

ISIR Journal of Business and Management Studies (ISIRJBMS)
ISSN: 3048-7684 (Online)
Frequency: Bimonthly
Published By ISIR Publisher
Journal Homepage Link- https://isirpublisher.com/index.php/isirjbms

Design of an Expos method to evaluate Social, Economic, Environmental and Security impacts (SEES) of the development of the road infrastructure in Belize.

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Article History

Received: 25/09/2025
Accepted: 08/10/2025
Published: 11/11/2025

Vol – 2 Issue – 6

PP: -22-34

Abstract

The purpose of the research was to design an Expos evaluation method that considers and incorporate formulators, implementers and strategic decision makers as stakeholders. Additionally, the public opinions of the stakeholders as interested parties should always be consider critical, since they are independent beneficiaries of the process of formulation and implementation of the rehabilitation of the Humming Bird highway. This study was based on the importance of customer satisfaction project beneficiaries. Furthermore, according to Rodríguez Jean-P. (2020), the foundations of transport are related to the physical ability to transport passengers, merchandise as well as the costs associated to support this mobility. The proposed evaluation method had a descriptive approach that applied to various evaluation actors such as the formulators, implementers, and other stakeholders. Additionally, the proposed evaluation method considered the criteria of the relevance, effectiveness, efficiency, impact and sustainability of each stakeholder group evaluated for the purpose of evaluating performance.

Keywords*: Expos-Evaluation Method, Evaluation Criteria, relevance, effectiveness, efficiency, impact and sustainability, Stakeholders,Humming Brid Highway*

1. INTRODUCTION

1.1 Definition of the Problem

Belize, as a new nation in Central America, is celebrating forty-three years of Independence, which is much younger than the other Central American nations. Currently, the country is in development, improving and redesigning its infrastructure (Airports, Sea Port, and Highways).

It is believed that these infrastructures are the key drivers to promote the economic growth of the country, through the export of agricultural products (Citrus, Banana, Sugar Cane, Cocoa), maritime products, as well as seasonal tourism, since this has increased significantly in the last six years according to data from the Statistics Institute of Belize (SIB, 2021).

The infrastructure investment and development are emerging in the country's road projects, and evaluation criterion or Technical Evaluation Method (MET) must be urgently designed to carry out Ex-ante, During, Terminal and Expos evaluations for the assessment of the aforementioned infrastructure.

The said evaluation will be a process that guarantees adequate planning, implementation, monitoring and closure of public investment projects. (Kati, K. and Ott, K. 2014, Pg. 7).

Currently, the ministry responsible for infrastructure works in the country does not have an evaluation method (Ex ante, During, Terminal and Ex post) that integrates various stakeholders to carry out the assessment of the development of the country's public civil infrastructure, as confirmed by the head of engineering at the Ministry of Infrastructure Development &Housing(MIDH). The fundamental reason is based on the fact that when international organizations, as well as the government of the day, finance projects, they never include funds for their evaluations and therefore they have always remained unassessed. (Bradley, L; Direct communication July 15, 2021).

The design, construction and maintenance, as well as policies and institutional features, cannot be quickly transferred to the countries of the region Central American.

Therefore, the project design must incorporate a route of more realistic change, which may initially require less emphasis on standards international standards and implementation models, and more emphasis on gradually developing familiarity and confidence in international methods as expressed by the authors Blanco-Orozco, N; Arce-Díaz, E; Zúñiga-Gonzáles, C. (2015, Pg. 4),

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The continued absence of an Ex-post method to assess the social, economic, environmental and safety impacts of the road infrastructure in Belize, will leave a deficiency in the performance base on the criteria of relevance, efficiency, effectiveness, sustainability and impact of the projects. In addition, this will leave missing lessons learned from donors, formulators, implementers as well as beneficiaries.

1.2 Justification

The Ministry of Infrastructure Development &Housing(MIDH) in its project history, hasn't used expos evaluation nor has it carried out integrated evaluation designs. However; The lack of education of the technical team at the Ministry mentioned previously, regarding the Monitoring and evaluation of public projects has not made it possible to evaluate the relevance, effectiveness, efficiency, sustainability and impacts of the road projects developed recently. Furthermore, the lack of the said evaluation method has not allowed the evaluation (Ex ante, During, Terminal and Expos) of road projects in order to determine their performance.

Therefore, it is important to resolve this gap by considering the design of an expos evaluation method, which integrates the stakeholders in the Social, Economic, Environmental and Security (SEES) evaluation; to measure the impact they will bring to the beneficiaries.

In agreement with Mariana Gonçalves de Carvalho Wolff and Marco Antonio Farah Caldas (2018, Pg. 10), the implementation of the program seeks to translate the objectives into actions and through the performance of road administration, which has beneficial consequences for the whole of society. The mode of transport by road, for example, is recommended for door-to-door transport, especially in the case of fragments deliveries of products to the end customer.

According to Kati Kaare, Ott Koppel (2014, Pg. 213), Transportation planning recognizes the critical links between mobility and other societal goals. The Strategies supporting infrastructure investments generate substantial public interest because they are related to public expenses. The decision processes related to Transportation projects involve considerations of environmental, economic, technical and security, and are characterized by many actors and multiple objectives in the feasibility studies. This justifies the need to design a comprehensive method to carry out evaluations on the road infrastructure projects that are currently being carried out in the country, and specifically, the Hummingbird highway that connects the City of Belmopan with the municipality of Dangriga and the Thomas Vincent Ramos Highways in the country.

Due to the reason expressed above, a method was designed using the rehabilitated Hummingbird highway as an example, considering that it was completed Four years ago.

1.3 Research Objective

1.3.1***General objective***: Evaluate upon completion the results of the Humming Highway project in the Social, Economic, Environmental and Security(SEES) dimension, that can be used as a tool for future evaluations.

1.3.2Specific objective

1. Define the qualitative and quantitative techniques, as well as instruments and reporting actors such as formulators, implementers and travelers to carry out the evaluation of the Humming bird highway.
2. Define and apply variables of interest for the study in the evaluation of each of the Social, Economic, Environmental and Security (SEES) dimensions.

1.4 Operationalization of the Specific objective

An evaluation must provide information that is credible and useful, allowing for the incorporation of lessons learned in the decision-making process of both recipients. (OCED CAD). Additionally, evaluations investigate the reasons why certain aspects of a project or program has been implemented or not as planned.

According to the (OECD DAC, Pg. 25), a systematic evaluation and objective of an ongoing or completed project, program or policy is design, to implement and obtain oriented results. The objective is to determine the relevance and compliance of objectives, development efficiency, effectiveness, impact as well as the sustainability

1.5 Significance of the study

Lack of the said evaluation method, hasn't allowed evaluation (Ex ante, During, Terminal and Expos) of road projects in order to determine their performanceTherefore, it is important to resolve this gap by considering the design of an Expos method of evaluation, which integrates those interested in the evaluation: Social, Economic, Environmental and Safety (SEES); to measure the impact they will bring to the beneficiaries.

The continuous absence of a method (Ex post) to evaluate the Social, Economic, Environmental and safety impacts of road infrastructure in Belize, will leave a deficiency in the relevance, efficiency, effectiveness, sustainability and impact of the projects. Furthermore, this will leave lessons learned lost from donors, formulators, implementers and beneficiaries.

1.6 Limitation of evaluation object

The need to measure and judge the effects of rehabilitation through evaluation in this context, concentrates mainly on the Social, Economic, Environmental dimensions and Security (SEES).

Consequently, we focus on evaluation studies carried out in the field stage through the realization of five encounters with the different groups of interested parties and in which I present two types of limitations as observed subsequently.

2. LITERATURE REVIEW

2.1 Evaluation of Road Infrastructure Projects

2.1.1General principles of project evaluation

The general principles of project evaluation are foundations that guide the systematic analysis of an investment proposal or initiative, with the objective of determining its economic, financial, technical, environmental and social viability. These

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principles allow you to make informed decisions about whether or not to execute a project as outline below:

1. **Economic rationality**

The project must be evaluated from an economic point of view, seeking to maximize the efficient use of scarce resources. Costs and benefits must be compared over time.

2. **Analysis of alternatives**

You should not evaluate just one proposal, but compare different options (technological, location, scale, etc.) to select the most convenient one.

3. **Comprehensive approach**

The analysis must consider all relevant areas: technical, economic, financial, legal, social and environmental.

4. **Time horizon**

An appropriate time period must be defined for the evaluation, so that all relevant benefits and costs of the project are captured (project life).

5. **Time value of money**

It is recognized that a peso today is worth more than a peso tomorrow. For this reason, techniques such as net present value (NPV) and internal rate of return (IRR) are used.

6. **Decision criteria**

Projects are accepted or rejected based on certain indicators, such as:

1. Net Present Value (NPV)
2. Internal Rate of Return (IRR)
3. Benefit/Cost Ratio
4. Investment Recovery Period (Payback)

7. **Risk and uncertainty**

The risks that may affect the project must be identified and analyzed, applying tools such as sensitivity analysis, scenarios and simulations.

8. **Social and environmental impact**

The evaluation should consider the effects of the project on the community, the environment and other non-financial factors.

9. **Consistency and objectivity**

The analysis should be based on realistic assumptions, reliable data and a consistent methodology, avoiding subjective biases.

10. **Sustainability**

The project must be sustainable over time, not only economically, but also in social and ecological terms.

2.2 Types of project evaluation

In project evaluations, they are basically carried out in view of the Five Criteria of evaluation, but depending on the moment of the evaluation study, the perception of each topic is different. For example, in the ex-ante evaluation before starting a project, the "Relevance" can be examined based on the actual situation, but from the other points of view In view, the survey can only be carried out based on forecasts and perspectives.

In an interim evaluation after the start of the project, "relevance" and "efficiency" are can evaluate based on the actual situation and performance, but "effectiveness" and "impact" can only be examined primarily at the end of the project in accordance with what is considered necessary and possible at that moment for the evaluation and that depends on the extent to which a medium-term effect has actually occurred. (Bakhtawar et al, 2018)

According to OCED (2016), the depth and focus of the examination of each of the five evaluation criteria may also differ depending on the characteristics of a project and the problems you face. For example, for small projects, it may not be appropriate to conduct the survey using expensive questionnaires, but using instead another simple method or if the party involved is aware of the efficiency issues as a problem for a project, it may be necessary to conduct the study with a stronger focus on examining efficiency.

2.2.1Ex ante evaluation

The “ex-ante” evaluation includes the evaluations that are made on the processes or activities carried out in the pre-investment phase. Additionally, the evaluation serves to demonstrate the feasibility and viability of the project from three perspectives (financial, economic and social, and environmental). The results are used in the promotion phase, negotiation and financing in order to determine whether financial resources are allocated to the project. (Ramón Rosales, 2019, Pg. 31).

2.2.2Evaluation During

According to Rosales, R. (2019, Pg. 32), The evaluation during is also called "about the "start-up"; it is carried out in the investment or execution phase. Its fundamental purpose is ensuring compliance with the execution objectives (specific execution objectives) of the project, that is, the achievement of each of the project deliverable. Furthermore, this is the evaluation to which greater importance is assigned, since its results have immediate consequences that cause modifications in the activities that are in course of execution.

Additionally, in this phase there are three sub-processes, monitoring and control, evaluation and closing of the execution of the project, monitoring and control is what is carried out at activities of each of the project deliverable. These activities are carried out continuously throughout the phase, the evaluation can be carried out in two moments, one in the middle of the execution process, which is called the EMT mid-term evaluation. The Evaluations during are carried out in the middle of a project (in five-year projects, in the now about two and a half years have passed). Its purpose is to verify if the project It has been implemented smoothly and is on its way to producing effects. (OCED, 2016).

2.2.3Terminal Evaluation

According to the organization, (JICA, 2010), final evaluations are carried out at the end of cooperation; They examine at a comprehensive level whether the project objective was achieved. As Consequently, relevance, efficiency and effectiveness are examined depending on the situation real and performance. Impact and sustainability are also

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examined based on performance and the status of activities up to that point, and also with respect to future trends and viability. It is important to keep in mind that, although for impact and sustainability, they are the "perspectives" which will be judged in the final evaluation, the evaluation still has to identify the specific grounds for the trial to ensure that the sentence is not without merit basis. The evaluation results of the final evaluations are fed back mainly to operational departments and relevant government agencies and to the implementing agency in the partner country.

2.2.4Ex post evaluations

According to Rosales, R. (2019, Pg. 33), there are two types of "expos" evaluation, which are carried out in any of the following moments:

During the operation or operational phase of the project, whether at the beginning, middle or end of the phase: the "expos" evaluation of the operation or function. Each of these two types of evaluation has its own objectives and peculiarities; However, in general terms, the "expos" evaluation contemplates a careful examination of certain factors, including the quality of the goods or services that are produced or provided, the achievement of goals, the scope of the objectives, the solution of the problem, the satisfaction of the target group, the increase in production, etc., all of them linked to the living conditions of the objective beneficiaries direct objectives that are intended to be achieved through the project. The mentioned factors are measured based on parameters such as efficiency (appropriate use of resources), effectiveness (achievement of objectives in relation to the use of resources), the effects and impacts.

2.3 Difference between Ex Ante and Ex Post evaluation.

a. Ex ante phase (before execution)

It is the formulation and design stage of the project, where feasibility is analyzed and its implementation is planned. Includes:

1. Identification of the problem or opportunity.
2. Definition of objectives, goals and beneficiaries.
3. Feasibility study (technical, economic, social, environmental, institutional).
4. Preparation of the work plan, schedule and budget.
5. Ex ante evaluation: cost-benefit or cost-effectiveness analysis to decide whether it is advisable to execute the project.

b. Ex post phase (after execution)

It is carried out once the project is concluded, with a focus on evaluation and learning. Includes:

1. Evaluation of results (if immediate objectives were achieved).
2. Impact evaluation (medium and long-term effects on the population or context).
3. Sustainability analysis (if the benefits last over time).
4. Systematization of lessons learned and goodpractices.
5. Accountability to financiers, beneficiaries and actors involved.

2.4 Ex Post Evaluation

2.4.1Definition and purpose

Ex post evaluation in project management is a systematic process that is carried out once the project is completed, in order to analyze its results, impacts and the way in which it was managed.

a. Definition

Ex post evaluation is the comprehensive review of a project after its execution and closure, which seeks to determine to what extent the stated objectives were achieved, how the resources were used and what effects (positive or negative) it generated in the organization, the beneficiaries and the environment.

b. Purpose

The main purpose of the ex post evaluation is to learn from the experience to improve the management of future projects and verify the real value that the initiative generated. Its specific purposes include:

1. Measure results and impacts: determine if the expected benefits were achieved and what the long-term effects were.
2. Assess efficiency and effectiveness: analyze whether the resources invested were used appropriately in relation to the achievements.
3. Identify lessons learned: rescue good practices and errors to strengthen the management of future projects.
4. Be accountable: provide transparency to stakeholders (management, funders, community) about the achievements and relevance of the investment.
5. Evaluate sustainability: analyze whether the results are maintained over time, even after the project closes.

2.4.2Methodological approaches

In project management, research methodological approaches quantitative, qualitative and mixed—are applied as analysis, planning, monitoring and evaluation tools. Each approach provides different and useful perspectives depending on the type of project, its objectives and the type of information necessary for decision making.

a. Quantitative Approach

It is based on numerical and measurable data.

- Application in projects:

1. Estimation of costs, times and resources.
2. Risk analysis with statistical models.
3. Performance monitoring with indicators (KPI, EVM – Earned Value Management).
4. Structured surveys to measure customer satisfaction or impact.

- Advantage: Allows you to obtain objective, comparable results and project scenarios.
- Limitation: Does not explain in depth the perceptions, experiences or social factors behind

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the numbers.

b. Qualitative Approach

It focuses on deep understanding of experiences, perceptions and contexts.

- Application in projects:
  1. Identification of needs of users or communities (interviews, focus groups).
  2. Evaluation of the social or cultural impact of a project.
  3. Understanding of work dynamics in multidisciplinary teams.
  4. Study of success or failure factors from the perspective of those involved.
- Advantage: Provides rich and contextualized information to improve decision making.
- Limitation: Less generalizable results and with a certain level of subjectivity.

c. Mixed Approach

It combines both approaches (quantitative + qualitative), integrating the precision of numerical data with the depth of interpretation.

- Application in projects:
  1. Comprehensive evaluation of projects (e.g. measure economic impact with statistics and validate the perception of the beneficiaries).
  2. Organizational change management (surveys + interviews).
  3. Monitoring and evaluation of development or innovation projects.
- Advantage: Offers a holistic view, balancing objectivity and context.
- Limitation: Requires more resources (time, money, specialized personnel).

2.5 Advantages and limitations of Ex Post evaluation.

A. Advantages of Ex Post Evaluation

- Measures actual results – Unlike ex-ante (before) or mid-term evaluations, ex post deals with real data and outcomes, not projections or assumptions.
- Assesses long-term impacts – Can capture sustainability, unintended consequences, and lasting changes that may not be visible during implementation.
- Improves accountability – Provides evidence of whether the program/policy delivered on its promises.
- Learning for future projects – Lessons from successes and failures can inform the design of new policies or programs.
- More objectivity – Since the project has ended, political or operational pressures are usually reduced, leading to a more neutral assessment.

B. Limitations of Ex Post Evaluation

- Time lag – By the time evaluation happens, it may be too late to improve the completed project itself.
- Attribution challenges – Difficult to separate the project's impact from other external factors (e.g., economic changes, political shifts).
- Data availability issues – Records may be incomplete, inconsistent, or unavailable years after project completion.
- High costs & complexity – Collecting long-term impact data and conducting field studies can be expensive and resource-intensive.
- Stakeholder disengagement – Beneficiaries, staff, or policymakers may have moved on, making it harder to gather feedback.
- Risk of bias in recall – If based on interviews or surveys, respondents may misremember or reinterpret past experiences.

Limited immediate utility – Since the project is over, the evaluation is more about learning for the future than improving current operation.

These findings align with the research by Sihombing et al. (2021), which states that auditor experience has a significant impact on audit quality at public accounting firms in Medan. According to their findings, the longer an auditor works in the field, the more experience they accumulate, thereby improving their ability to produce high- quality audit reports.

Table No. 1; Evaluation criteria and Type of evaluation

Type / Criteria	Ex ante Evaluation	Monitoring	Mid Term	Final	Expos
Relevance		-			
Effectiveness		-			
Efficiency		-			
Impact		-			
Sustainability		-			

Source: JICA (2012)

- Examination based on the real situation and performance
- o : Examination based on forecasts and perspectives
- : Examination in accordance with what is judged necessary and possible for the evaluation
- : A full exam is not yet possible or was completed in an earlier phase

2.6 Evaluation Criteria.

a) **RELEVANCE**: Refers to the extent to which the objectives of a development intervention are consistent with the requirements of the beneficiaries, the needs of the country, the priorities and policies of the partners and donor countries. The evaluation of the project's relevance can be evaluated through the assignment of values to the criteria such as: Highly relevant (4), More than relevant (3), Relevant (2), Less than relevant (1) and irrelevant (0).

b) **EFFECTIVENESS**: Refers to the extent to which the objectives of the development intervention were

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achieved, or are expected to be achieved, considering their relative importance. In other words, effectiveness measures the extent to which an activity achieves its purpose, or whether this can be expected to happen based on the products. Implicit within this criterion of effectiveness is opportunity. The evaluation of the project's effectiveness can be evaluated in the following way through the assignment of values to the criteria such as: Highly effective (4), More than effective (3), Effective (2), Less than effective (1) Ineffective (0).

c) **EFFICIENCY**: Refers to a measure of how economic resources/inputs (funds, experience, time, etc.) are converted into results. Efficiency generally measures the outputs, qualitative and quantitative, achieved as a result of the inputs. This usually requires comparing alternative approaches to achieving a result, to see if the most efficient approach has been used. The evaluation of the project's efficiency can be assessed evaluated through the assignment of values to the criteria such as; Highly efficient (4), More than efficient (3), Efficient (2), Less than efficient (1) Inefficient (0).

d) IMPACT: This refers to the long-term positive and negative, primary and secondary effects produced by a development intervention, directly or indirectly, intended or unintended. In other words, these effects for a road project can be reflected in an increase in land value. However, there may be negative impacts for some residents who live near the highway. These include increased noise, pollution and aesthetic impacts. The evaluation of the project's impact will be assessed in the following way through the assignment of values to the criteria of Highly satisfactory (4), More than satisfactory (3), Satisfactory (2), Less than satisfactory (1) Unsatisfactory (0). If long-term impacts are uncertain, the rating may refer to probable impacts.

e) **SUSTAINABILITY**: Sustainability means meeting our own needs without compromising the ability of future generations to meet their own needs. In addition to natural resources, we also need economic resources. Sustainability is not just environmentalism. In other words, sustainability is a holistic approach that considers ecological aspects, social and economic dimensions, recognizing that everything must be considered together to find lasting prosperity. The evaluation of the sustainability of the project was evaluated as follows through the assignment of values to the criteria such as: Highly sustainable (4), More than sustainable (3), Sustainable (2), Less than sustainable (1), Unsustainable (0).

Table No.2; The five evaluation criteria according to DAC/OECD are detailed below.

CRITERIA	*DESCRIPTION*
RELEVANCE	The extent to which the objectives of the road rehabilitation are consistent with the requirements of the beneficiaries, the needs of the country, priorities and policies of partners and donors. **What is the relevance or significance of road rehabilitation with respect to local and national requirements and priorities?**
EFFECTIVENESS	The extent to which the objectives of the road rehabilitation were achieved, or the achieved results are expected to be achieved. In other words, it refers to the extent to which a road rehabilitation has achieved, or is expected to achieve, its main relevant objectives. **How great is the effectiveness of the road rehabilitation compared to the planned objectives?**
EFFICIENCY	What was the cost or efficiency of completing the Humming bird highway, with respect to the assigned resources (funds, experience, materials, equipment, time, etc.). **How efficient is the utilization of resources in resource rehabilitation? What does the cost/benefit ratio say?**
SUSTAINABILITY	It refers to whether the benefits or positive effects of the project are likely to continue after the rehabilitation of the Humming highway. **Are the positive effects of the rehabilitation of the** Humming **highway sustainable over time?**

Fuente: Tomado de la Cooperación Austriaca para el desarrollo. CAD; (2009)

2.7 Location of the study

This study was conducted in Belize, Central America, where road infrastructure is currently under construction and remodeling. Belize as a country is the youngest, just 40 years

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of Independence recently as a nation, but making economic efforts to increase the level of productivity through the tourism industry, the export of mono crops such as Citrus, Banana, Sugar Cane and seafood (seafood).

The export of these items has been key to the growth of the Belizean economy as expressed according to data from the Belize Statistics Institute (SIB, 2021).

Furthermore; this study will be carried out precisely on the Humming bird highway. It is a modern, paved, two-lane highway that opened in 1995. The Hummingbird Highway is approximately 55 miles (88 km) long and connects Belmopan, the national capital, with Dangriga on the southeast coast. The road itself offers a panoramic view of all the different landscapes of Belize.

Illustration No.1. Location of the Hummingbird Highway



The Hummingbird Highway passes through the northern part of the Mayan Mountains, crossing several picturesque rivers and passing citrus orchards before ending a short distance from the beach on the outskirts of Dangriga. It passes through several bridges along its route, which are double lanes.

Because it is paved and well maintained, it is the fastest way to travel from the northern and western points of the country to the south eastern coast. From Belize City, the route southeast follows the Western Highway towards Belmopan in the center of the country and then the highway heads southeast until it reaches the outskirts of Dangriga on the coast. (Recuperated on September 2nd 2021: https://www.hummingbird-highway-in-belize/).

3. METHODOLOGY

3.1 Type of Research

This research employs a qualitative methodology, which consist of a proposed evaluation method that has a descriptive approach that applies the survey technique to the various stakeholders such as formulators, implementers, entrepreneurs, private transportation and public transportation travelers.

3.2 Sources of information

The primary sources of information were the data collected through surveys administered to people (formulators, implementers, and travelers in public and private transportation).

3.3 Bibliographic research

Finally, information was obtained from secondary sources through the use of books, articles, electronic journals from countries that have previously carried out studies of this nature through bibliographic research. Additionally, an evaluation matrix that relates each evaluation criterion to (Relevance, Effectiveness, Efficiency and Sustainability) was designed.

4. RESULT ANALYSIS

Table No 3; illustrates the proposed evaluation method that incorporates the five groups of stakeholders who can or should be involved in the evaluation of any development project road infrastructure. The participation of the five groups of interested parties (formulators), implementers, companies, travelers of private transport and public transport), indicates that the most fundamental impacts of transportation are related to the capacity physical to transport passengers, goods and the associated costs to support this mobility. Furthermore, this implies a better level of use of the assets of existing transport systems that benefit their users, since passengers and cargo are They transport more quickly and with less delay according to Rodríguez Jean-P. (2020),

Table No 3: The interested party, criterion, weight and evaluation sub-criterion

PARTNER	CRITERIA	WEIGHT
FORMULATORS	RELEVANCE	20
	EFFECTIVENESS	15
	EFFICIENCY	15
	IMPACT	30
	SUSTAINABILITY	20
	TOTAL	***100***
IMPLEMENTERS	RELEVANCE	20
	EFFECTIVENESS	15
	EFFICIENCY	15
	IMPACT	30
	SUSTAINABILITY	20
	TOTAL	***100***
BUSINESS	RELEVANCE	20
	EFFECTIVENESS	15
	EFFICIENCY	15
	IMPACT	30
	SUSTAINABILITY	20
	TOTAL	***100***
	RELEVANCE	20
	EFFECTIVENESS	15

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PUBLIC TRANSPORT	EFFICIENCY	15
	IMPACT	30
	SUSTAINABILITY	20
	TOTAL	***100***
PUBLIC TRANSPORT	RELEVANCE	20
	EFFECTIVENESS	15
	EFFICIENCY	15
	IMPACT	30
	SUSTAINABILITY	20
	TOTAL	***100***
PRIVATE TRANSPORT	RELEVANCE	20
	EFFECTIVENESS	15
	EFFICIENCY	15
	IMPACT	30
	SUSTAINABILITY	20
	TOTAL	***100***

Table No 4: Criterion, classification, value, interval and percentage

Criteria	Sub criteria	Value	Range	%
Relevance	Highly relevant	4	3.21 - 4.00	81 - 100
	More than relevant	3	2.41 - 3.20	61 - 80
	Relevant	2	1.61 -2.40	41 - 60
	Less than relevant	1	0.81 - 1.60	21 - 40
	Irrelevant	0	0.0 - 0.80	0 - 20
Effectiveness	Highly effective	4	3.21 - 4.00	81 - 100
	More than effective	3	2.41 - 3.20	61 - 80
	Effective	2	1.61 -2.40	41 - 60
	Less than effective	1	0.81 - 1.60	21 - 40
	ineffective	0	0.0 - 0.80	0 - 20
Efficiency	Highly efficient	4	3.21 - 4.00	81 - 100
	More than efficient	3	2.41 - 3.20	61 - 80
	Efficient	2	1.61 -2.40	41 - 60
	Less than efficient	1	0.81 - 1.60	21 - 40
	Inefficient	0	0.0 - 0.80	0 - 20
Impact	Highly satisfactory	4	3.21 - 4.00	81 - 100
	More than satisfactory	3	2.41 - 3.20	61 - 80
	Satisfactory	2	1.61 -2.40	41 - 60
	Less than Satisfactory	1	0.81 - 1.60	21 - 40
	Unsatisfactory	0	0.0 - 0.80	0 - 20
Sustainability	Highly sustainable	4	3.21 - 4.00	81 - 100
	More than sustainable	3	2.41 - 3.20	61 - 80
	Relevant	2	1.61 -2.40	41 - 60
	Less than sustainable	1	0.81 - 1.60	21 - 40
	Unsustainable	0	0.0 - 0.80	0 - 20

The proposed evaluation method seeks to standardize the evaluation criteria to the infrastructure projects and establish a statistical measure of empirical validation. Saying evaluation method, I use the descriptive and quantitative approach that applies the technique of survey of various evaluation actors such as formulators, implementers, entrepreneurs, travelers of private transport and public transport.

Considering that the reconstruction of the highway was completed exactly three years ago, it is considered it appropriate to carry out the evaluation of the end of the project, based on the five best-known evaluation criteria that simultaneously consider the five actors.

The evaluation of the project considers the criteria of relevance, effectiveness, efficiency, impact and sustainability of each stakeholder group evaluated in order to evaluate the performance using the evaluation criteria mentioned above. The evaluation of a project is carried out with the purpose of determining the relevance, as well as the compliance of objectives, development efficiency, effectiveness, impact. This evaluation will provide credible and useful information, which will incorporate lessons learned.:

a) **RELEVANCE**: Refers to the extent to which the objectives of a development intervention are consistent with the requirements of the beneficiaries, the needs of the country, the priorities and policies of partners and donor countries. The evaluation of the relevance of the Hummingbird highway project was evaluated through the assignment of values to the criteria of Highly relevant (4), More than relevant (3), Relevant (2), Less than

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relevant (1) irrelevant (0), as described later.

Highly relevant (4). The planned results of the project were completely aligned with the development priorities of the country, donor or funding agency and corporate strategies. Furthermore, the design had innovative features, value of significant demonstration for other projects or transformation effects.

More than relevant (3). The project's planned results were up to 80% aligned with the development priorities of the country, the donor or the funding agency and the corporate strategies. Furthermore, the design had innovative features, value of significant demonstration for other projects or transformation effects.

Relevant (2). The expected results of the project were largely aligned with the development priorities of the country and were Table No 8: Economic efficiency of a project based on the TIRE relevant to corporate and government strategies funding agency or donor.

Less than relevant (1). The expected results of the project were not or were no longer aligned with the country's development priorities or were not or were no longer relevant to the corporate and funding agency or donor strategies.

Irrelevant (0). The expected results of the project were not in line with the priorities and development needs of the country or with the corporate strategies and donors or corresponding financial agencies.

b) **EFFECTIVENESS**: Refers to the extent to which the objectives of the intervention were achieved development, or are expected to be achieved, considering their relative importance. In others In other words, effectiveness measures the extent to which an activity achieves its purpose, or whether it can be expect this to happen based on the products. Implicit within this criterion of effectiveness is the opportunity. Evaluating the effectiveness of the Humming Bird highway project It was evaluated in the following way, through the assignment of values to the criteria of Highly effective (4), More than effective (3), Effective (2), Less than effective (1) Ineffective (0).

Highly effective (4). The results and products objectives of the project were met and they surpassed some or all. There were no problems in the design or implementation of plans safeguard or gender action plans, if any.

More than effective (3). The results and products objectives of the project were met and They achieved up to 80%. There were fewer problems in the design or implementation of plans safeguard or gender action plans, if any.

Effective (2). The project results and products were substantially achieved (around 80% or more of the objectives were fully met or, on average, about 80% or more of each objective was met). When it cannot be demonstrated that the objectives of results have been substantially met due to data problems, the evaluation should demonstrate that product objectives have been met and there is no special reason to suspect that outcome objectives have not been met or will not be met in a foreseeable future.

Less than effective (1). There are deficiencies in the fulfillment of the results and products of the project, and the achievement was between 40% and 80% (considering changes in the scope). Serious problems with safeguards can also be a reason for a less than effective rating for the project.

Ineffective (0). Most of the planned project deliverables and/or project results (more than 80%) did not materialize.

c) **EFFICIENCY:** Refers to a measure of how economic resources/inputs (funds, experience, time, etc.) become results. Efficiency generally measures the products, qualitative and quantitative, achieved as a result of the inputs. Esto generalmente requiere comparar enfoques alternativos para lograr un resultado, para ver si se ha utilizado el enfoque más eficiente. La evaluación de la eficiencia del proyecto de la carretera Colibrí se evaluó de la siguiente manera a través de la asignación de valores a los criterios de Altamente eficiente (4), Mas que eficiente (3), Eficiente (2), Menos que eficiente (1) Inefficient (0).

Table No 5: Economic efficiency of a project based on the TIRE

Criteria	Criterion A Project with TIRE	A Project without TIRE
Highly Efficient	**The Internal** Rate of Economic Return (EIRR) is higher than the benchmark of 12% 1 (or a different reference point if approved explicitly for the project²). **Benefits** are produced at the lowest cost in comparison with industry alternatives or with the projections in the Report and President's Recommendation (RRP). **Process efficiency** is rated high If the Internal Rate of Economic Return (TIRE) is the only basis for evaluation, a TIRE of at least 18% is sufficient. **If the** Internal Rate of Economic Return (EIRR) is the only basis for evaluation, an EIRR of at least 18% is enough.	**Unit costs** were lower than sector or industry standards, or costs unitary values presented in the Report and President's Recommendation (RRP). **Alternatively**, the predicted results are achieved or exceeded with costs ignificantly lower or over a longer period shorter than planned.
	The Internal Rate of Economic Return (EIRR) is	**Unit costs** meet

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Efficient	equal to or greater than 12%, and the benefits are produced at the lowest cost compared to industry alternatives or projections in the President's Report and Recommendation (RRP), and **Process efficiency** ratings are Positive.	standards of the sector or industry, or unit costs presented in the PVP, **The planned** results were achieved within the planned costs or the period of implementation
Less than Efficient	**The Internal Rate** of Economic Return (EIRR) of the entire project is less than 12%, or The project is not likely to be the option lower cost compared to alternatives of the industry or with the projections in the President's Report and Recommendation (RRP)**.**	**The unit costs** were above the sector or industry standards (where there are reliable data available), or the costs units presented in the report and president's recommendation (RRP), or **Cost overruns** or delays are considered to have reduced the economic benefits of the project below opportunity cost

ERR = Economic Internal Rate of Return, RRP = President's Report and Recommendation.

Section G1 of the OM/OP allows a lower EIRR between 10% and 12% in cases where there are likely to be significant unquantifiable benefits. A theoretical figure of an EIRR of 18% or higher can be used as a basis for a highly efficient rating. It can be 16% if recognize significant unquantified social benefits. However, a highly rated efficient based on an EIRR > 18% (or 16%) should not have methodological problems.

d) IMPACT: This refers to the long-term positive and negative effects, primary and secondary effects produced by a development intervention, directly or indirectly, intentional or unintentional. In other words, these effects for a road project can reflected in an increase in land value. However, there may be negative impacts for some residents who live near the highway. These include increased noise, pollution and aesthetic impacts.

The evaluation of the impact of a project will be evaluated in the following way through the assigning values to the criteria of Highly satisfactory (4), More than satisfactory (3), Satisfactory (2), Less than satisfactory (1) Unsatisfactory (0). If the long-term impacts are uncertain, the rating may refer to probable impacts. The qualifications must be assigned as follows:

Highly satisfactory (4); There is clear evidence that the project has had impacts of positive developments beyond the expectations indicated in the RRP and there are no impacts negatives.

More than satisfactory (3); There is evidence that the project has had impacts of positive development up to 80% of the expectations indicated in the RRP and there are no impacts negatives.

Satisfactory (2); The project is likely to have positive development impacts, such as it was expected. Negative impacts, if any, were minimal relative to the project profits.

Less than satisfactory (1); The project may have had some development impacts positive, but they were smaller or did not exceed the negative impacts.

Unsatisfactory (0); The project has had very few positive impacts or its impacts Negative outcomes substantially outweigh any positive development outcomes.

e) SUSTAINABILITY: Sustainability means meeting our own needs without compromise the ability of future generations to meet their own needs. In addition to natural resources, we also need economic resources. The Sustainability is not just environmentalism. In other words, sustainability is an approach holistic that considers ecological aspects, social and economic dimensions, recognizing that everything must be considered together to find lasting prosperity. The evaluation of the sustainability of the Humming Bird highway project was evaluated through the assignment of values to the criteria of Highly sustainable (4), More than sustainable (3) Sustainable (2), Less than sustainable (1), Unsustainable (0).

Highly sustainable (4); It is expected that all significant achievements related to your development objective are maintained throughout the economic life of the project. The specific and robust features were included in the project design or during the execution that will most likely ensure its economic sustainability.

More than sustainable (3); It is expected that up to 80% of significant achievements related with its development objective are maintained throughout the economic life of the project. The specific and robust features were included in the project design or during the execution that will most likely ensure its economic sustainability.

Sustainable (2); It is expected that most of the significant achievements of the project will be maintain during the economic life of the project. Satisfactory features included aimed at ensuring its economic sustainability.

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Less than sustainable (1); Some of the significant achievements of the project are not expected to are maintained throughout the economic life of the project; Few features included either during design or execution to ensure its financial performance and/or economic sustainability.

Unsustainable (0); Few, if any, of the project's achievements are likely to be keep. No features were included to ensure its financial sustainability.

F) GENERAL RATING: The weight of the criteria is relevance (20), effectiveness (15) efficiency (15), Impact (30) Sustainability (20). It is determined by adding the qualifications of the five basic criteria of relevance, effectiveness, efficiency, impact and sustainability (Table 4).

Under each core criterion, the ratings of the four descriptors are translated into a whole number score between 0 and 3. The overall project evaluation score is a weighted average of the score values of the five core criteria and, therefore, it ranges between 0 and 3.

Highly successful (4). The overall weighted average of the rating values of the basic criteria is greater than or equal to 3.21. This rating is awarded to projects whose achievements exceed expectations and where there is a high probability that the results and the impact are maintained throughout the life of the project; the project is still relevant; and I don't know have produced nor are they likely to produce significant unintended negative effects.

More than successful (3). The overall weighted average of the rating values of the basic criteria is greater than or equal to 2.41 and less than 3.20. This rating is awarded to projects whose achievements exceed some expectations and where there is an average probability that results and impact are maintained throughout the life of the project; the project remains relevant; and no significant unwanted negative effects have occurred.

Successful (2). The overall weighted average is greater than or equal to 1.61 and less than 2.40. Although the result may not have been completely achieved or there may have been some minor negative results, no major deficit has occurred and the result and the Expected impacts will generally be achieved and maintained over the life of the project. He projects remains relevant and its implementation and operations are efficient. The Negative impacts, if any, are minimal relative to project profits.

More than successful (3). The overall weighted average of the rating values of the basic criteria is greater than or equal to 2.41 and less than 3.20. This rating is awarded to projects whose achievements exceed some expectations and where there is an average probability that results and impact are maintained throughout the life of the project; the project remains relevant; and no significant unwanted negative effects have occurred.

Successful (2). The overall weighted average is greater than or equal to 1.61 and less than 2.40. Although the result may not have been completely achieved or there may have been someminor negative results, no major deficit has occurred and the result and the Expected impacts will generally be achieved and maintained over the life of the project. He projects remains relevant and its implementation and operations are efficient. The Negative impacts, if any, are minimal relative to project profits.).

Less than successful (1). The general weighted average is greater than or equal to 0.80 and less than 1.60. Although there has been a significant deficiency in achieving the outcome and impact of the design and complete sustainability is unlikely, some project components will provide significant benefits (e.g., equivalent to at least half the level originally expected).

No success (0). The overall weighted average is less than 0.80. The project is a technical failure and/or economic. The achievement of results is minimal. It is expected that the installed facilities, if there are, operate below design capacity or at high cost, requiring a large subsidy.

Table4.Summary table of evaluation criteria

#	Criteria	Weight	Ratings	%
1	**Relevance**			
2	**Effectiveness**			
3	**efficiency**			
4	**Impact**			
5	**Sustainability**			

5. CONCLUSION

5.1 Ex-pos method

The proposed expos evaluation method was validated by reviewing the content of its components: type of stakeholders or actors [formulators, implementers, businessmen, travelers of private transport and public transport] evaluation included and the way of preparing the samples according to impacts, evaluation criteria, form of measurement and weighting.

The proposed evaluation method considers the criteria of the relevance, effectiveness, efficiency, impact and sustainability of each stakeholder group evaluated with the purpose of evaluating performance using the criteria already mentioned, considered to have passed the reliabilitytest, ensuringthat the analysis results are stable and trustworthy.

6. LESSONS LEARNED

6.1 Strategic

It is very important to have defined and direct strategic objectives that measure the effectiveness and efficiency of the results of any infrastructure project to provide feedback to the appropriate department to make the necessary amendments to improve the process. An evaluation model is required that incorporates the stakeholder groups, the criteria and the design of measurement instruments through an evaluation matrix.

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The absence of policies and budget for the monitoring and evaluation of health projects public infrastructure, limits the obligation to tender the process publicly to increase the participation of capable people who could carry out the required evaluation. The scoring of each criterion allows the audit team, executors and parties interested parties see where the weaknesses and strengths are to give positive reinforcement necessary to improve in the future.

7. RECOMMENDATIONS

7.1 Evaluation method

The proposed evaluation method can be used for expos evaluation, which incorporates the five groups of stakeholders (formulators, implementers, entrepreneurs, travelers in private transport and public transport). Additionally, the evaluation Effectiveness of a project requires that the standards, criteria and evaluation indicators are established during the early stages of the project planning process (Kati Kaare, Ott Koppel; 2014, Pg. 185).

7.2 Further Research

1. Future research is recommended to involve auditors from the government agency as well as the financial donors. This would help ensure that theresults are more representative and can be generalized at the national level.
2. Future studies are expected to minimize potential bias by utilizing secondary and objective data or external assessments of audit performance, rather than relying solely on respondents' perceptions.

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