



# Promoting local tourism development by rehabilitating natural and archaeological sites in Batna Province, Algeria

*Promouvoir le développement du tourisme local en réhabilitant les sites naturels et archéologiques dans la province de Batna, en Algérie*

*Promover o desenvolvimento do turismo local por meio da reabilitação de sítios naturais e arqueológicos na província de Batna, Argélia*

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**Abstract:** Tourism features are essential for tourist attraction and tourism development. Attention and promotion are among the most important reasons for their preservation due to frequent use. In this study, we review the province of Batna, a region with a tourist and historical dimension, as it is considered a tourist destination through its many landmarks. The Roman archaeological city is in Timgad, which is classified as a global heritage site by the United Nations. It is also home to the shrine of Imadghassen, which is the second oldest landmark in North Africa for the sleepy civilization. The province of Batna is also available on the Koudiet Lemdouar Dam, considered a tourist attraction area that allows tourism preparation to make it a place for the arrival of

local and foreign tourists. The study also relied on statistical analysis to study the elements of tourism development in the region and establish a tourism project proposed by the researchers. This is done by studying the economic feasibility in terms of the financial returns it provides, which helps achieve sustainable tourism development in the province of Batna.

**Keywords :** Koudiet Lemdouar Dam, Tourism, Batna, archaeological

**Résumé :** Les caractéristiques touristiques sont essentielles pour l'attraction des touristes et le développement du tourisme. Leur préservation, en raison de leur utilisation fréquente, repose en grande partie sur l'attention qui leur est accordée et leur promotion. Cette étude examine la province de Batna, une région à la dimension touristique et historique, considérée comme une destination touristique en raison de ses nombreux sites emblématiques. Parmi eux se trouve la cité archéologique romaine de Timgad, classée au patrimoine mondial par les Nations Unies, ainsi que le mausolée d'Imadghassen, le deuxième plus ancien monument d'Afrique du Nord, représentant la civilisation berbère. La province de Batna abrite également le barrage de Koudiet Lemdouar, considéré comme une zone d'attraction touristique, offrant des perspectives de développement pour attirer les touristes locaux et étrangers. L'étude s'appuie également sur une analyse statistique des éléments du développement touristique dans la région et propose un projet touristique établi par les chercheurs. Ce projet repose sur une étude de faisabilité économique, mettant en avant les retombées financières qu'il pourrait générer, contribuant ainsi à un développement touristique durable dans la province de Batna.

**Mots-clés :** Barrage de Koudiet Lemdouar, tourisme, Batna, archéologie.

**Resumo:** As características turísticas são essenciais para a atração de turistas e o desenvolvimento do turismo. Sua preservação, devido ao uso frequente, depende amplamente da atenção dada a elas e de sua promoção. Este estudo analisa a província de Batna, uma região com dimensão turística e histórica, considerada um destino turístico por causa de seus inúmeros pontos de referência. Entre eles, destaca-se a cidade arqueológica romana de Timgad, classificada como patrimônio mundial pelas Nações Unidas, e o mausoléu de Imadghassen, o segundo monumento mais antigo do Norte da África, representando a civilização

berbere. A província de Batna também abriga a Barragem de Koudiet Lemdouar, considerada uma área de atração turística, oferecendo perspectivas de desenvolvimento para atrair turistas locais e estrangeiros. O estudo também se baseia em uma análise estatística dos elementos de desenvolvimento turístico da região e propõe um projeto turístico elaborado pelos pesquisadores. Este projeto se apoia em um estudo de viabilidade econômica, destacando os retornos financeiros que poderia gerar, contribuindo assim para o desenvolvimento sustentável do turismo na província de Batna.

**Palavras-chave:** Barragem de Koudiet Lemdouar, turismo, Batna, arqueologia.

## Introduction

The province of Batna enjoys the qualifications of tourism attraction (Kherrou et al., 2020; Pai et al., 2024), as it can be one of the purposes of tourists, whether from inside or outside the country (Kelfaoui et al., 2021), as it contains historical and cultural tourist tracks represented in the archaeological city of Taimgad, which is classified as a global heritage (Mechiat & Dekoumi, 2023; Carvache-Franco et al., 2024) and Haheit, which is the first launch pad for the glorious editorial revolution against the French colonizer. The province also has natural trails across the Auras Mountains, which are a natural and exploratory challenge for adventure tourists (Serhane et al., 2021), in addition to the dam of Koudiet Lemdouar and its natural attractive surroundings, as it has a large area that allows for the development of tourism infrastructures (Annab, 2006), which allows for the push of local development and the provision of positions for local occupants (Duda-Gromada, 2012), in addition to the natural reserve which is considered a nature reserve that contains all kinds of wildlife (Dta, 2023), dense vegetation (Chohra et al., 2019), and this is a crucial transition to Algerian as a tourism destination.

In essence, this study relies on several challenges for a region that needs actual attention to upgrading tourism to national tourism industry (Couissi, 2023), as it focused on developing resting gains for its valuation (Ghoulmrani, 2023), with the preparation of a tourist territory around the perimeter of the dam of Koudiet Lemdouar, which feeds the residents of the province of Batna and Khanchala with drinking water (Paw, 2006). Investment opportunities in the tourism sector (Rabehi et al., 2023) are for a province that is not limited to Algerian province funds but promises to provide a climate conducive to properties and grant them economic financial (Guri et al., 2021) and epidemiological privileges (Gorelick & Walmsley, 2020), to create the added value granted by the tourism industry (Streimikiene et al., 2020; Faizal et al., 2024), which has been reflected in the provision of a tourism real eprovince portfolio to protect it from urbanization and desertification risks (Labadi et al., 2021).

This research is underpinned by a robust statistical analysis of the data collected from the field survey of the study area. A questionnaire was distributed on the variables of tourism development (Nooripoor

et al., 2021; Carvache-Franco et al., 2024), with the introduction of the zero hypothesis that there is no correlation and impact between these variables, and the alternative hypothesis that provinces that there is a correlation and impact between the variables of tourism development in the province of Batna. The possibility of preparing a dam perimeter for a round was also presented through the establishment of a comprehensive, integrated and diverse tourism compound in various forms of tourism (Eyisi et al., 2023), and the development of the project's financial study to determine its financial return (Trusova et al., 2020), through the indicators of the present value and the payback period of the invested amount (Scarlett, 2021), in addition to other financial indicators, and thus determining the investment decision by rejection or acceptance in proportion to those financial indicators (Agung et al., 2021).

A crucial problem drives our research: Is there a correlation and impact between these variables that lead to serving tourism activity and achieving local tourism development? Our findings' potential impact on the tourism development field cannot be overpriced.

Two hypotheses were therefore proposed:

H0: There is no correlation and influence between the primary variables of tourism development at the level of the study regions in the province of Batna.

H1. There is a correlation and influence between the primary variables of tourism development at the level of the study regions in the province of Batna.

## Literature review

This field study introduces a new approach to enhancing and promoting tourism, with a focus on fostering sustainable development and preparing the natural environment in the Batna region. After a thorough review of the literature and studies concerning this historically significant area, known for its rich ancient monuments, we highlight the most relevant published research on the subject.

This study assesses the impact of tourism development strategies on the attractiveness of mountain destinations. The study relied on three tourism sites in the Auras Mountains. Results showed that tourist attractions mainly rely on nature, antiquities, traditional foods, and acceptable prices (Zeraib et al., 2022).

This study underscores the crucial importance of preserving urban heritage in heritage areas and the need to evaluate them from social, historical, and economic perspectives. The study, centered on a comprehensive analysis of the urban heritage of Manaa, recommended the active involvement of local residents in projects that preserve archaeological urban heritage. It also proposed the creation of a local guide for archaeological areas in the study area and the promotion of these areas through various traditional and digital media, thereby enhancing the value of the region as a whole (Boulesnane et al., 2022).

The study on the province of Batna's tourism development was subject to the abstraction of the reality of development in general and tourism in particular in terms of facilities, equipment, and various tourist attractions. Among these projects, it was proposed that tourism projects be prepared to bring added value to the region socially, culturally, and economically. (Kherrou et al., 2018).

## Materials and Methods

This study was conducted in two phases in which various scientific research methods and methods were used, the first phase, and based on the collected data and information. This was determined by the computational average, standard drift, and variation, with the aim of identifying the value of correlations between the variables of tourism development, for the answers of randomly selected samples. In the second phase, and with the follow-up of the movements of the field research team, the information presented was faced with the reality of the province of Batna, especially in preparing the area surrounding a code dam for roles by proposing the establishment of a tourist compound that gives tourism value to the province of Batna.

## Study area

The study area is located in the eastern part of the country (north-east) between 4° and 7° East longitude and 35° and 36° North latitude, at the junction of the Tellian Atlas in the north and the Saharan Atlas in the south. It is bordered to the north by the province's of Oum El Bouaghi, Mila and Sétif, to the east by the province of Khanchela, to the south by the province of Biskra and to the west by the province of M'Sila. They are covering an area of 12,038.76 Km2. The province of Batna currently comprises 21 daïras and 61 communes. As shown in Figure 1. To the north, we distinguish the area of the high Tellian plains, which form the northern boundary of the Province. Altitudes range from 800 to 1000 m, and slopes rarely exceed 3%. To the south, the high steppe plains are characterized by average altitudes of less than 500 m. Mountainous relief accounts for 45% of the Province's total surface area, with altitudes ranging from 700 m to 2,326 m. The climate of Batna Province is that of a semi-arid region, with average annual temperatures of 6°C in January and 27°C in July. In winter, temperatures drop below freezing at night, with frequent frosts (icy roads). The average annual rainfall is 280.5 mm (ONM Batna, 2017).

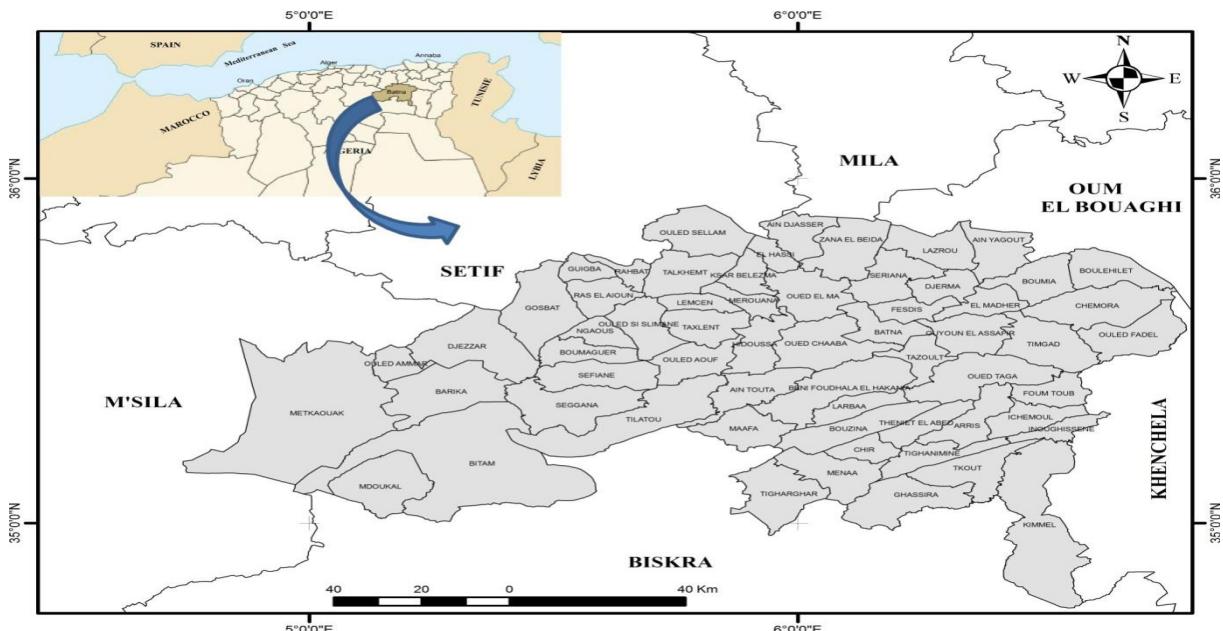


Figure 1 - Geographical situation of the study area.

Source : Kherrou et al., 2018

## Touristic Potentialities Of The Province Of Batna

### The Archaeological City of Timgad

Timgad Archaeological City is one of the most important cities established by the Romans in the first century around Auras, As shown in Figure 2. It is the ancient name of a province named after the Eurasian Mountains (Dufton & Fentress, 2022). The Romans sought to limit the movements of the Nomadians, in addition to monitoring the Roman route linking Khanchla and Tebassa to the east. The archaeological city is classified as a global heritage and is a destination for tourists from all over the world, especially those interested in ancient civilizations (Shen & Quan, 2022; Lin et al., 2024). It shows the development of urbanization during that era (Ahlem, 2018), as it contains the public square, the bustling theater, in addition to the Trianus Arch and the bathrooms that were the place where the Veterans met (Houten, 2021).



Figure 2 - The archaeological city of Timgad.

Source : The authors, 2023

### Belezma natural park

The natural reserve is located in Blazma at a latitude of 35 degrees north on both sides of a longitude of 6° eastward. It consists of small blocks between the Al-Houdnah Mountains to the west and the Auras Mountains to the southeast. From the northwest and southwest, the plains of Marwanah and Wadi Batna are overlooked (Daoudi & Farhi, 2023).

The national civilization enjoys a unique natural geography, as it contains many animal varieties, vegetation covers, and natural equilibrium, in addition to the waterways resulting from rainfall (Cherak et al., 2021). It is divided into four bare forests: the forest of Shelia, the sons of Yacoub, the pilgrims, and the sons of Fadalah.

Figure 3 shows that the Blazma Reserve is an important tourist attraction in the province of Batna. It can combine natural, sports, and adventure tourism with scientific tourism due to its environment for plant, animal, and geological research (Paw, 2006).

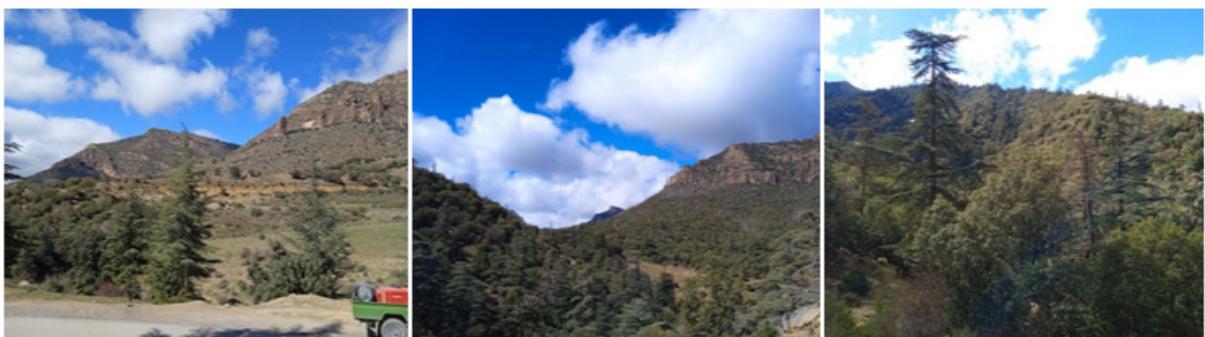


Figure 3 - Belzma National Park.

Source : The authors, 2023

### Koudiet lemdouar Dam

As shown in Figure 4, the Koudiet Lemdouar dam, situated 7 km north of Batna, is an economic and tourism resource at the local and regional levels (Belkoum & Houha, 2017). It gives the province of Batna an environmental character, making it a preferred destination highly appreciated by tourists (Alloui-Ami Moussa, 2021). The dam is surrounded by beautiful forests and landscapes that encourage the establishment of recreational infrastructure.

The dam is a tourism asset for our study, as it is proposed to set up facilities that allow for leisure and entertainment of various forms of tourism and thus diversify the sources of local development of the region as a whole (Abbas Naqvi et al., 2020), such as infrastructure for reception, accommodation, hotels and youth hostels. Lakes surrounding areas are often cultural destinations, so this aspect is also used for marketing purposes (Pardosi et al., 2021).

The Koudiet Lemdouar dam area offers exceptional panoramas and views, with the historical site of Timgad just a few meters away. This historical site, which hosts an international festival every year, adds a unique cultural and tourism specificity to the already breathtaking area.



**Figure 4 - Koudiet Lamdaour Dam.**

*Source : The authors, 2023*

## **The Mausoleum of Imadghassen**

Figure 5 shows the oldest preserved royal mausoleum in North Africa, which, according to medieval historians, derives its name from the king of Numidia. The Algerian authorities applied in 2002 for inclusion in the World Heritage List. It is ranked among the 100 most endangered monuments on the planet (Hassiba, 2012).

The mausoleum is one of the tourist attractions in the province of Batna, as it is a destination for foreign and local tourists. Due to its appropriate environment, natural environment, and proximity to other tourist areas, it can be used for infrastructure development programs (Dhwb, 2017).



**Figure 5 - Imdaghassen Mausoleum.**

*Source : The authors, 2023*

## Results and Discussion

The study sample included local residents, merchants, craftsmen, owners of tourist agencies and entertainment venues, and workers in the study areas, as well as some local associations active in local tourism in the province of Batna.

### Statistical study

Table 1 demonstrates the comprehensive nature of the study. The random study sample, which includes both men and women, responded to a questionnaire with 20 variables divided into five main categories. The questionnaire, based on a five-point Likert scale, was diligently answered by 300 participants over the period from 1 July 2023 to 31 December 2023.

**Table 1 - Interpretation of Mean Scores According to the 5-Point Likert Scale**

Category	[1,79 - 1]	[2,59 - 1,8]	[3,39 - 2,6]	[4,19 - 3,4]	[5 - 4,2]
Decision	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree

The study relied on key variables to achieve tourism development and sustainability to serve the region and the local population. These variables are:

- Tourist facilities and equipment.
- Human resources skills working in the field of tourism
- Communication technologies and means.
- Tourist services and general procedures for receiving tourists.
- Tourism databases.

Survey validation and consistency coefficient: In order to measure the authenticity and consistency of the survey in all its sections, the Cronbach's alpha was used. The coefficient takes values between 0 and 1 [0-1]. If there is no stability, the value is close to zero, but if the value is close to one, the survey is stable. It is honest and transparent in its sections. In our study, Table 2 shows that Cronbach's alpha was 97.7% for a total of 20 variables distributed across 5 main axes, including the survey results being honest and consistent.

**Table 2 - Reliability Statistics**

<b>Reliability Statistics</b>	
Alpha de Cronbach	Nombre d'éléments
,977	20

Source: Authors, depending on SPSS V23 output

**Table 3 - The characteristics of the study sample concerning gender**

	<b>Category</b>	<b>Repetition</b>	<b>%</b>
<b>Gender</b>	Male	256	85,33
	Female	44	14,67

Source: Researchers depending on SPSS V23 output

Table 3 shows that the sample consists of 256 males (83.33%) and 44 females (14.67%), which is a logical percentage given the demographic nature of the study area. The table also provides an analysis of the arithmetic mean, standard deviation, and variation of local development variables for the province of Batna.

This stage is based on the calculation medium, standard drift and variance of the variables on which the field research was conducted. It includes five main axes of the variables of local development of a province summarized in the following table:

**Table 4 - Analysis of the arithmetic mean, standard deviation and variance of local development variables in the province of Batna**

Variables	Mean	Standard Deviation	Variance
Facilities and tourist amenities ( Q1,Q2,Q3,Q4)	4,46	0,581	0,341
Human resource skills in the tourism sector (Q5,Q6,Q7,Q8)	4,36	0,699	0,489
Communication techniques and media (Q9,Q10,Q11,Q12)	4.35	0,640	0,410
Tourist services and general procedures for receiving tourists (Q13,Q14,Q15,Q16)	4,44	0,570	0,326
Tourism databases (Q17,Q18,Q19,Q20)	4.47	0,548	0,300
<b>Overall Mean and Standard Deviation</b>	<b>4,42</b>	<b>0,607</b>	<b>0,373</b>

*Source: Authors, depending on SPSS V23 output*

## Analysis

The mean scores for all variables show relatively high numbers, ranging from 4.35 to 4.47, indicating that respondents feel positive levels of satisfaction or effectiveness across all measured variables. see Table 4.

- The standard deviations of all the main axes of the variables are relatively convergent and also for the general standard drift, which was estimated at 0.607, of which the majority of the sample responses are in a single positive context.
- Variations for each variable are relatively low, ranging from 0.300 to 0.489, indicating that responses are clearly aggregated around the mean, which also indicates a high level of consensus among respondents.

- The overall computational average across all variables is 4.42, which indicates a positive overall perception of the quality or effectiveness of tourism-related factors.
- The overall variance of 0.373 indicates a moderate level of variation in respondent perception across all measured variables.

The statistical analysis of this table shows that respondents generally feel high levels of satisfaction or effectiveness across various aspects of tourism-related factors, with relatively low variability in their responses. Figure 6 provides a summary of the previous results.

the mean and standard deviation for local development variables in the Batna province.

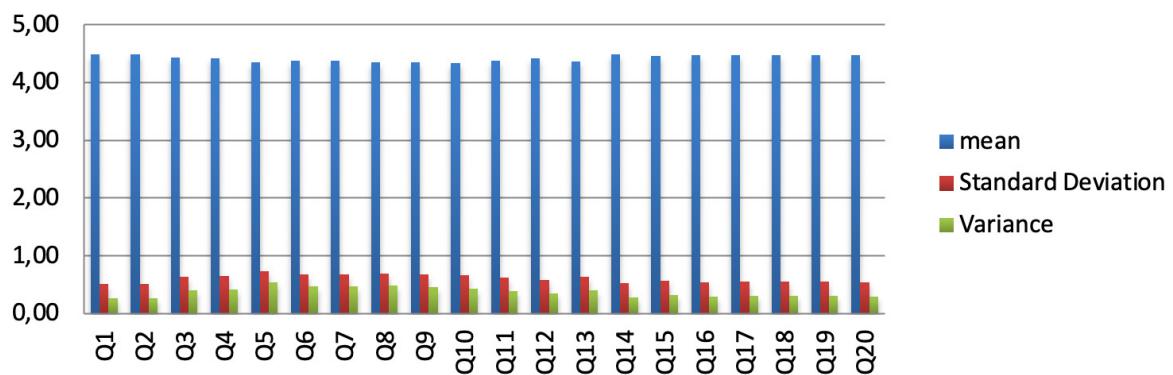


Figure 6 - mean and standard deviation for local development variables in Batna province.

## Spearman analysis of the tourism development variables for Batna province

Table 5 below shows the Spearman correlation coefficient values among the key variables for tourism development at the province level, with a significance level of 0.01.

Table 5 - Spearman statistical correlation analysis of tourism development variables in the province of Batna

Variables	Overall Facets	Significance (Sig)
Facilities and tourist amenities	0,902	0,01
Human resource skills in the tourism sector	0,881	0,01

Communication techniques and media	0,916	0,01
Tourist services and general procedures for receiving tourists	0,943	0,01
Tourism databases	0,904	0,01

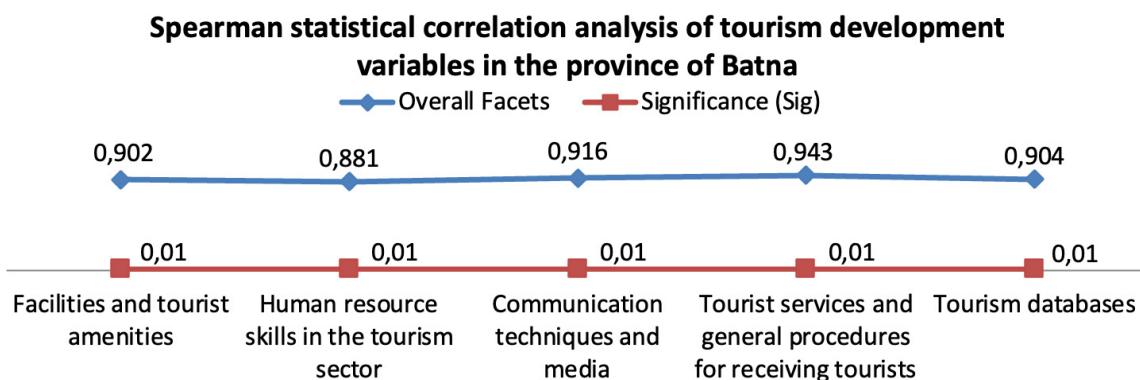
*Source: Authors, depending on SPSS V23 output*

## Analysis

- Results showed a very strong statistical correlation between tourism facilities and equipment and the general axis of all variables with a value of (0.902) and at the morale level (0.01), which proves the link between infrastructure in the development and achievement of tourism development
- The results showed a very strong statistical correlation between the skills of human resources working in the field of tourism and the general axis of all variables with a value of 0.881 and at the morale level (0.01), which indicates the positive and radical connection of the human resource in achieving tourism development at the province level.
- The results showed a positive and high statistical correlation between communication technologies and means and the general axis of all variables with a value of (0.916) and at the morale level (0.01), which indicates the positive correlation of means of communication for the service provider and tourists.
- From the table, it is clear that there is a direct and very positive statistical correlation between tourism services, general procedures for receiving tourists, and the general axis of all variables with a value of (0.943), which is the highest statistical correlation, and this is at the moral level (0.01), which shows the positive reflection of the facilities in the reception of tourists and the provision of comfort and luxury conditions, while providing quality in tourism services at the level of the special province of Batten, which would be an important element of attraction for local and foreign tourists.
- The table shows that there is a strong statistical correlation between the tourism data bases and the general axis of all variables with a value of (0.904) and at the morale level (0.01), which indicates the importance of databases in tourism work in general at the level of the study area. It also shows that databases contribute to knowing tourist

preferences and peak times, and even helping to make in-kind and future decisions, which positively reflects on the local development of tourism.

We interpret the previous results with the graph presented in Figure 7.



**Figure 7 - Spearman statistical correlation analysis of tourism development variables in the province of Batna**

### **Statistical impact analysis of the tourism development variables for the province of Batna**

The impact of the tourism development variables in the province of Batten is analyzed through a multiple linear regression analysis, which is shown in the following Table 6:

**Table 6 - Analysis of the statistical impact of tourism development variables in the province of Batna**

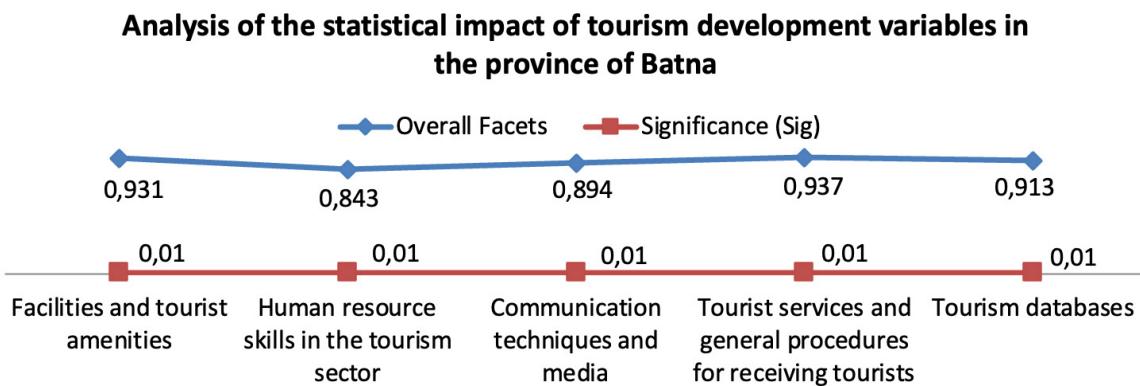
Variables	Overall Facets	Significance (Sig)
Facilities and tourist amenities	0,931	0,01
Human resource skills in the tourism sector	0,843	0,01
Communication techniques and media	0,894	0,01
Tourist services and general procedures for receiving tourists	0,937	0,01
Tourism databases	0,913	0,01

*Source: Authors, depending on SPSS V23 output*

- The linear regression coefficient in the first axis of tourism facilities and equipment was 0.931, indicating that the infrastructure was positively and strongly affected in attracting tourists, especially with historical and archaeological sites that played a significant role in individuals' choice to travel to the study area.

- The tourism human capital skills had a positive impact on tourism development in a region through tour guides, reception centres and hotels, as well as tourist loyalty.
- Communication techniques and methods have a 0.894 impact, affecting the process of communicating with tourists coming to the study area, and facilitating the integration of modern technologies in direct communication to know the needs of tourists in real time.
- The linear regression coefficient of tourism services and the general procedures to receive tourists amounted to 0.937, which is the largest factor in this study. It also indicates that the study area provides quality in services, flexibility in facilities related to attracting tourists, whether before or after a visit to tourism medicine regions at the province of Batna level.
- Tourism databases with a linear regression coefficient of 0.913, which shows the great importance of information related to tourists in general, as the database allows knowing the preferences of tourists, periods of peak visitation, as well as helping to make future predictions for them, and preparing development strategies and plans in the study area.
- From it, the linear regression analysis of all themes showed positivity in the high influence of variables of tourism development in the province of Batna, as we tend to reject the zero hypothesis and accept the alternative hypothesis, which confirms a statistically significant presence among the variables of tourism development in the study area.

We explain the previous results using the graph shown in Figure 8.



**Figure 8 - Analysis of the statistical impact of tourism development variables in the province of Batna**

## Financial study of the proposed project

This project is a theoretical proposal for a tourist facility that can benefit multiple dimensions. It contributes to the local development of a population in the dam of koudiet lemdouar by providing job opportunities and flourishing local industries, such as the Chawi Barnous, local trinkets, and even traditional international food such as Chakhokha, Tareeda, and Chawiya cider. As for tourists, it is a unique opportunity that allows him to stay and reclaim in a beautiful and comfortable natural area. It also provides him with proximity to tourist attractions areas, such as the archaeological city of Timgad, the National Reserve of Belezma, in addition to the charming Ghoufi balconies.

In this study, the financial aspects of this project, especially investment returns, will be studied. Accordingly, is the decision taken to invest in tourism in the study area or not, in accordance with the indicators of the net present value, which is the most important indicator of investment decision-making, in addition to the financial indicators related to the period of return, return on investment and profitability.

### Net Present Value

It is considered the most important financial indicator in the evaluation of investment projects, as it depends on the calculation of the expected cash flows of the proposed investment, and its financial comparison with the financial flows needed by the investment project, in a time period often five years, to identify the changes in the cash value used in financing the project.

The net present value is subject to a positive and negative measure. If it is positive, it is an acceptable project that has a financial return and is recommended. If the indicator is negative, it is not financially viable and it is recommended to leave it. see Table 7.

- $CF_t$ : the sum of cash inflows.
- $NPV = \sum CF_t - I_0$
- $I_0$ : represents the project capital (suggested by researchers).
- $i$ : represents the discount factor (update).

- n: number of years.
- DZD: the dinar is the monetary currency of Algeria

**Table 7 - the feasibility of the project in the dam of koudiet lemduar dam**

Years	2023	2024	2025	2026	2027
<b>CF<sub>t</sub></b>	1 520 000	2 230 000	2 410 000	3 750 000	3 915 000
<b>Coefficient (1+i)<sup>-n</sup></b>	0.909	0.826	0.751	0.683	0.620
<b>New CF<sub>t</sub></b>	1 381 680	1 841 980	1 809 910	2 56 1250	2 427 300
<b><math>\Sigma_{\text{newCF}_t}</math></b>			10 022 120		

Source: Authors.

$$\text{NPV} = (\text{CF1} / (1+i)^1) + (\text{CF2} / (1+i)^2) + (\text{CF3} / (1+i)^3) + (\text{CF4} / (1+i)^4) + (\text{CF5} / (1+i)^5) - \text{Initial Investment}$$

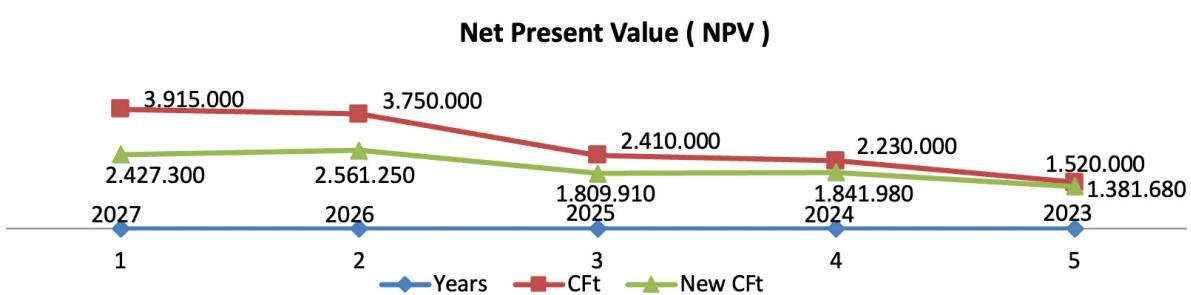
$$\text{NPV} = \{1 520 000 \times (1+10\%)^{-1} + 2 230 000 \times (1+10\%)^{-2} + 2 410 000 \times (1+10\%)^{-3} + 3 750 000 \times (1+10\%)^{-4} + 3 915 000 \times (1+10\%)^{-5}\} - 8 450 000$$

$$\text{NPV} = 10 022 120 \text{ DZD} - 8 450 000 \text{ DZD}$$

$$\text{NPV} = 1 572 120 \text{ DZD}.$$

Investment decision rule:

If the NPV is positive and greater than zero, this means that the project has a financial return and the proposed project is acceptable. Figure 9 illustrates the net present value chart.



**Figure 9 - Net Present Value**

## Payback period

Represents the period of investment recovery for the proposed project, as the shorter the period the more financially viable the tourism project.

**PP** =  $I_0$  (The capital of the invested project) / **MCF<sub>t</sub>net** (median net cash flow of the project)

**MCF<sub>t</sub>net** =  $\Sigma_{\text{newCF}_t}$  (Total new cash inflows) / **N** (The number of years)

**MCF<sub>t</sub>net** = 10 022 120 / 5

**MCF<sub>t</sub>net** = 2 004 424 DZD

**PP** = 8 450 000 DZD / 2 004 424 DZD

**PP** = 4.21

0.21 \* 12 months = 2.52 months

0.52 months \* 30 days = 15.6 days

0.6 days \* 24 hours = 14.4 hours.

0.4 hours \* 60 minutes = 24 minutes.

Payback period is 4 years and 2 months and 15 days

At 14H am and 24 minutes

Investment decision rule:

In this project, the refund period for the invested amount was less than five years, as the amount was refunded in four years, two months and fifteen days. 15/02/2027 to 14 hours and 24 minutes.

## Rate of Return

**RR** (Rate of Return) = **M<sub>f</sub>** (Cumulative Accumulation of Contributions in the Last Year 2024) /  $I_0$  (The capital of the invested project)

**M<sub>f</sub>** =  $\Sigma_{\text{CF}_t}$  (Total cash inflows) / **N** (The number of years)

$\Sigma_{\text{CF}_t}$  (Total cash inflows) = 1 520 000 + 2 230 000 + 2 410 000 + 3 750 000 + 3 915 000

$\Sigma_{\text{CF}_t}$  (Total cash inflows) = 13 825 000 DZD

**M<sub>f</sub>** = 13 825 000 DZD / 5

**M<sub>f</sub>** = 2 765 000 DZD

**RR = 2 765 000 DZD / 8 450 000 DZD**

**RR = 0.3272**

The return on investment in this project amounted to 32,72 arguments for every 100 cases invested in it.

## Analyze the results of the financial study

The project's financial study showed, through the results of the calculated positive indicators, that the proposed tourism project about the perimeter of the dam of koudiet lemdouar is a financially profitable project, and it also benefits the local development of the province in terms of direct and indirect labor, tax entitlement, and the introduction of tourist areas in the region. Lastly, it is an acceptable and implementable project.

## Conclusion

Tourism is a real industry that has evolved to become the main driver of many global economies and actively contributes to strengthening the local, national, and international development. This study, in its statistical aspect, proved to contribute to local development through the outputs of the field survey and its positive correlation and impact on its variables. The financial study of the proposed project showed that all indicators had a positive impact, especially in the net present value index, including the following suggestions:

- Tourism must have minimum baselines that allow attraction of tourists around historical and cultural areas.
- Field research shows that there is a significant segment of the population that considers tourism as an additional financial resource outside their basic work. From there, the tourism culture must be instilled in the local community and spread it to all segments of society. This is done by adopting that tourism is a self-contained industry that has a financial impact that distributes wealth among members of society.
- The study area contains many archaeological and historical sites that have been found in some parts of them, including neglect and sedimentation. Hence, we suggest the actual preservation,

protection, and evaluation of these sites through restoration methods, rationalization of consumption, and registration in national and international preserved sectors.

- During the field study, it was noted that the province of Batna lacks the actual tourist paths that allow attracting tourists, as the province is rich in great touristic elements, and it is suggested to create paths in line with the requirements of tourists, and the official authorities adopt the valuation of these paths to preserve and develop them.
- The study showed that the National Park needs national and international promotion and marketing as a large and diverse reserve, including the proposal to digitize the national barn to reach the largest target tourist segment, including the application of some principles of the national plan for tourism preparation, such as promoting Algeria as a global destination.
- The province of Batna has many easy areas for tourism preparation, such as the establishment of cultural, tourism, and recreational vehicles. For example, we propose a plan for tourism preparation in the charming areas of Ghoufi balconies, mountain tourism resorts in the Aures Mountains, as well as the Koudiet lemadouar dam, and in the vicinity of the Imadghassen shrine.
- In the field study, it is noted that funding for tourism development is scarce, and therefore, we suggest opening up local and international investments to achieve added value in local development in all its components.

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