transformed into a fashionable women's garment that rivals the elegance of its wear with its originality. Its distinct style captivates attention and adds a touch of chic to the wearer's attire, showcasing the region's rich cultural heritage. Other traditional crafts in the Djelfa region are mainly intended for local consumption. Kechabia is a traditional attire for men woven from wool or Ouber (Figure 10 c, 10 d), while the haik is a very fine covering sometimes of a solid color such as ochre, white, or blue. The djellabas are a more elaborate form of clothing than the burnous and can be made of wool or camel hair (kachabia). The H'mel is a large hanging used to divide the tent between the part reserved for women and the part reserved for men, while RoubetArbi is a long, wide, and opaque dress also called the "Naili dress" used by women until now. Djelfa's agro-pastoral region allows for the emergence of leather processing trades such as traditional tannery, shoe manufacturing, leather belts, and horse saddle making. Traditional shoes such as El Taobi, El Megroune, etc. are mainly made in Djelfa and Messaâd and are intended for nomadic customers (Figure 10e).



Figure 10. Traditional Industry and Crafts: (a) The camel hair burnous, (b) Kechabia, (c, d) Weaving, (e) The traditional "Taobi" shoes (Source: DTA)

Basketry and pottery are produced by women who make the tagine - a plate with raised edges used for baking bread. Two types of tagine are available: one with a bottom for everyday bread, and the other with a smooth bottom that allows the "baghrir" (pancake-like bread) to be cooked for holidays and ceremonies.

Traditional Jewelry: The jewelry industry in Djelfa is characterized by unique designs, particularly in silver products, giving traditional jewelry an artisanal and aesthetic value for women, as depicted in Figure 11.



Figure 11. Traditional jewelry (Source: DTA)

Local Traditions

The Naili Dance is a renowned dance in Djelfa known for its graceful and synchronized movements, including various types such as El Saadaoui, El Hal, El Rechk, El Fouroussia, and El Komri. The Naili Song emerged in the latter half of the 19th century and derives its name from the Ouled Nail tribe present in M'sila, Djelfa, Laghouat, and partially in Biskra.

Traditional music instruments: Djelfa preserves its Bedouin heritage through featuring simple instruments such as El Kasba, Eldef (El Bendir), El Ghayta, El Oud, and Violant. These traditional musical instruments reflect the region's cultural heritage as an extension of the Algerian Sahara. Proverbs and poetry, such as Chiir El Melhoun, have long been used by the inhabitants of Djelfa to express and address social concerns, maintaining their significance even today.

Popular games such as El Sik, El Kharbka, El Sibak, Ghomaida, and TilaTila contribute to a sense of unity among the community. Folk tales, passed down through generations, play a vital role in preserving customs and traditions among both Bedouins and city dwellers. Popular poetry: El Chiir El Malhoun, a prevalent form of popular poetry in Djelfa, explores themes related to horses and Bedouin culture, often expressing the hardships and melancholy associated with long journeys, differing from the poetry of nomadic peoples in the South and the North.

El Tksad is a local heritage rooted in Madih El Dini and the resonant sound of the large drum (Bandir).

Fantasia: Hospitality and warmth epitomize the spirit of the Ouled Nail people, while the ancient fantasia embodies a true "warrior ritual" practiced by ancestors to celebrate religious or civil festivals (Figure 12a, 12b).

Culinary art in Djelfa incorporates high-quality ingredients such as cereals, farm produce, countryside products, and sheep meat, with specific culinary specialties such as Chakhchoukha, couscous, Méchoui, and El Khobze (figure 12e).

Hunting with Sloughi dogs and birds of prey is a cherished tradition, and the Feast of the Sheep, a symbolic festival for the region, has not been celebrated since 2005 (Figure 12c).



Figure 12. Local traditions: (a), (b) Fantasia, (c) Hunting, (d) The hospitality of the Ouled Nail, (e) Culinary art (Source: SDATW, 2013)

3. The Status of Hotel Institutions in the Municipality of Djelfa

Djelfa municipality has six hotels, all located in the urban area of Djelfa city, offering 264 rooms and 578 beds. This indicates that tourism in Djelfa mainly focuses on urban and business activities, with limited hotel options for the region.

Unfortunately, most tourism projects in Djelfa prioritize urban hotels, neglecting the potential for rural, environmental, mountainous, and climate-related tourism. Consequently, tourism offerings in these areas are perceived as limited, disorganized, and underdeveloped (SDATW, 2013). Additionally, a significant portion of the remaining hotels in Djelfa is not officially classified, leading to a decline in the quality of tourism services and the overall image of the tourism sector. During summer, there is a shortage of accommodation due to the influx of residents from the southern Sahara states, leading to families renting houses as an alternative accommodation option.

4. The Evolution of Tourist Flow in the Municipality of Djelfa

The tourist influx to the municipality of Djelfa has experienced significant growth in both classified and unclassified hotels. The following table provides relevant data. Table 1 indicates that there was a notable increase in the number of Algerian tourists visiting Djelfa in 2022, with over 24,388 recorded during the COVID-19 pandemic period. However, the number of foreign visitors remained relatively low, with only 106 recorded, mainly engaged in business tourism. This suggests that Djelfa has yet to achieve a satisfactory level of foreign tourism, likely due to a lack of diversification in its tourism offerings.

Table 1. Tourist flow at accredited hotel establishments in the municipality of Djelfa for the year 2022 (Source: DTA, 2022)

Total flow	Algerian visitors		Foreignvisitors		Total	
	arrivals	nights	arrivals	nights	arrivals	nights
The flows to classified hotels	13715	15171	93	119	13808	15290
The flows to non-classified hotels	10673	10673	13	13	10686	10686
Total touristsinflow	24388	25844	106	132	24494	25976

RESULTS AND DISCUSSIONS

The aim of this research is to conduct a comprehensive study of the tourism potential in the municipality of Djelfa, with a focus on promoting environmental tourism in the region. This study will assess the attractiveness of tourist sites, accessibility, available facilities and activities, infrastructure, and tourism services. The ultimate goal is to develop economically viable environmental tourism projects in the region. Currently, the existing plans for tourism development are not feasible, and tourism is still in its early stages in the area. Previous research has emphasized that the absence of prior studies on tourism demand is a significant factor in the failure of environmental tourism initiatives. These studies help identify the underlying issues that hinder the growth of this economic activity, despite the existence of the tourism development plan (SDATW, 2013) for the Djelfa province. However, due to the limited availability of recent statistical data from tourism authorities such as the Tourism and Traditional Industries Directorate and the Planning and Budget Monitoring Directorate for Djelfa, questionnaires were distributed to tourists to gather relevant information.

The questionnaires were distributed to tourists both on-site during their visits to the Senalba forest and through social media platforms. The objective was to gather information on the social and demographic profile of tourists, their reasons for visiting the area, the duration and level of accommodation during their stay, their level of satisfaction, and any challenges or issues they encountered. Additionally, the questionnaires aimed to gain insights into the demands of the tourism market and categorize them accordingly.

1. Study Sample

To address the lack of statistical information on tourism activity in the municipality of Djelfa, a survey was conducted using a convenient sampling method. The survey targeted tourists and visitors in various tourist areas within the municipality, including the Senalba forest, nearby forests, and the prominent Prince Hotel. The survey was also extended to university students and researchers, and questionnaires were distributed through social media platforms from August 20, 2022, to September 30, 2022. Out of the 540 questionnaires distributed, 535 were retrieved, resulting in a confidence level of 99%. After discarding four questionnaires due to incomplete or unserious responses, 531 surveys were eligible for the study. The survey was structured into three sections: gathering demographic information, capturing details about the purpose and motivations behind the visit, and assessing the current state of tourism in Djelfa using the Principal Component Analysis (PCA) method. The PCA method involved obtaining opinions from tourists and visitors and measuring their satisfaction levels using 14 variables or questions, covering aspects such as natural and cultural attractions, environmental factors, general infrastructure, tourism infrastructure, and available services and amenities.

2. Description of the Demographic Characteristics of the Study Sample

Descriptive statistics were used to analyze the demographic characteristics of the study sample. Figure 12a shows that 77% of the sample comprised males, while females accounted for 23%, indicating a higher participation of men in tourism activities within the area. The age distribution was divided into two categories: 31-50 years old, representing 49%, and 19-30 years old, representing 32%, with the latter category consisting of young and curious individuals, as depicted in Figure 12 (b). In terms of education level, the majority of the study sample, 56.5%, possessed a university education level, as illustrated in Figure 12a. Approximately 21.3% had a secondary education level, suggesting that educational attainment contributes to an increased openness and tourism culture among individuals. Figure 12 (e) shows that 44% of the study sample were employed with their families, possibly due to their financial stability; desire to escape work routines, particularly on weekends, and access to private transportation. Students accounted for 25% of the sample, falling within the aforementioned youth category, characterized by enthusiasm, a penchant for exploration, and engagement in sports activities in neighboring forests. Self-employed individuals accounted for 13% of the sample, while 10% were retirees and 8% were unemployed.

The Sanalba Forest, located just a 5-minute drive from Djelfa city, is a popular destination for visitors seeking serene natural landscapes and an escape from urban noise. It is particularly favored as an ideal destination for holiday retreats. As shown in (Figure 14), our analysis indicates that 64% of tourists prefer forests and mountains, appreciating their tranquil beauty. Additionally, 16% show interest in cultural sites, while 13% enjoy exploring craft exhibitions. Moreover, 30% of tourists actively engage in sports activities within forests and mountains. Our analysis also reveals that 46% of tourists, particularly those originating from southern region, choose to spend their summer holidays in the municipality of Djelfa. This preference is driven by the region's moderate summer climate, its location at an altitude exceeding 1200 meters above sea level, and the abundance of dense forests surrounding the area.

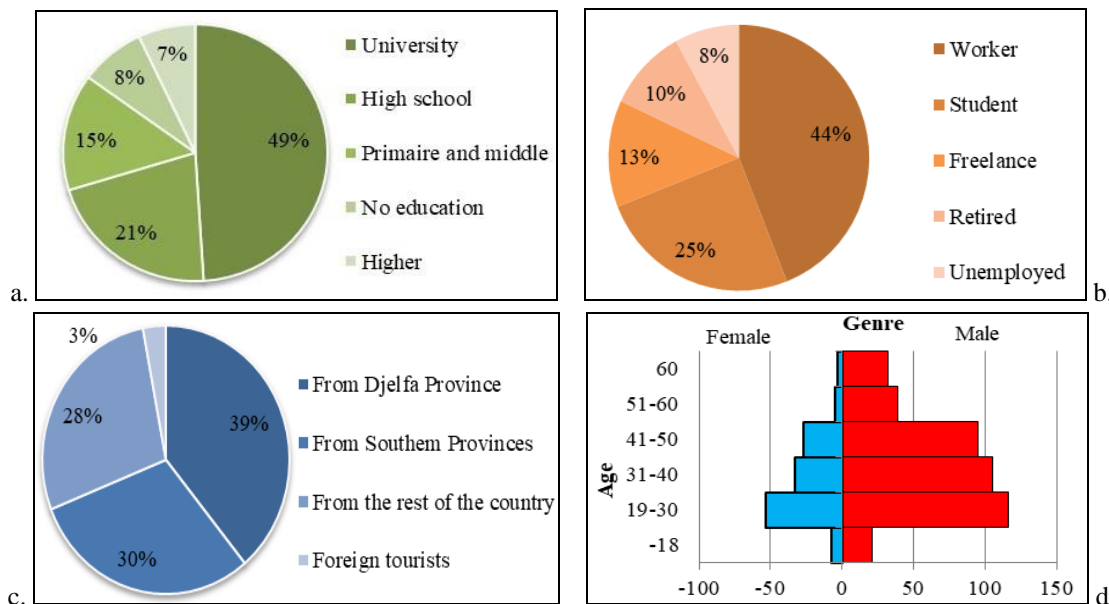


Figure 13. The demographic characteristics: (a) educational level, (c) origin of tourists (b) occupation, (d) gender male/female (Source: Authors)

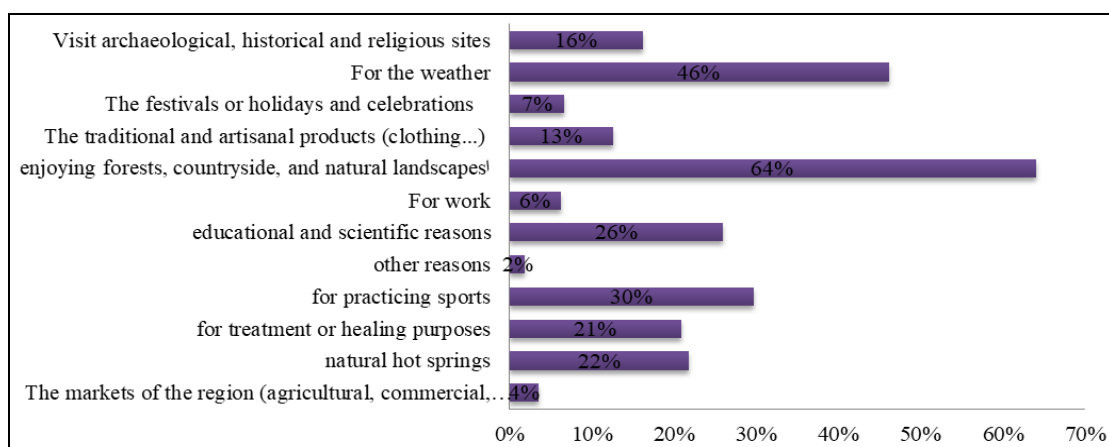


Figure 14. Tourists motivation to visit Djelfa (Source: Authors)

3. Evaluation of Tourism reality using the principal component analysis (PCA) method

To assess the state of tourism in the municipality of Djelfa, the opinions of tourists and visitors were collected, and their level of satisfaction was measured using a set of 14 questions or variables. These variables covered various aspects such as natural attractions, cultural sites, environmental conditions, general tourism infrastructure, diverse services, and available amenities. To effectively analyze and summarize the gathered information, Principal Component Analysis (PCA) was employed. PCA is a valuable tool for condensing and interpreting large sets of quantitative data (Guerrien, 2003). It proves particularly beneficial when dealing with extensive data that requires processing and comprehension. Thus, utilizing PCA as a method to evaluate the tourism reality in the Djelfa region based on the opinions and satisfaction levels of tourists and visitors is a sound approach. By examining the relationships between the different variables, including the latent dimensions of natural, cultural, environmental, general tourism infrastructure, services, and amenities, we can gain valuable insights into the overall tourism experience in the municipality (Beguin and Pumain, 2010).

A. Study Tool Reliability

It is good to know that the reliability of the research instrument was assessed using the Cronbach's alpha coefficient to examine the correlation between the variables in the questionnaire. The Cronbach's alpha coefficient provides an overall measure of the internal consistency or reliability of the scale. A value of 0.861 was obtained for the study axes, which

exceeds the accepted threshold of 0.60 for reliability, indicating a satisfactory level of reliability for scientific research purposes. This suggests that the fourteen variables in the questionnaire effectively measure the same construct, indicating the stability and dependability of the questionnaire in the field application of the study.

B. Correlation matrix

The results obtained from the SPSS program and presented in Table 2 (appendix) indicate that the correlation coefficients between the selected variables are strong, with an average of over 0.5. This suggests a high degree of association between the variables, where changes in one variable are likely to be accompanied by changes in the other variable. The strong correlation between the variables will aid in the formation of factor axes, with their direction and significance interpreted based on their relationships with each variable. As a result, we are motivated to proceed with the principal component analysis (PCA) method to analyze the data and gain insights into the tourism experience in the municipality of Djelfa.

Table 2. Correlation matrix (Source: Authors)

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	
Correlation	V1	1.000	.561	.724	.021	.080	.629	-.061	.016	.011	.205	.183	.272	.103	-.014
	V2	.561	1.000	.664	.025	.320	.425	.039	.029	.135	.394	.364	.511	.276	-.105
	V3	.724	.664	1.000	.179	.259	.732	.039	.021	.042	.295	.309	.408	.183	-.028
	V4	.021	.025	.179	1.000	.627	.252	.529	.132	.430	.246	.251	.156	.563	.523
	V5	.080	.320	.259	.627	1.000	.246	.440	.192	.460	.256	.336	.316	.664	.428
	V6	.629	.425	.732	.252	.246	1.000	.160	-.004	.109	.268	.329	.341	.164	-.001
	V7	-.061	.039	.039	.529	.440	.160	1.000	.035	.677	.638	.566	.437	.516	.545
	V8	.016	.029	.021	.132	.192	-.004	.035	1.000	.031	.011	.015	.048	.118	.064
	V9	.011	.135	.042	.430	.460	.109	.677	.031	1.000	.624	.541	.429	.496	.302
	V10	.205	.394	.295	.246	.256	.268	.638	.011	.624	1.000	.764	.736	.500	.251
	V11	.183	.364	.309	.251	.336	.329	.566	.015	.541	.764	1.000	.743	.478	.272
	V12	.272	.511	.408	.156	.316	.341	.437	.048	.429	.736	.743	1.000	.450	.137
	V13	.103	.276	.183	.563	.664	.164	.516	.118	.496	.500	.478	.450	1.000	.625
	V14	-.014	-.105	-.028	.523	.428	-.0001	.545	.064	.302	.251	.272	.137	.625	1.000

C. Suitability of data measure using KMO indicator and Bartlett's test

The KMO (Kaiser-Meyer-Olkin) test results, as presented in (Table 3), show a value of 0.81, which exceeds the threshold of 0.5 and is considered excellent (Kaiser and Rice, 1974). This suggests that the correlations between the variables are of high quality. In addition, the results of the Bartlett's test of sphericity are significant ($P < 0.005$), consistently at a highly significant level ($0.001 > p$). As a result, we can reject the hypothesis of no correlation, indicating that not all correlations are zero. This confirms the suitability of conducting factor analysis for the study, without the need to exclude any variables from the analysis. Hence, the application of the principal component analysis (PCA) method is deemed appropriate for the study.

Table 3. KMO index and Bartlett's test (Source: Authors)

KMO index and Bartlett's test		
Kaiser-Meyer-Olkin index for measuring sampling quality		0.810
Bartlett's test of sphericity	approximate chi-square	4795.498
	Ddl	91
Significance		0.000

D. Determining the Principal Components (Explained Total Variance)

Data analysis was conducted using SPSS, and it is worth noting that no measurement units needed to be eliminated since they were homogeneous. To reduce the information matrix, the 14 variables were converted into two main axes, as shown in (Table 2), which provides an overview of the principal components, their respective variances, and the proportion of information explained by each component. The number of principal components selected aimed to minimize information loss while adhering to the Kaiser criterion. Following the Kaiser criterion, we selected the first three factors whose eigenvalues exceeded one (1) from the 14 variables obtained through PCA, as shown in (Table 4). By retaining these primary axes, as depicted in (Figure 15), it became essential to interpret them economically in relation to the amount of information they encompass. This interpretation is crucial for gaining valuable insights into the underlying dimensions of the tourism experience in the municipality of Djelfa.

Table 4. Explained total variance (Extraction method: Principal component analysis - PCA) (Source: Authors)

component	initial eigenvalues			sums extracted from the squared loadings			sums of the rotated squared loadings		
	Total	% of the variance	% cumulative	Total	% of the variance	% cumulative	Total	% of the variance	% cumulative
1	5.322	38.011	38.011	5.322	38.011	38.011	3.660	26.143	26.143
2	2.730	19.500	57.511	2.730	19.500	57.511	3.126	22.329	48.472
3	1.516	10.831	68.343	1.516	10.831	68.343	2.782	19.871	68.343

E. The component matrix after rotating the axes:

The component matrix, obtained after rotating the axes, provides valuable insights into the economic interpretation of the components by examining the correlations among the variables within each factor. The correlation matrix presents values that elucidate the connections between variables, enabling us to understand the relationships between them. In addition to the component matrix and correlation matrix, the correlation circle, also known as the variable plot, is a useful tool for illustrating the correlations between the components and the original variables. This circle provides a visual representation of the

interrelationships between variables and their association with each component. It is possible to include additional variables as vectors in the representation, which can provide further insights into the underlying dimensions of the tourism experience in the municipality of Djelfa. In the working plan, Figure 16 displays the correlation circles between variable 1 and variable 2, as determined by STATISTICA PCA, which encompass a cumulative energy of 58%. Geometrically, the correlation coefficient between variables is represented by the angles specified between each variable pair. We can observe three distinct scenarios:

- There are three groups, each containing variables with angles close to zero, indicating a strong positive relationship within each group.
- The angle between group (G1) and group (G3) is approximately 90°, suggesting a lack of correlation between the two groups.
- The angle between group (G2) and groups (G3) and (G1) is close to zero, indicating that the variables in-group (G2) progress similarly to those in groups (G1) and (G3), strengthening the repulsive relationship among them.

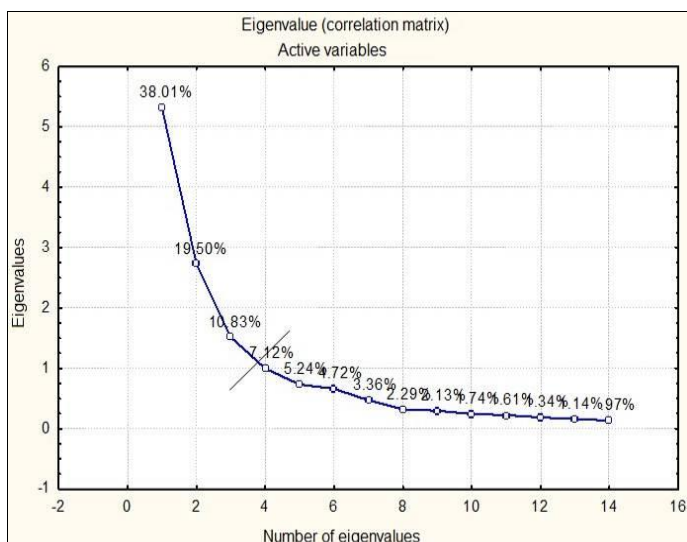


Figure 15. Graphical representation of eigenvalues using Kaiser's method (Source: Authors)

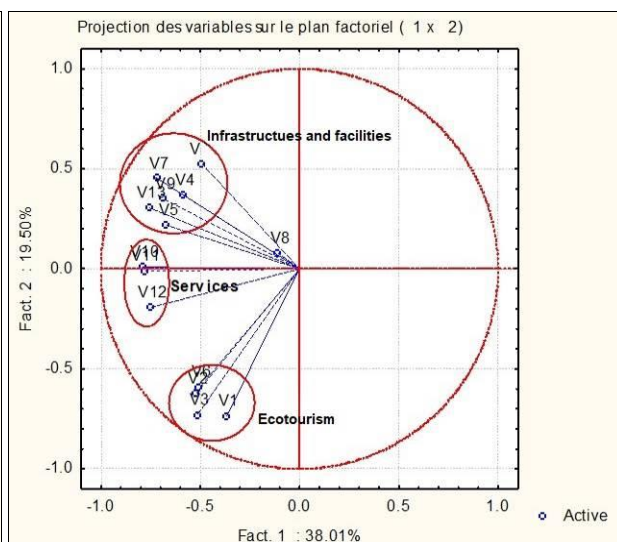


Figure 16. The correlation circle of PCA (graph of variables) eigenvalues (Source: Authors)

Based on the observations from the correlation circles, we can conclude that group (G1) comprises variables related to ecological or environmental tourism, which is the main focus of the study. This group shows a strong positive correlation with group (G2), which consists of tourism service variables directly associated with the development of environmental tourism in the municipality of Djelfa. Furthermore, we can observe that worker 1 (G1) is completely independent of variable 3, representing infrastructure (G3). This suggests that enhancing infrastructure and resources alone may not have a significant impact on the growth and development of environmental tourism in the municipality of Djelfa. Instead, it is important to focus on developing tourism services that are directly related to environmental tourism, as these variables are strongly correlated with ecological or environmental tourism (G1). These insights can be useful in developing effective strategies for promoting and developing eco-tourism in the municipality of Djelfa. To effectively promote and foster the environmental tourism sector in Djelfa, it is crucial to carefully consider the development of the group encompassing tourism service variables (G2) and align it positively with variable 3 representing infrastructure (G3). This strategic approach will facilitate the growth and development of environmental tourism in the municipality of Djelfa. To achieve this objective, it is recommended to propose tourism investment projects in tourist sites such as the Senalba Forest site, located west of the city of Djelfa. These projects should focus on developing tourism services that are directly related to environmental tourism (G1) and aligning them with the necessary infrastructure and resources (G3) to support their growth and development. By doing so, it will be possible to create a positive impact on the local economy while also promoting sustainable tourism practices.

4. Assessment of the tourism potential of the municipality of Djelfa using the SWOT analysis tool

The SWOT analysis tool was employed to assess the tourism potential of the municipality of Djelfa, as shown in (Table 5). This four-fold analysis provided a valuable framework for devising future strategies and evaluating the area's developmental prospects. The aim was to conduct a comprehensive diagnosis of the tourist destination to formulate an effective strategy that capitalizes on strengths and opportunities, while mitigating weaknesses and threats that impede tourism growth. The SWOT analysis is a widely recognized analytical tool utilized by managers and strategic planning experts to assess various aspects of a given situation (Valentin, 2001).

5. Recommendations and necessary measures to revive environmental tourism in Djelfa:

- Emphasize the development and enhancement of high-quality tourism elements, such as improving infrastructure including roads, water supply, electricity, sanitation, and various tourism services in key tourist areas like the Senalba Forest site. This should involve constructing facilities for sports activities, establishing campsites, and actively engaging local residents in all environmental tourism projects. It is crucial to provide education and training programs to equip them with the necessary skills to cater to this type of tourism while respecting their customs and traditions.

Table 5. Evaluation of Djelfa tourism potential using SWOT analysis

Strengths	Weaknesses
<ul style="list-style-type: none"> • Djelfa municipality is strategically located in the Atlas Saharan mountains, in the middle of the country, and is intersected by National Road Number 1, a major transportation artery that connects the northern and southern regions of Algeria. • Djelfa's forest wealth, especially the Senalba forest, is considered one of the most important high plateau forests in the country and serves as a vital shield against desertification. • Djelfa offers unique natural destinations for pastoral desert regions, with diverse plant and animal life, and is home to the largest national wealth of sheep. • The local community in Djelfa is renowned for its hospitality, openness, and welcoming attitude towards visitors. • Djelfa is famous for its weaving industry, which produces brown and white blankets and carpets from camel hair, as well as leather goods such as belts, horse saddles, and other products that are nationally and internationally renowned. • The availability of raw materials from wool and leather has led to the development of a thriving leather industry in the region, with craftsmen producing a variety of leather products, including "Taa'bi" shoes, clothes, hunting gear, embroidered horse saddles, and other leather goods. • Djelfa is home to several important historical landmarks, including archaeological sites and rock stations. • The city of Djelfa has a rich cultural heritage reflected in the buildings that preserve its essence and bear witness to the city's history. • Djelfa and its surroundings offer a diverse range of tourist attractions, including relaxation and medical Hammam sources, the geotouristic site of the Salt Rock Mountain, sandy dunes reminiscent of the great Saharan race, wet areas (Zahrez East and West) classified under the Ramsar Convention, and caves. 	<ul style="list-style-type: none"> • The forests in the region are not fully utilized for tourism purposes, and their potential remains largely untapped. • Infrastructure, services, and tourism facilities in ecotourism areas, especially the Senalba forest, are weak and inadequate. • Citizens lack information and awareness regarding environmental protection, preservation, and cultural heritage. • Tourist destinations in the region are inadequately promoted, resulting in lower visitor numbers. • Despite the organization of many diverse cultural festivals, media coverage of the region is weak, which limits its exposure to potential visitors. • Investments in the tourism sector are very low, which hinders the development of necessary infrastructure and services. • Road signs directing tourists to destinations are absent, which makes it difficult for visitors to navigate the region. • Professional services at tourist sites, as well as professional guides, are lacking, which limits the quality of the visitor experience. • The maintenance of Hammam sources is neglected, and they are not exploited in a traditional manner. • Transportation to tourist sites, especially those outside the city, is inadequate and needs improvement. • The absence of an airport in the region limits accessibility for tourists arriving by air. • The majority of demand is directed towards urban areas, and tourists have a short stay duration, making the region primarily a transit area. • Local tourism agencies primarily issue rather than receive tourists, and the products offered are geared towards foreign countries, which limits the region's appeal to domestic visitors. • Sectorial coordination between tourism, environment, forests, culture, transportation, and properties is weak, which hinders the development of a cohesive tourism strategy. • The decline in handicraft activity in the region is attributed to the lack of tourism activity, which reduces the demand for locally crafted products.
Opportunities	Threats
<ul style="list-style-type: none"> • Djelfa Province has a guidance plan for tourism development (SDATW, 2013) to better direct tourism activities and stakeholders. • Djelfa benefits from the duplication of the national road number 1, which crosses it and connects the north to the south, facilitating transportation and accessibility. • The municipality of Djelfa has important infrastructures such as classified hotels, the headquarters of the Tourism and Environment Directorates, the Forest Conservation Department, the Regional Radio Station, the Cultural Center, the Municipal Museum, the Regional Theater, the National Directorate for the Management and Exploitation of Protected Cultural Properties, the High Commissioner for the Development of Steppes, and the Algerian-Cuban Eye Hospital, which provide necessary support for tourism activities. • Djelfa has a monitoring station for the National Observatory for Environment and Sustainable Development, which helps to monitor and manage the impact of tourism on the environment. • Djelfa has a large national wealth of sheep, with 3 million heads, which has created markets for livestock with a national character, providing opportunities for tourism activities such as agricultural tourism. • The region has distinctive natural destinations for pastoral regions with diverse plant and animal life, making it an attractive destination for eco-tourism. • Djelfa is known as a commercial area and has services that are compatible with its position as a transit point, which provides convenience for tourists and visitors. • The railway line can be utilized to revive tourism when the project is completed, which will enhance transportation and accessibility. • There is a need for new branches for tourism training to meet the demand for tourism jobs, which will help to develop the sector and provide employment opportunities. • Djelfa has a regional bus station that records the second-highest passenger demand nationally after the capital station, which provides necessary transportation infrastructure for visitors. • Djelfa benefits from several financial and tax incentives to 	<ul style="list-style-type: none"> • There is a lack of information and awareness campaigns aimed at citizens regarding environmental protection, conservation of cultural heritage, and preservation of the environment, which hinders their participation in conservation efforts. • The desert regions are in an advanced state of deterioration and are characterized by the fragility of their ecological system, which poses a threat to biodiversity and tourism potential. • Endangered animals such as gazelles and hyenas are at risk due to habitat destruction and human activities. • The environmental condition in the city and its surroundings is continuously deteriorating due to the presence of random dumps of human waste, especially in forests and some tourist sites, which poses health and environmental risks. • The forest wealth in the area is exposed to many human and natural threats due to the fragility of its environmental system. Although ecotourism contributes significantly to forest sustainability and has a positive impact on economic aspects, there are disadvantages that have shown that the unrestricted dependence of local populations on forests threatens to harm biodiversity conservation in them (Bhandari and Jianhua, 2010). • Activities and tourism investments in natural areas such as the Senalba forest must comply with environmental protection principles and applicable regulations. • The lack of professional guides limits the quality of the visitor experience and hinders the development of tourism in the region. • The appearance of new chaotic buildings on the outskirts of the Senalba forest in the western part of the city (Wad al-Hadid area) threatens the city's encroachment towards it, which poses a threat to the environment and tourism potential. • Local cultural heritage is not listed or registered, which limits its recognition and protection. • Uncontrolled grazing in forests, particularly the Ouled Nail sheep variety, poses a threat to forest sustainability and biodiversity conservation.

<p>support tourism investment, which will attract investors and enhance the development of the sector.</p> <ul style="list-style-type: none"> • The region witnesses the organization of many diverse cultural festivals such as Eid Al-Adha and the Ouled Nail singing festival, which provide opportunities for cultural tourism. • There is potential for creating mountain hiking trails through organizing summer and spring trips, picnics, missions, and stays, which will enhance the development of adventure tourism in the region. Implementing tourism projects such as recreational forests and camps. 	<ul style="list-style-type: none"> • The phenomenon of tree cutting by the timber mafia poses a threat to forest sustainability and biodiversity conservation. • The recording of many forest fires poses a threat to the environment and tourism potential in the region. <p>The lack of organization and preparation of recreational, sports, and parking areas inside the Senalba forest, especially sports fields, creates an atmosphere of chaos, which hinders the development of tourism in the region</p>
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- Take measures to preserve the SenalbaForest and prevent the encroachment of Djelfa city into its surroundings. Erecting a protective barrier, particularly on the eastern side of the forest (Figure 17), is essential.
- Recognize the significance of transportation as a fundamental component of the tourism system and incorporate it into development policies. Governments should prioritize transportation modes that facilitate accessibility to neighboring destinations (Kelfaoui et al., 2021).



Figure 17. Construction progress towards Senelba Forest (Source: 17a: Authors, 2023; 17b: Googlemaps, 2023)

- Design distinctive tourist structures that showcase local and traditional architectural styles, providing a unique and culturally immersive experience for visitors.
- Address the limited investment in natural tourist sites and the obstacles hindering investments within major cities. Efforts should be made to overcome these challenges and attract more investment to promote sustainable tourism development.
- Provide training opportunities for local residents to work in various tourism roles, thereby supporting the local economy and fostering positive interactions between tourists and locals. Managing tourism demand in a manner that respects the interests of both residents and visitors is essential (Pathmanandakumar et al., 2023).
- Conduct tourism education programs for residents, focusing on the principles, regulations, and challenges of tourism. Additionally, raise awareness about current development policies and tourism plans across different regions. Utilize various media channels to familiarize residents with the values, customs, and traditions of visiting tourists for fostering tourism awareness.
- Remove barriers and create an enabling environment for tourism development, encouraging private sector investment across various tourism sectors. Facilitating access to government support and funding for local and foreign individuals interested in investing in tourism infrastructure, along with providing short and medium-term tax benefits, is recommended (Souiher and Rezzaz, 2020).
- Prioritize qualification and professionalism within the tourism sector, ensuring that all workers, including tour guides and travel agencies, receive proper training. Launch public awareness campaigns and integrate tourism education into educational programs to foster a culture of eco-tourism and build its foundations.
- Consider the carrying capacity of tourism projects in environmentally sensitive areas like the Senalba Forest. This refers to determining the maximum number of tourists or users an area can sustain without causing negative impacts on its resources. Practicing eco-tourism requires understanding and respecting the hosting site's capacity while establishing effective planning and monitoring systems (Lequin, 2001).
- Highlight the environmental dimension in marketing tourism services and raise awareness among tourists and tourism operators about the importance of maintaining cleanliness and responsibly using natural resources.
- Encourage investors and tourism industry workers to adopt environmentally friendly practices in waste management, waste treatment, and reducing greenhouse gas emissions. Promote the use of alternative energies and showcase excellence in sustainable practices.

- Utilize environmental tourism marketing through attractive websites that showcase future tourism opportunities and projects. Engage the press by organizing events (sports, cultural, scientific) and inviting foreign journalists to cover or prepare reports about the region (Kelfaoui et al., 2021).

- Foster collaboration between the public and private sectors in tourism project development while maintaining ongoing communication. This collaboration is crucial to avoid tourism expansion that harms the environment, disrupts ecosystems, reduces biodiversity, or spoils the natural beauty of the region.

- Ensure that meeting tourism needs does not harm the social and economic interests of local communities, natural resources, or historical and cultural sites at tourism destinations, both locally and internationally.

- Take concrete steps to implement agreements and recommendations issued by the World Tourism Organization and international bodies to protect the environment.

- Embrace new information and communication technologies in tourism activities, encouraging all stakeholders in the local tourism sector and residents to utilize online services, which have become popular booking tools among tourists.

- Establish new academic programs and training courses in colleges, institutes, and training centers specifically focused on environmental tourism.

- Conduct a thorough inventory and documentation of the country's tourism resources and assets in various regions. Create an information database to promote these resources locally and internationally.

- Develop a comprehensive tourism guide and maps that provide detailed information on climate, biodiversity, flora, fauna, and tourist sites. These resources will assist visitors in navigating and exploring the destination.

- Encourage the diversification of tourism products and direct investments towards eco-tourism in mountainous regions, forests, rural areas, and areas with pristine natural environments. This approach will help promote sustainable tourism practices and protect the natural heritage of these regions.

6. Development perspectives and proposals for developing eco-tourism projects in the municipality of Djelfa

Djelfa has gained recognition as a remarkable recreational tourist destination, drawing visitors from nearby regions, particularly the southern areas. Its proximity to forests and picturesque countryside, combined with its agreeable climate and fresh air, make it an attractive option for nature enthusiasts. In response to the increasing demand for green spaces in close proximity to urban areas, several communities in Djelfa are transforming forest areas on the city outskirts into suburban "parks" that emphasize recreational activities rather than production functions (WIAT, 2008).

The development of commercial and craft activities within Djelfa city and its surrounding markets has played a significant role in revitalizing the region's economy. The marketing of locally produced goods with unique features has contributed to economic growth. The region's connection to its forest environment has the potential to further stimulate the economy through tourism activities. This development can create new job opportunities, both directly and indirectly. However, it requires the encouragement of tourism investment and the provision of necessary infrastructure such as roads, electricity, drinking water, sewage, and telecommunications. Achieving successful and sustainable tourism development in Djelfa requires genuine consultation among all stakeholders involved in the tourism sector. This approach enables the involvement of various actors in decision-making processes related to development and preservation of tourism potential and regional values in this mountainous area (Kherrou, et al., 2018).

To promote sustainable tourism, investment projects in eco-tourism that align with the area's characteristics should be proposed, with a focus on resource management and rational utilization. The implementation of fair tourism, which preserves nature, respects the community, preserves traditions and cultures, and contributes to desired local development, is crucial. This approach can help to ensure that tourism development aligns with the interests and needs of the local community while preserving the region's natural and cultural heritage.



Figure 18. The proposed project site located at Senelba forest (Source: Authors, 2023)

The Senelba forest is a nationally recognized tourist area with significant scientific and environmental importance. It attracts families throughout the year for hiking, sports, and exploration. To maximize its potential, the construction of recreational centers and sports facilities is recommended (SDATW, 2013). This initiative can generate employment opportunities and improve the local population quality of life. However, the environmental impact of tourism projects

should be carefully studied and evaluated before their execution to mitigate any negative consequences. Tourism projects serve as a fundamental element of development and a crucial source of income. They contribute to an improved standard of living by creating both direct and indirect employment opportunities. Additionally, tourism-based development has a positive ripple effect on other economic sectors, including services, construction, transportation, commerce, and agriculture (Kherrou et al., 2020). Given the significance of tourism planning, we propose the establishment of a sports training center through private and suitable investment in eco-tourism, specifically within the Senalba forest site (Figure18).



Figure 19. Proposed project for a sports training center in England (Source: leicestermercury, 2018)

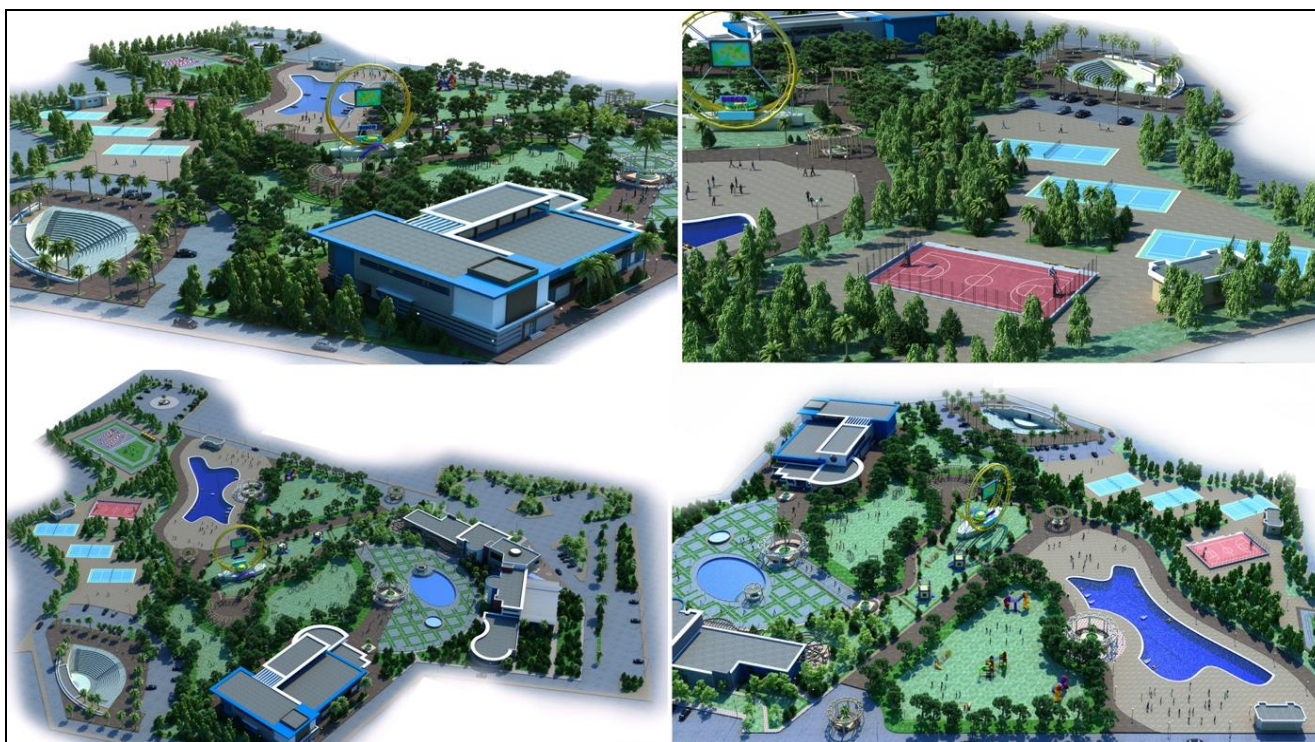


Figure 20. Development of the Senalba site for the creation of the eco-sport and entertainment village (Source: Authors, 2023)



Figure 21. Development of ecological accommodations of a sports training center in the Senalba site (Source: Authors, 2023)

The center can include sports fields and halls (Figure 19 and 20), accommodation facilities (Figure 21), recreational areas for families and children, an outdoor theater, hiking and running trails, horseback riding and racing training and mountain biking (VTT) Furthermore, promoting investment decision-making in tourism infrastructure should involve financial analysis based on the economic feasibility and financial profitability of the tourism project (Souiher and Rezzaz, 2020).

6.1 Economic Feasibility Study for a Sports Training Center Project

A. Preliminary Project Study Phase

The initial phase of the project study focuses on the economic feasibility and its role in supporting the investment decision for the tourism project. It involves identifying the total investment cost for the hotel, restaurant, conference hall, swimming pool, sports hall, eco-complex for sports teams, and parking lot. Based on this, we evaluate the project's financial returns over a period of 5 years.

Project Type: The project falls under the category of a touristic investment project.

Project Classification:

- Ownership: the project is owned by the private sector but serves a public need by providing services to various segments of tourists, visitors, or sports teams.
- Size: A tourism development project capitalizes on Djelfa's historical and cultural aspects. It requires:
 - Self-financing by the investor; External financing through borrowing from a bank; High expertise in the tourism field.
- Economic Activity: The project is classified as a commercial service project since it includes commercial facilities and offers tourism services.
- Project Identification: The project must have the following resources:
 - Human resources; Financial resources; Material resources



Figure 22. The forest is a real sports field in the Senelba site a Djelfa (Source: Authors, 2023)

B. Project Study Stages

- Market Study: A comprehensive analysis of the market is conducted to determine the demand for the project. Tourism consumption is influenced by factors such as income, culture, traditions, and competition.
- Technical Study: The necessary technical requirements for the tourism project are identified based on its scale and aligned with the available resources. The project location is determined.
- Financial Study: This involves assessing the financial feasibility of the project by examining its cash inflows and outflows.
- Legal Study: All legal aspects related to the project are examined.

In the financial feasibility study, various financial criteria and indicators are evaluated, including:

- Net Present Value (NPV); - Profitability Indicator; - Payback Period. The project may also be accepted based on political or strategic considerations, such as alignment with the National Tourism Development Plan (SDAT 2035).

C. Financial Feasibility Study

The economic value of the investment project is derived from its impact on cash flows. Before evaluating the project, an estimation of all cash flows resulting from its implementation is necessary. It is economically logical to select investment projects that optimize the use of available financial resources based on the defined objectives.

I0: Amount of the investment = 95,000,000,000 Algerian Dinar (DZD) = (95,000,000 DZD)¹⁰⁰⁰i: Discount factor = 10%.

Table 6. The study office's estimates for the cash inflows, with updating factors for the project, are for a period of five years (Source: Authors)

Years	2022	2023	2024	2025	2026
(CFt) 1000	25 000 000	28 000 000	30 000 000	35 000 000	38 000 000
Coefficient	0.909	0.826	0.751	0.683	0.62
(1+i) -n					
New (CFt) 1000	22725000	23128000	22530000	23905000	23560000
Σ (NewCFt) 1000	115848000				

Therefore, each project is evaluated to determine its expected net benefit before accepting or rejecting it. The project relies on criteria that consider the element of time. These criteria take into account or are adjusted to the timing aspect in the evaluation process, as shown in (Table 6).

Net Present Value (NPV) (VERNIMMEN, 2010)

The net present value (NPV) is a financial metric calculated at a specific time point, usually starting from the first year. It represents the sum of future net cash flows (inflows minus outflows) that the project is expected to generate by the end of the fifth year. The NPV is adjusted by a discount factor, which accounts for the cost of capital or the minimum required rate of return on investment. In this project, the discount rate is set at 10%.

Where: • ΣCF_t : Total new cash inflows; • NPV = $\Sigma CF_t - I_0$; • I_0 : Represents the capital of the invested project (technical and economic study office of Algiers); • i : Represents the discount factor (update); • n : Number of years.

NPV (Net Present Value) = $\Sigma_{new} CF_t$ (Total new cash inflows) - I_0 (The capital of the invested project)

$$NPV = \{(25,000,000 \text{ DZD})^{1000} \times (1+10\%)^{-1} + (28,000,000 \text{ DZD})^{1000} \times (1+10\%)^{-2} + (30,000,000 \text{ DZD})^{1000} \times (1+10\%)^{-3} + (35,000,000 \text{ DZD})^{1000} \times (1+10\%)^{-4} + (38,000,000 \text{ DZD})^{1000} \times (1+10\%)^{-5}\} - (95,000,000 \text{ DZD})^{1000}$$

$$NPV = \{(115,848,000 \text{ DZD})^{1000} - (95,000,000 \text{ DZD})^{1000}\} = 20,848,000 \text{ DZD}$$

Investment Decision Rule: If the net present value (NPV) is greater than the amount of investment, it means that the inflows of cash are greater than the investment cost, and therefore the project is accepted.

Indicator Profitability (IP) (VERNIMMEN, 2010): $IP = \Sigma_{new} CF_t$ (Total new cash inflows) / I_0 (The capital of the invested project); $IP = (115,848,000 \text{ DZD}) \times 1000 / (95,000,000 \text{ DZD}) \times 1000$; $IP = 1.22$

Investment Decision Rule: If the result is greater than one, it means that the project is profitable and therefore economically acceptable. Payback Period (PP) (VERNIMMEN, 2010):

$PP = I_0$ (The capital of the invested project) / MCF_{tnet} (median net cash flow of the project); $MCF_{tnet} = \Sigma_{new} CF_t$ (Total new cash inflows) / N (The number of years); $MCF_{tnet} = (115,848,000 \text{ DZD}) \times 1000 / 5$; $MCF_{tnet} = 23,169,600 \text{ DZD}$; $PP = (95,000,000 \text{ DZD}) \times 1000 / 23,169,600 \text{ DZD}$; $PP = 4.100.10 \times 12 \text{ months} = 1.2 \text{ months}$; $1.2 \text{ months} \times 30 \text{ days} = 36 \text{ days}$. Investment Decision Rule: If the payback period is less than the typical period (5 years), then the project is acceptable. In this project, the payback period is estimated to be 4 years and 36 days (i.e., on June 6, 2026).

D. Financial Analysis Results

The financial analysis conducted on the tourism project indicates its feasibility and profitability. The positive net present value (NPV) indicates that the project's cash inflows exceed its investment cost. Additionally, the profitability indicator, with a value of 1.21, confirms that the project is economically profitable and financially viable. Furthermore, the payback period, which is 4 years and 36 days, is considered favorable for the project. Based on these evaluations, it is recommended to proceed with the implementation of the project. All of the aforementioned evaluation criteria provide valuable information for decision-makers in investment. While each criterion carries its significance, it is important to consider all of them collectively during the decision-making process. Different criteria may hold varying weights depending on the specific circumstances, but it is crucial not to disregard the insights provided by other criteria.

CONCLUSION

The municipality of Djelfa possesses a rich regional heritage consisting of natural, cultural, climatic, and historical elements. These elements define its image, attractiveness, and tourist value. The municipality has the potential to become a prominent tourist destination in the near and medium term due to the beauty and allure of its regional and national tourist resources. However, there is a disparity between the strong appeal and value of these tourism potentials and the inadequate provision of various tourist services and infrastructure, both in terms of quantity and quality.

Therefore, it is crucial to take effective measures and implement them to overcome or minimize the obstacles hindering tourism development. The significance of forests in society is increasingly evident, as demonstrated by the number of visitors they attract. Considering forests is essential for promoting sustainable development within the community, a concept embraced in the late twentieth century. In this regard, ecotourism can play a crucial role in revitalizing the local economy, particularly in the underutilized Senalba forest, which has yet to undergo tourism development efforts to establish it as a distinguished tourist destination. To contribute to local development in the area, it is necessary to preserve existing environmental systems, diversify tourist products, promote them effectively, and enhance infrastructure by providing complementary tourist services. It is also vital to carefully select suitable tourism projects for the region, with emphasis on conducting economic feasibility studies. Furthermore, this study can serve as a valuable reference model for sustainable tourism development in similar regions.

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