Study of the environmental assessment of an investment project Case of Electric Train Project on Outskirts of Algiers

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Abstract:

The growing interest in environmental issues in general and the issues associated with the development process, in particular led to call for the study of the environmental impact assessment of development projects, so that environmental problems can be identified and the most appropriate ways to deal with them since the beginning of these projects, so that the process of development and environmental protection can be achieved.

This paper aims to clarify how the environmental assessment of the project investment is conducted, define the scientific ways for conducting it, know if it is carried out in practice as required and appropriate. For this a field study was provided about the environmental assessment for the electrification of the railway network, it has been reached that it is applied scientific methods, but not in the required and appropriate form because there are many difficulties in practice, and some recommendations have been provided in this regard.

***Key Words**: The investment project, environmental assessment of the project, project selection, decision of the investment, project of the electrical train.*

الملخص: باللغة العربية

أدى الاهتمام المتزايد بقضايا البيئة عامة والقضايا المصاحبة لعملية التنمية خاصة إلى المطالبة بدراسة تقييم الأثر البيئي لمشاريع التنمية، حتى يمكن التعرف على المشكلات البيئية وتحديد أنسب الطرق للتعامل معها منذ بداية عمل هذه المشاريع، وذلك حتى يمكن تحقيق التوافق بين عملية التنمية وحماية البيئة.

لهذا تهدف هذه الورقة البحثية إلى توضيح كيف يتم إجراء التقييم البيئي للمشروع الاستثماري، التعريف بالطرق العلمية لإجرائه، معرفة هل يتم إجراءه في الواقع العملي بالشكل المطلوب والمناسب. ومن أجل هذا تم تقديم دراسة ميدانية حول التقييم البيئي لمشروع كهربة شبكة السكة الحديدية، وقد تم التوصل إلى أنه يتم تطبيق طرق علمية ولكن ليس بالشكل المطلوب والمناسب وذلك لوجود عدة صعوبات في الواقع العملي، وقد تم تقديم في هذا الخصوص بعض التوصيات.

الكلمات المفتاحية: المشروع الاستثماري، التقييم البيئي للمشروع، اختيار المشروع، قرار الاستثمار، مشروع القطار الكهربائي.

JEL Classification: *Q5 Environmental Economics*

Introduction

In many cases, the economic dimensions of environmental issues are complex and unclear. There is a kind of confusion in the true relationship between economic development and environmental systems that underpin economy, where the prevailing traditional view of the investment projects objectives, in the first half of the last century, was the need to achieve the maximum possible profit, and the only social responsibility of the investment project was the exploitation of economic resources in order to increase profit, but the rapid changes in the world have led to the belief that profit maximization is no longer the sole objective of investment projects, where there should be a consistency and balance between economic development and the environment when planning for development, especially after the emergence of negative effects that were not taken into account in the past during the implementation of some projects in the world, where it was found that the deterioration of environment was primarily due to an increase in the economic activity. The advance of technology led to mass production, which depleted natural resources and its enormous residue contaminated the environment, which prompted the growing interest in environmental issues in general and issues associated with the development processes in particular, and here there was a need, or a necessary when creating new projects or make replacement operations or renovation projects, that economic feasibility studies for these projects include conducting environmental feasibility studies through which to conduct the environmental evaluation of investment projects, which allows the identification of various restrictions and environmental variables and determine the most appropriate ways to deal with them before starting to implement these projects in accordance with wisdom theory " prevention is better than cure " and reaching the primary objective through achieving compatibility between development processes and environment protection.

In light of the above we can ask the following problem:

Research problem: How the environmental assessment of the investment project is conducted?

From this main question the following sub-questions can be asked:

- What are the scientific methods used in the environmental assessment of the investment project?
- In practice, is the environmental assessment of the investment project done properly and as required, and is it depending on sound scientific grounds?

Research hypotheses:

- There are several scientific ways in environmental assessment of the investment project are not adopted in practice.

- In practice, the environmental assessment of the investment project is not done properly and as required, and it is not depending on sound scientific grounds.

Research objectives:

- Defining the scientific ways used in the environmental assessment of the investment project.
- Awareness and sensitization of this assessment importance and its role in helping officials to make good decisions.
- Knowing how environmental assessment is conducted in practice, and if it is being conducted on a sound scientific basis.
- Skills development in order to have the ability to conduct the environmental assessment efficiently, especially in light of the current global economic variables, and to serve the state's strategy to achieve compatibility between development and environment protection.

Methodology: To address the subject of this research a descriptive approach was chosen through analytical research and documentary research, the comparative causal research, and case study.

Research plan: This paper will address the following points:

Introduction

- Theoretical study on the environmental assessment of an investment project.
- Applied study design.
- Discussing the environmental assessment of the electric train project.
- Results and recommendations.

1. Theoretical study on the environmental assessment of an investment project:

The great interest in the subject of environment protection, which has become one of the main axes in the national economy, making the environmental assessment one of the most important aspects of the feasibility studies and evaluation of projects. Therefore, the following axes of the topic will be discussed.

1.1 Concept of environmental assessment of the project: In some countries, eIA is direct legal requirement, while in others it is enforced indirectly under general planning, heath or pollution control powers. The national environmental policy act (NEPA) was introduced in the U.S in 1969 and required environmental statements to be prepared for federally funded or supported projects that were likely to have impacts on the environment. In 1973, the U.S council of environmental quality (CEQ) has developed and published standard procedures for environmental statement. In 1978, the CEQ published regulations under the act which were directed towards streamlining the process, making the output more useful to planners and decision markers, encouraging public involvement and ensuring that the agencies follow up on their responsibilities after the approval of the EIS. In 2000, the environmental impact assessment act was issued as a legal regulation. In 1972, environmental assessment was accepted in principle at the united nation conference on the human environment at stockholm

when the framework of modern environmental international and national Policy was laid down.(1)

You can define the concept of environmental assessment of the project through the following:

Firstly, the definition of environmental assessment of the project: It can be defined as "organized, integrated and multi-science process that will evaluate the environmental consequences of any development project in advance to ensure controlling all the possible environmental impacts during the stages of planning, design, licensing, implementation and operation of the project."(2)

It can also be defined as "a tool for control and prevention which is a guarantee that takes into account interests of the protection and preservation of environment through designing, implementing and operating the development projects." (3)

(Lohani: 1997), in his description of the prediction and assessment of impacts on the environment, provides specific guidance on and examples of how to assess significance for: (1) air; (2) surface water; (3) soil and groundwater; (4) noise; (5) biological environment; (6) cultural (architectural, historical and archaeological) environment; (7) visual environment; and (8) socioeconomic environment.(4)

Secondly, the goals of the environmental assessment: Environmental assessment of investment projects aims to achieve the following:(5)

- Amendment of projects design and improving them as well as ensuring efficient use of resources.
- Determining the negative environmental impacts early and find how to mitigate them.
- Providing information to decision-makers so as not to deviate from the specific environmental projects line.
- Avoiding the destruction of environment and providing protection for human health and ensuring the achievement of development, but not at the expense of future generations.

Thirdly, the principles of environmental assessment: The success of the environmental assessment process depends on the following principles:(6)

- Focusing on the most serious and potentially important influences, in order to avoid complexity with all the focus on the possible and reasonable solutions.
- Providing qualified personnel that can conduct the evaluation properly and be aware of its importance.
- Soliciting the views of citizens and the use of people with loud ability to provide ideas.
- Providing clear choices that take into account several considerations.
- Facilitating the use of information by presenting facts and supporting it with explanatory means.

1.2 The environmental assessment stages of the project: The environmental assessment methodology takes place before the beginning of the project in the design and planning phase and it is in the form of stages as follows:(7)

- **Screening:** To decide which project should be subjected to environmental assessment. Criteria used include threshold, size of project and sensitivity of the environment.

- **Scoping:** Is the process, which defines the key issues that should be included in the environmental assessment. Many early EIAs were criticized because they were encyclopedic and included irrelevant information**.**

- **EIS preparation:** Is the scientific and objective analysis of the scale, significant and importance of impacts identified. Various methods have been developed to assist this task.

- **Review:** As environmental essessment are normally produced by the project proponent, it is usual for a review to be undertaken by a government agency or an independent review panel. The review panel guides the study and then advises the decision-makers.

1.3 The examination of the mutual effects between the project and the environment: The relationship between the project and environment is not only a relationship of one side, it is a reciprocal relationship, where there are effects of the environment with all its components on the project, as there are effects of the project on the environment, whether these effects are positive or negative. Therefore, the environmental assessment study requires that the two previous effects have to be taken into account.

Firstly, the impacts of environment on the project: It means the environment in which the project will be established and therefore it is the investment environment, that may provide investment climate for investments and investors, that climate is a group of institutional frameworks and economic, political, social, cultural, technical, and legal systems influencing investment decisions in any national economy. Thus, when the concept of the investment environment is taken in the broad sense, we find that the effects of environment on the project include the following:**(8)**

- **General external environment and its impact on the project:** The effects of economic, political and social environment, technological and artistic environment, legal environment and natural environment.

- **The specific external environment and its impact on the project:** The effects of competitive environment, consumer environment, and supplied environment.

The impact of environmental variables on the project is classified into three categories as follows:**(9)**

- **Negative impact:** Restrictions, threats, risks, and problems.
- **Positive impact:** Opportunities and incentives offered by environment including its different variables such as the absence of the project competitors.
- **Neutral effect:** The effect of the combination of the first and the second one, but it may adversely affect the future of the project's goals.

Secondly, the project impacts on the environment: There may be positive impacts and therefore the project has a feasibility from an environmental perspective, as there may be negative effects, causing damage to environment, whether through contaminating air, or water or place ... etc. And here we are in front of the following three cases:**(10)**

- The existence of adverse effects on environment that can be addressed and providing protection to the environment, without adding new and substantial investment costs to the project such as transferring the project to another site that does not cause damage.

- The presence of adverse effects on environment that can be addressed and providing protection to environment, by taking certain actions such as the use or installation of sophisticated equipment that increases investment costs.

- The existence of adverse effects on environment that can be addressed and providing protection to environment. In this case, the project rejection is preferable because of the lack of feasibility from an environmental perspective.

According to the previous effects, projects are classified into three main groups when studying environmental feasibility and environmental impacts assessment, in accordance with the so-called lists method, this method depends on projects classifiction according to severity of potential environmental impacts to the three lists are:**(11)**

- **White list projects:** Projects that have meager environmental impacts and can be addressed at low cost.

- **Gray list projects:** Projects that have significant negative effects on environment and can be addressed by a large investment cost.

- **Black list projects:** Projects that have an unavoidable harm to environment and these projects often are rejected after conducting a full environmental study.

1.4 Environmental assessment methods of investment projects: There are different ways to evaluate and measure environmental impacts of any investment project; they can be summarized as follows:**(12)**

Firstly, the marginal cost method: Based on comparing the marginal costs of reducing environmental damage with the marginal benefit resulting from this reduction.

Secondly, the accounting method: It requires the adoption of the integrated environmental and economic accounting instead of the traditional accounting, which requires specific environment statistics, as requires high costs, where it studies the costs of environmental degradation and the economic value of environmental assets.

Thirdly, the cost-benefit analysis method: Based on estimating the benefits of reducing the environmental damage of any project and estimate the reduction of the damage costs and then compare them to each other by setting prices or relative weights expressed in monetary units, relying on the social discount rate and the readiness of society to sacrifice a portion of its current resources for the benefit of future generations, and it is noticeable in this method a difficulty of measuring some of benefits and costs due to the problem of pricing where prevailing market prices do not reflect the project effects, where a proper assessment requires adjustments to market prices so that the modified prices reflect all social considerations, and so-called the reference prices (shadow prices), as well as the social discount rate varies from one society to another and is difficult to define it for any project. Therefore, it is difficult to estimate the social discount, which is the basis for calculating the value of the resources and the present value of the project costs and its benefits.**(13)**

1.5 Quantitative environmental assessment of investment projects: In order to quantify the impact through sensible values or numbers, three approaches were mainly selected, these are:[14]

- Leopold matrix.
- Overlays.
- Battelle environmental evaluation.

The methods used have varied in the assessment and identification of environmental effects resulting from development projects, and perhaps the most important of them is relying on the effects matrix, since this method requires a quantitative matrix which consists of two axes, first axis represents development activities and the second one represents the affected environment elements by these activities through inputs or outputs of the economic process, and the number at the intersection of axes refers to the extent of environmental impact of economic activity and reflects the extent of the influence of two digits, the first number represents the magnitude of impact in terms of the degree and severity of impact scale and is expressed (0-10), the second number reflects the relative importance of environmental component relative to the group of other environmental elements, and an integer is selected, for example (100), and then is distributed to the different environmental elements according to the relative importance of each element, and in the end, the calculation of the total numbers at the tip of matrix, and through this numbers, elements that have a significant negative impact on the environment are recognized, and that need certain procedures to reduce this effect, where a second matrix is made after putting these measures in order to reach a better position for the adverse effects on environment.

The use of mathematical equation is considered one of the important means for environmental assessment of development projects, and Battelle has put a method for environmental impact assessment (EIA) resulting from development projects and it is based on a quantitative assessment of the environmental impacts of projects, and the effects of development have been divided into different levels based on the environment elements, and the method is done through several stages:[15]

- **First stage:** Converting elements of the environment that represent the level of environmental quality digitally (0-1) where the change in environmental quality can be calculated in order to decide whether there has been an improvement or deterioration;
- **Second stage:** The relative distribution according to the importance of environmental elements by picking the number (1000) and dividing it on the elements of environment according to the relative importance;

The access to measurable results can be achieved by the future conditions assessment of environmental quality in the case of the project existence or the lack of it, using the following equation:

$$\textbf{Environmental Impact Unit} \quad EIU = \sum_{i=1}^{m} (v_i)1 \times w_1 - (v_i)2 \times w_i$$

Where:

$(V_i)1$: Is the environmental quality of the environment element.

$(V_i)2$: Is the environmental quality without the project.

(W_i): The relative importance of the environment element.

(M): The total number of the environment elements.

(i): The existence of the project ranges from 0 to 1.

Through Battelle method, the extent of future impact of any element in environment on any kind of development projects could be identified, where the goal of this methodology is to identify areas which suffer from deterioration of environmental problems, which will draw attention to environment elements that will be affected adversely.

2. Applied study design: Information collected on the environmental assessment of the project was based on the study carried out by the french development Agency, variables are the assessment criteria which are accredited as independent variables and the assessment result as the dependent variable, whereas the criteria adopted in the assessment process affect the result, and they must be appropriate in order to get it in a credible way. To find out the environmental assessment results of this project, a summary on how to conduct the environmental assessment was provided and the assessment process was discussed, as follows:[(16)]

2.1 Project submission: The national company of transport by rail (AGHA) gave a proposal to establish a huge investment project, in order to give due consideration to this type of transportation, an electric train project on outskirts of Algiers, and certainly it will have multiple direct and indirect impacts on the region. A summary will be given for the applied study related to this project, through the following:

Firstly, project description: The proposed project is an electrification of the railway lines on outskirts of Algiers, as follows:

- Algiers -El Harrach (at a distance) ⟶ 10 kilometers.
- El Harrach -Thénia (at a distance) ⟶ 43 kilometers.
- El Harrach -Blida- El Affroun (at a distance) ⟶ 58kilometers.

These lines are in a double direction, and the electrification of railway lines can be expanded in the future as follows:

- Thénia - Tizi Ouzou (at a distance) ⟶ 52 km.

And for the effectiveness of this project, the following necessary and accompaniment achievements have to be done:

- Replacement of diesel trains by purchasing at least 64 electric trains 75- meter -long, running in a dual or triple form in the overcrowding hours of passengers, in order to fill all the berths with a total length of 225 m, allowing a capacity provision of 1800 passengers at a time.

- Making adjustments in the civil structures such as the change of inappropriate bridges, roads and places.

- Adjustment of the railways to reach the required level to allow a maximum speed of 120 km / h.
- Updating the signaling system with the completion of a central control system in Algiers.
- Completing a station in Hamma city as a branch of the central station to meet the growth requirements of civilization.
- Accomplishing rail fixtures in Kharouba to exploit them in suburbs, and the completion of a garage in Thénia is necessary to increase the efficiency of the traffic and the use of electrically driven vehicles.
- Completion of the maintenance workshop of electrically driven vehicles in Rouiba.
- Gradually eliminating 26 corridors which cut the railway, between El Harrach and El Affroun.
- In order to meet the future growth of the number of passengers, it is expected to extend the sidewalks to 330 m.

Secondly, the project objectives and justification: The objectives and justification behind this project are:

- Separation of passenger and cargo transport in the link line between Algiers and Rouiba.
- Electrification of the following sections in the future: Algiers- El Harrach, El Harrach - Thénia, El Harrach - Blida - El Affroun, Thénia - Tizi Ouzou, and reformatting the central station Agha.
- Giving due consideration to this type of transport and putting in service a calendar of electrically driven trains which allow the lifting of transport capabilities across the railroad tracks.

Thirdly, the expected cost and time of the project completion: Through the total financial estimate and the calculation of all fees for the project, it is quite clear that the huge cost cannot be afforded by anyone except the state, where it was estimated at: 70701.8 million dinars, and the moving equipment is considered the most important in terms of total financial estimate where it was at: 36557.1 million dinars. The time of completion is based on the timeline of completing the project elements; it is clear that it started in 2004 and finished in 2012, in order to meet the passenger needs of transport services till 2022.

2.2 Examination of the mutual effects between the project and the environment: After analyzing the project from the perspective of the impact on environment, showing the presence of the effects of environment on the project and vice versa, it can be summarized as follows:

Firstly - the effects of environment on the project: Are as follows:

- **The effects of physical environment on the project:** There are two main elements that could affect negatively the project- by virtue of nature and characteristics of the region (the plain of Mitidja) which is characterized by its fertile soil and fragility as well as frequent rainfall especially in winter - are erosion and landslides, floods.

- **The impact of earthquakes on the project:** All the areas, where the project resides, are classified as areas prone to frequent earthquakes of high intensity, and the geological nature which is characterized by the fragility of soil increases this risk, and thus the possibility of large landslides may cause serious damage: Cracked and collapsed buildings and some of the civil structures, large parts of the rail lines go off the track, the train carriages go off the track and will be exposed to significant damage, the fall of the lights and disks, power outage ... etc.

Secondly, project impacts on environment: It can be summarized as follows:

- Eliminating a large part of vegetation and prejudicing livestock wealth.

- Penetrating residential and agricultural areas and the acquisition of a large part of the territory, where we find, for example, 20-hectare of industrial zone into an agricultural area.

- Releasing gas, contaminated water and throwing industrial waste which cause negative effects on health.

- The impact of noise (Annoying sounds) during the completion and operation of the project: Noise that will be caused by railway transport has several types including noise of rolling, noise of vehicles, noise of flow or stirring, noise of preponderant rolling.

2.3 Quantitative assessment of the project impacts on environment: This assessment is necessary to carry out the economic assessment of this kind of development projects.

Firstly, estimating the profit resulting from polluted factors: This process involves the following steps:

- Estimating traffic and expressing it through: Vehicle / km / year.

- Estimating the production of various types of pollutants for different traffic of specific transport means.

- Calculating the economic cost of pollution unit, according to the following rules:

  - ✓ The cost of damage caused by pollution, such as health expenses, the cost of maintaining buildings, low tourism profits.... etc.
  - ✓ The loss cost of the declared value of the house as a result of exposure to pollution.
  - ✓ The cost of the quality of life resulting from respiratory diseases as advertised.

Depending on many complex studies done in France, within the framework of environmental assessment for this kind of development projects, and after making adjustments that take into account the Algerian reality, the unitary economic cost which is caused by polluted factors of various means of transport on the outskirts of Algiers was measured, as illustrated in the following table:

Table (1): The value of polluted discharges for one year in: DZD / Vehicle / Km.

Vehicle	Unit	Value in: DZD
Taxi	Car / km	0.4619
Bus	Bus / km	3.9926
Diesel Train	Train / km	26.2262

Source: Documents of the field study.

Based on data of the table above, profit of the costs of pollution resulting from traffic saving of these vehicles, which will be caused by this project during the years 2008-2022. And the following table illustrates this:

Table (2): Profit of the costs resulting from the polluted discharges of the project (depending on the medium traffic hypothesis).

The profit of costs resulting from a substitution of diesel train by electric train		The profit of costs resulting from a change of traffic from buses to the electric train		The profit of costs resulting from a change of traffic from taxis to the electric train		Total profits in: million DZD
Value in: M DZD	Trains savings in km in: million / train / Km	Value in: M DZD	Buses savings in km in: million / bus / Km	Value in: M DZD	Taxis savings in km in: million / car/ Km	
547.65	20.88 x 26.2262	1204.51	301.69 x 3.9926	59.07	127.88 x 0.4619	**1811.23**

Source: Prepared by the researchers based on the documents of the field study.

So the project will achieve a reduction in the traffic of diesel trains, buses and taxis in suburbs, and thus it will result in a reduction in pollution from these vehicles, so achieving a profit in pollution costs estimated: **1811.23 million DZD.**

Secondly, estimating the profit resulting from a reduction in the amount of carbon (CO2):

According to the report of the general inspectorate for French plans (Boiteux), the quantitative assessment of the impact of CO2 emissions shall be in accordance with the criteria described in the following table:

Table3: Assessment criteria of CO2 emissions.

Phases of assessment	Criterion used
Estimate of the energy consumed	Fuel value per liter of petrol or gasoline
Estimate of the amount of CO2 emitted	The amount of CO2 resulting from the fuel consumed is estimated at: 0.71 kg of CO2 for every 01 liter of fuel
Estimate of the annual cost of CO2 emitted	The price of CO2 emitted and recovered estimated at: 100 euros or 8900 dinars / ton.

Source: Documents of the field study.

By applying these phases and standards on this project, the result of cost saving can be obtained as a result of the reduction of CO2 emitted because of reduced traffic of taxis, buses and diesel trains, during the years from 2008 to 2022, and the following table illustrates this:

Table 4: Cost saving as a result of reducing the amount of CO2 emitted (depending on the medium traffic hypothesis).

Phases of the cost estimate	Substitution of diesel train	Reduction of buses traffic	Reduction of taxis traffic
The annual cost of fuel	79.52 million DZD (*)	/	/
The price of a liter of fuel	17.75 DZD (*)	17.75 DZD(*)	18.26 DZD(*)
Annual fuel consumption	79.52÷ 17.75 =4.48 million liters	/	/
The vehicle's fuel consumption	/	33 liters/100 km	10liters/100km
kilometers saving during 15 years	/	257.29 million km	123.60 million km
Fuel consumption during 15 years	/	(33 X257.29)÷ 100= 84.91 million liters	(123.6×10)÷100=12.36 million liters
CO2 emitted during 15 years	4.48 x0.71 kg x15 years=47712 tons	84.91x 0.71 kg= 60283.40 tons	12.36×0.71=8775.33 tons
The value of CO2 emitted during 15 years	47712 x 8900 DZD = 424.64million DZD	60283.40 x 8900DZD= 536.52 million DZD	8775.33 × 8900 =78.10 million DZD
Total cost saving of CO2 emitted	**424.64million DZD+536.52 million DZD+78.10 million DZD=1039.26 million DZD**		

Source: Prepared by the researchers based on documents of the field study.

(*) Values remain constant during the evaluation period.

This result **1039.26 million DZD**, is added to cost saving as a result of reducing the calculated discharges, which were estimated at: **1811.23 million DZD**, bringing the total profit of the costs of polluting the environment on the outskirts of Algiers to rise because of reducing the traffic of taxis and buses and diesel trains to **2850.49 million DZD** during 15 years (2008 - 2022).

Note: This profit in polluting the environment costs will be added to the project non-commercial benefits, so as to conduct its economic assessment as a whole, in order to know whether it will be accepted or rejected, and the method of cost-benefit analysis has been adopted in the economic assessment of the project on the basis of the system of modified market price and hypothesis of medium traffic, and based on two criteria: The net present value (NPV) and internal rate of returns (IRR).

3. Discussing the environmental assessment of the electric train project: Algeria has little experience in such studies and studies assessing large projects like this one often entrusted to foreign agencies, making them based on data and information that do not reflect properly the Algerian reality, which affects their assessment results, where through the examination and the scrutiny of the field study parts, some observations that may affect the credibility of the environmental assessment of this project were given.

3.1 The project is vulnerable to natural hazards such as earthquakes, floods, and therefore, solutions and measures must be given in order to protect this project and minimize the risks.

3.2 It can be argued that the study focused on assessing the effects of the project on environment by measuring the costs of various polluting discharges that could be reduced by the project, but it neglected another aspect, which is measuring the possible damage of this project on environment (social costs); as costs of solid and liquid polluted discharges that can result from this project, the cost of the destruction of a large part of vegetation, especially agricultural and pastoral areas and landscaping, because a project of this magnitude must have negative effects on environment.

3.3 The study relied in determining the cost per unit of pollution caused by various means of transport on European data; as a result, the cost savings do not reflect the true values. Most modes of transport in Algeria are old, and the approved exchange rate does not equal real exchange rate, this latter is limited between the formal and informal exchange rate.

3.4 It has been relying on market prices, with some necessary adjustments and the assumption that the distortions in prices will be controlled thanks to economic liberalization that still does not exist until today. Therefore, this assumption is inapposite and it is an attempt to evade exerting greater efforts, because the reliance on reference prices requires in-depth analysis and the hypotheses are taken from the Algerian reality.

3.5 Some of the data are regarded as fixed ones during the assessment period, estimated at 15 years, this is inapposite because values cannot remain constant for this long-term especially exchange rate, the price of oil and the amount of fuel consumed and therefore the amount of CO2 emitted.

3.6 When the study of environment effects on the project was conducted, the focus was more on the impact of natural environment, while in the study, there was no significant expansion

to include other environmental effects, such as those of political, social, cultural, and legal environment.

Conclusion: After presenting this research paper on the subject of environmental assessment of the electric train project on outskirts of Algiers, it has been reached as follows:

Results:

In light of the problem of this research and its objectives, the following could be said:

The environmental assessment of the project begins by describing the proposed project and then describing the environment surrounding it and identifying all the direct and indirect benefits that can be achieved by this project for the environment, as well as all direct and indirect costs that could inflict on environment, then measuring the benefits and costs that can be measured and describing the benefits and costs that cannot be measured, and then entering these benefits and costs within the economic assessment of the project as a whole, and taking all the necessary procedures and measures to improve it from the environmental perspective, so as to prevent negative effects or to minimize or compensate them in the case of acceptance, or offer other options and alternatives in the case of rejection, then prepare a report to document all the steps and past results, and its adoption as a tool to see the potential problems and knowing the necessary procedures to address them, and making sound decisions, and thus protect and conserve the environment and natural resources, including related human health aspects of the effects of development process, and to ensure sustainable development that meets the needs and requirements of the present without diminishing the capacity of future generations to meet their needs.

Recommendations: In light of the research results and objectives, the following recommendations are proposed:

- The purpose of protecting environment does not mean obstructing the process of development, but on contrary, achieving development is linked to the achievement of a parallel environmental balance to it and in its direction and consistent with its movement and interactions. The human being lives within a system of nature, technology and values (customs, traditions, ethics), and there must be coordination between them, any system cannot be ignored at the expense of other one, otherwise it's a crime.
- Creating specialized research centers in the assessment of investment projects, that include Algerian professionals from various fields, and developing statistical awareness and work to provide necessary information and data taken from the Algerian reality and on a continuous basis until a strong knowledge base is built, through which proper planning processes can be conducted and the study of how the evolution of building will change in the future, changing bad habits and bad mentalities, including secrecy, reluctance and fear that obstruct the free flow of information.

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