



## **Benchmarking Evaluation of Environmental Impact Assessment Studies Case Study: New Burg El Arab City– Alexandria – Egypt**

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### **Abstract**

Environmental impact assessment (EIA) is one of the great significance tools to achieve environmental sustainability. The objective of this research was to investigate the effectiveness of EIA practice in Egypt, through evaluation of the produced environmental impact statement (EIS) reports in New Burg El Arab City (Case study) using the Lee & Colley EIS review package. The study focuses on a comparison between different EIA studies conducted by the Egyptian Environmental Affair Agency (EEAA) and the Industrial Development Authority (IDA), emphasis areas for improving the EIA report quality, and make suggestions for future improvements. The Lee and Colley's EIS review package were modified to evaluate both EIA complete studies (B Scope, C and high-risk industrial projects) and EIA forms (A, B and low-risk industrial projects) in Alexandria, Egypt. The first modification of the EIS review package was used to evaluate the quality of (75) EISs complete study produced during the years 2016 and 2022. The results of This EISs evaluation revealed that approximately 75% of the total samples were satisfactory in quality. (36 EISs) 48% were good, (33 EISs) 44% borderline, (6 EISs) 8% poor. The second modification of the EIS review package was used to evaluate (80) environmental classification forms (A and B) during 2016 (EEAA) and to evaluate (100) low risk industrial projects during the period 2017-2022. The environmental classification forms (A and B) were evaluated that were submitted to the concerned Alexandria branch of the EEAA, and it was found that about 91% of the EIS samples were of acceptable quality. Of these (44 EISs), 55% were good, (36 EISs), 45% were border line. Moreover, the evaluation of low-risk industrial projects indicated that about 56% of the EISs samples were of acceptable quality. Of those (31EISs) 31% were good, (33EISs) 33% were borderline and (36EISs) 36% were poor. The research presents suggestions and recommendations for enhancement of EIA process in Egypt. The use of EIA guidelines, EIS reviewing criteria, environmental monitoring program, EIA consultant's accreditation, consideration of alternatives and public consultation, all ensue an effective EIA system in Egypt along with protecting our environment /natural resources for us and further generation.

**Keywords:** Environmental Impact Assessment (EIA), Effectiveness, Quality of EIA reports, New Burg El Arab and Egypt.

## **Introduction**

Environmental Impact Assessment (EIA) is a process by which the likely environmental impacts (all types) of proposed development can be evaluated early in decision-making to support sound environmental management. The EIA system was created because of growing concerns regarding the environmental effects of major industrial, agricultural, and urban developments. The USA was the first country to establish an environmental protection law, in 1969, by the National Environmental Policy Act (NEPA). Then, EIA systems were introduced in many countries worldwide. The EIA process is often based on the same principles all over the world, but its implementation in developing countries is often less than international standards. Deficiencies in adapting EIA in developing countries include insufficient consideration of environmental effects, alternatives, and public participation and hence, concerns are raised about whether EIA influences decision-making. Many negative environmental impacts, including pollution emissions, water contamination, soil deterioration, inadequate sanitation, and health risks from industrial effluents appear because of the failure to implement environmental legislation.

Several developing countries, including Egypt (**Badr et al., 2011**), Tanzania (**Mwalyosie and Hughes, 1998**), Ghana (**Appiah-Opoku, 2001**), Vietnam (**Doberstein, 2003**), Malawi (**Mhango, 2005**), Pakistan (**Nadeem and Hameed, 2006**), South Africa (**Kruger and Chapman, 2006; Sandham, Moloto and Retief, 2008; Sandham Siphugu and Tshivhandekano, 2005B**), Myanmar (**AUNG and Thiri Shwesin, 2017**), Brazil (**Loomis and Dziedzic, 2018**), and Bangladesh (**Kabir, Zobaidul, and Imran Khan 2020**), have carried out researches on the EIA effectiveness including quality of the produced EIA reports. The results of such research indicated that there are still areas for improvement to introduce good-quality EIA reports. Given that Egypt is characterized by rapid industrial expansion and urbanization, it shows us the importance of reviewing the quality of the produced EIA reports. Therefore, such research will help to highlight the strengths and weaknesses of the practice of EIA in Egypt and give us the opportunity to continuously improve EIA in practice. According to **Petts (1999)**, effective public consultation should involve two-way communication between developers and the public, as well as between government, environmental agencies, and local communities. To ensure quality control, the review phase of the EIA process is crucial, as it ensures that the data and information regarding proposed environmental impacts in the EIA report are sufficient before the report is used to make further decisions (**Fuller, 1999**). **Ahmad and Wood (2002)** suggest that methods for ensuring objectivity should include using EIS audit standards, accrediting EIA consultants, establishing an independent review body, and involving public consultations. The EIA process involves a crucial step of decision making which involves either accepting or rejecting a project. Research on EIA evaluation conducted globally reveals that projects subject to mandatory EIA are rarely turned down or canceled before approval, and that the influence of EIAs on decision-making is somewhat restricted, according to **Jay et al. (2007)** and **Polonen (2006)**.

Currently, both the Egyptian Environmental Affairs Agency (EEAA) and the Industrial Development Authority (IDA) are responsible for administering the EIA studies in Egypt. The EEAA classifies EIA project applications into three classes, A, B and C, according to the riskiness of expected environmental effects. In 2016, the EEAA divided projects into four divisions according to the riskiness of their probable environmental effects (decree of Chief Executive Officer of EEAA 26 of 2016) A, B, B scope and C list. First, division (A): Projects with minimal environmental effects, which are required to complete Form A. Second, division (B): Projects with potentially harmful but less harmful than category C, are required to

complete Form B. Third, division (B) scoped: projects with adverse effects, which are required to prepare a scoped EIA study. Fourth, division (C): projects which have extremely adverse effects and are requested to prepare a complete EIA study. In May 2017, Minister of Industry Decision No. 1 of 2017 issued a law to facilitate procedures for granting licenses to facilities. Industrial and its executive regulations by Resolution No. 1082 of 2017, after which the Industrial Development Authority (IDA) divided projects into two categories. Firstly, low-risk industrial activities and the limited environmental effects study submitted for review and approval by the IDA within 10 working days of completing the data. Secondly, high-risk industrial activities submit a complete EIA study for review and approval by the EEAA. Therefore, the main aim of the current study is to investigate the effectiveness of the Egyptian EIA in practice, through evaluation the produced EIA reports using the Lee & Colley EIS review package. The study focuses on comparison between different EIA studies conducted by EEAA and IDA in New Burg El Arab City as a case study. This study identifies prospective areas for EIA report quality improvement, draws conclusions, and offers ideas for further advancements of EIA system in Egypt.

## **Materials and Methods**

### **Review the quality of the EIA for categories B scope, C and high-risk industrial projects**

This study used the evaluation of the EISs quality as a dependable measure of the EIA process' performance in Alexandria Governorate, which serve as an indicator of how EIA system is being implemented in Egypt. A modified version of Lee and Colley's EIS Review Package was used to assess the quality of the selected EISs (Lee et al., 1999). Minor adjustments were made to the evaluation package to align with the specifications of the Egyptian EIA system and to enable comparison with research conducted in other countries. These modifications involved adding a new review category (1.6, relevant environmental law and/or licensing requirements governing this process) and are view sub-category (3.3.3, Environmental Management Plan (EMP), to ensure real implementation of mitigation measures and monitoring program). The audit process employs a rating system, ranging from grade A to F, to assign quality scores (Table 1) to different elements of the EIS, based on the structural auditing standards (Fig. 1) that make up The Lee and Colley EIS review package. The review package includes four main areas, each review area with several categories, and category with several subcategories.

The four primary areas of review are as follows: First, description of the development, local environment, and baseline circumstances, second, identification and assessment of the major impacts, third, alternatives and mitigation measures, and fourth, results communication. Full EIA studies were reviewed during the period from 2016 to 2022 and were done by reviewing the studies during the years 2016 and 2022 according to Table 2. The types of activities / projects that were reviewed during the two years include the following: infrastructure projects; health projects; industrial projects; petroleum projects; tourism projects; energy projects; and land reclamation.

The total number of EISs selected was 25 EISs in 2016, representing 4.95%, and 50 projects in 2022, representing 2% of the total number of studies B scope, C in 2016, then B scope, C, high risk in 2022 for analysis in this research. One of the main study aims was reviewing an unbiased representative EISs sample introduced for this project types between 2016 and 2022. The availability of category C project types, however, limited the EISs sample number for some projects such as agricultural development and landfill. Thus, the number of EISs complete study for this project category was (75) including the following: (55) EISs for various industrial projects, (7) EISs for main infrastructure, (5) EISs for energy sector, (5) EISs

for tourism developments, (2) EISs for solid waste landfilling and (1) EIS for agricultural projects. Additionally, relevant information was gathered including the EIS's publication date, its length, its language, and the consultant's expertise in completing EIAs for each EIS sample.

Table 1. Evaluation symbols used in Egyptian EIS quality assessment according to **Lee et al., 1999**.

Symbols	Meaning
A	Perform related tasks well with no essential jobs are missing unfinished.
B	Overall fine / complete, but with minor exclusions/ shortcomings
C	Considered acceptable despite of exclusion and/or shortcomings
D	Portions have been done well, but considered unacceptable due to exclusions or shortcomings
E	Not acceptable, the important(s)jobs were poorly accomplished or not done
F	Highly unacceptable as essential job (s) was poorly performed or not done.
NA	Refer to un-applicable tasks.

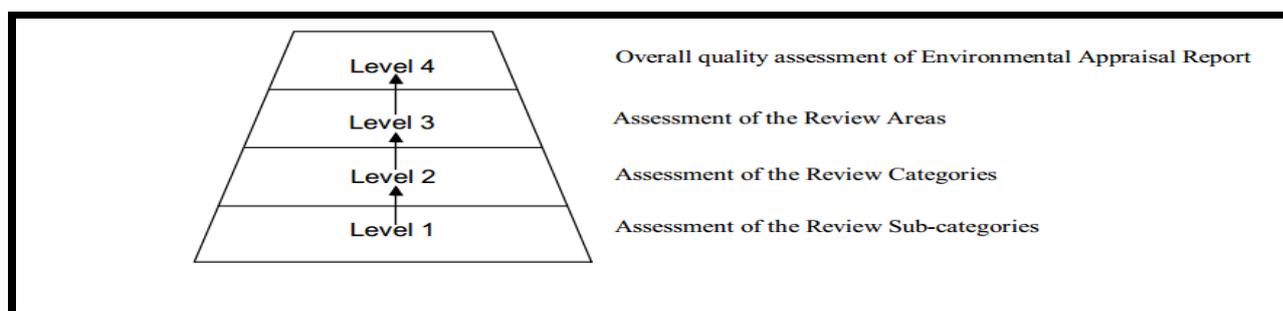


Fig.1. The evaluation pyramid (environmental statements) used in reviewing EISs in Egypt.

Table 2. Number of the Environmental Impact Statements (EIS) submitted to the Egyptian Environmental Affairs Agency (EEAA) during the years 2016 and 2022.

The year	Total EIS number	No. of EIS studied
2016	505	25(4.95%)
2022	2616	50(2%)

### Reviewing the quality of the EIA for categories A, B and low risks industrial projects

The quality of the selected EISs for forms A and B, and low-risk industrial developments was reviewed using a modified version of Lee and Colley's EIS Review Package to be applicable for the Egyptian EIA process and the results to be comparable with similar research findings. These modifications include adding a new review category (1.6, Relevant Environmental Law and Standards) and a subcategory (3.3.3, EMP Mitigation and Monitoring Proposals); along with deleting Categories 2.2, 2.3 and 2.4 as the severity of

impacts is weak or moderate and does not require scoping or general advice on A, B, or low Risk and also omit Categories 4.1 and 4.4 as they are not a requirement of Section A and B and Low Risk.

Reviewing EIA forms, A and B, as well as scoped and full environmental impact studies (B scoped and C), used to be done by the main branch of EEAA in Cairo. However, after the amendment of the 1994 Law to become Law 9 of 2009, the responsibility for reviewing environmental impact assessment forms A and B was transferred to the regional branches of the Environmental Affairs Agency. On the other hand, the categories B scope and C review in the main branch in EEAA as shown in Table 3. The number of EIA forms for divisions (A and B) mentioned in Table 3 represents the number of forms submitted to the central administration in Cairo as well as to the regional branches of the EEAA. Therefore, the number of forms submitted to the regional branch in Alexandria is difficult to determine, and we selected a random sample of 80 of the A and B forms (EEAA) submitted to the regional branch in Alexandria, which represents about 2.5% of all forms submitted to the Ministry of Environment in 2016, and given that in 2017 a limited environmental proposal study is submitted for industrial activities and form B for service activities and warehouses, forms A and B were evaluated in 2016 only.

Table 3. Number of each Environmental Impact Statements (EIS) category submitted to the EEAA in 2016.

<b>Category</b>	<b>Total EIS number</b>
Division A	20
Division B	3206
Division B scope	383
Division C	122
The total number	3731

The number of studies related to the study of the limited environmental proposal for industrial activities submitted to the IDA from 2017 to 2022 is unknown, and therefore (18) annual samples were taken, with a total of (90) studies for a period of five years from 2018-2022, and (10) studies for the year (2017) Thus, the total number of samples for the limited environmental proposal study (IDA) is (100) studies from 2017-2022.

## **Results and discussion**

### **EISs classes B scope, C and high-risk industrial projects**

Table 4 indicates the proportion of EISs that received an acceptable rating (A, B, or C overall grade) and an unacceptable rating (D, E, or F overall grade). These findings demonstrate that out of the sampled EISs, 75% (56) were of acceptable quality. Additionally, within the sample, 48% (36) of the EISs were rated as good, 44% (33) as borderline, and only 8% (6) were rated as poor overall. Fig. 3 represents the percentage of acceptable and unacceptable EISs reports regarding the four main review areas.

### **First, Development description, local environment, and baseline circumstances (Area 1)**

Review area 1 had the highest performing evaluation tasks, with 89% (66) of the sampled EISs receiving an acceptable rating and a higher proportion of EISs rated as good (52%, 39) than any other review area (Table 4, Fig. 2 and Fig. 3). This finding is consistent with previous studies on EIS quality reviews (**Barker and Wood, 1999; Cashmore et al.,**

2002; Badr et al., 2011). The problems in this area relate to the disclosure of data on the anticipated duration of various project phases (construction or operation), the number of workers involved, raw material transportation method, approximate quantities of raw materials and products, and waste generation measurement methods, as well as relevant basic environmental data.

Table 4. Summary of results from 75 complete Environmental Impact Assessment (EIA) report case studies for classes B scope, C and high-risk industrial activities in Alexandria, Egypt.

Review Category	Area	Good		Border line		Poor		% acceptable (A -C)	% Unacceptable (D-F)
		A	B	C	D	E	F		
<b>Summary of preliminary grades</b>									
1.1 Development description	Area 1	60	0	8	7	0	0	91	9
1.2 Description of the site		60	0	0	0	0	15	80	20
1.3 Wastes and emissions		0	25	27	23	0	0	69	31
1.4 Description of the environment		5	40	23	7	0	0	91	9
1.5 Baseline references		15	33	27	0	0	0	100	0
1.6 Relevant environmental law		0	0	75	0	0	0	100	0
<b>Summary of grades of Area 1</b>		<b>23</b>	<b>16</b>	<b>27</b>	<b>6</b>	<b>0</b>	<b>3</b>	<b>89</b>	<b>11</b>
2.1 Definition of Impacts	Area 2	4	15	33	23	0	0	69	31
2.2 Assessment of Impacts		7	20	21	30	4	0	64	36
2.3 Scoping		10	22	10	13	10	10	56	44
2.4 Prediction of impact magnitude		15	15	5	21	19	0	47	53
2.5 Evaluation of impact significance		5	10	25	15	5	10	53	47
<b>Summary of grades of Area 2</b>		<b>8</b>	<b>17</b>	<b>19</b>	<b>19</b>	<b>8</b>	<b>4</b>	<b>58</b>	<b>42</b>
3.1 Alternatives	Area 3	13	16	20	13	3	10	65	35
3.2 Scope and Effectiveness of		10	20	19	14	7	5	65	35
3.3 Commitment to Mitigation		18	18	17	10	10	2	71	29
<b>Summary of grades of Area 3</b>		<b>14</b>	<b>18</b>	<b>19</b>	<b>16</b>	<b>6</b>	<b>2</b>	<b>68</b>	<b>32</b>
4.1 Layout	Area 4	36	12	17	8	2	0	87	13
4.2 Report presentation		38	18	5	14	0	0	81	19
4.3 Emphasis		30	16	20	9	0	0	92	8
4.4 The non-technical summary		32	17	14	12	0	0	84	16
<b>Summary of grades of Area 4</b>		<b>34</b>	<b>16</b>	<b>14</b>	<b>11</b>	<b>0</b>	<b>0</b>	<b>85</b>	<b>15</b>
<b>Final Grade For EIA</b>		<b>20</b>	<b>16</b>	<b>20</b>	<b>13</b>	<b>4</b>	<b>2</b>	<b>75</b>	<b>25</b>

Revision category 1.1 "development description" which entails defining the goal, design, and other aspects of the development, is an example of a straightforward activity that tends to perform well. Such descriptive tasks tend to have greater quality, according to earlier studies, such as in Egypt (Badr et al., 2011) and Ethiopia (Ebissa et al., 2022). On the other hand, tasks requiring quantitative data tend to be more problematic (Lee et al., 1999). Category 1.2 was rated acceptable by 80% and poor by 20%, with issues identified in subcategories 1.2.3 (failure to address post-closure activities) and 1.2.5 (failure to mention transportation methods or quantities of raw materials and products).

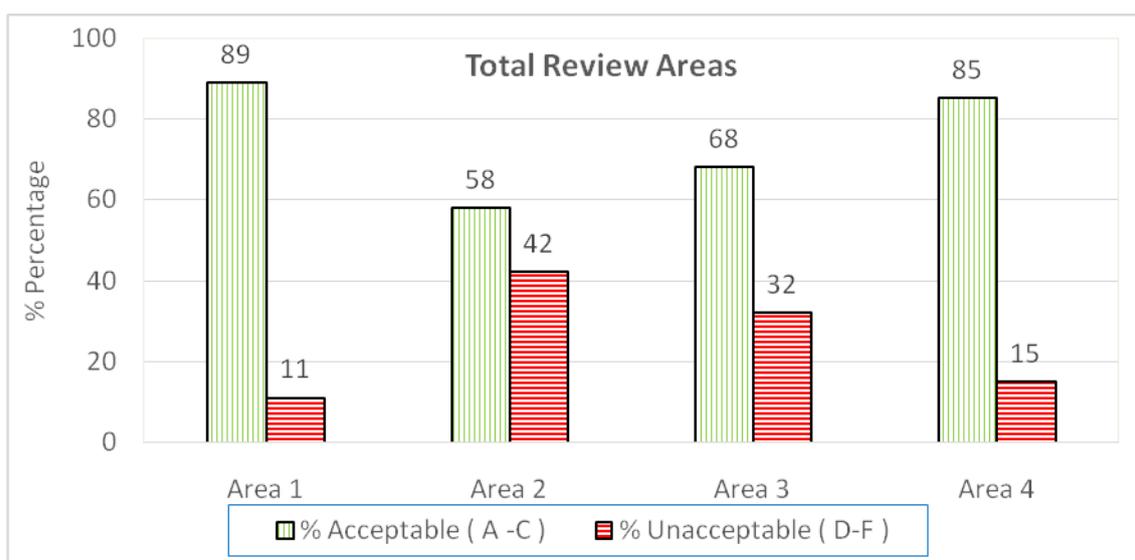


Fig. 2. Results of the total Review Areas of the complete EIA study reports in Alexandria, Egypt.

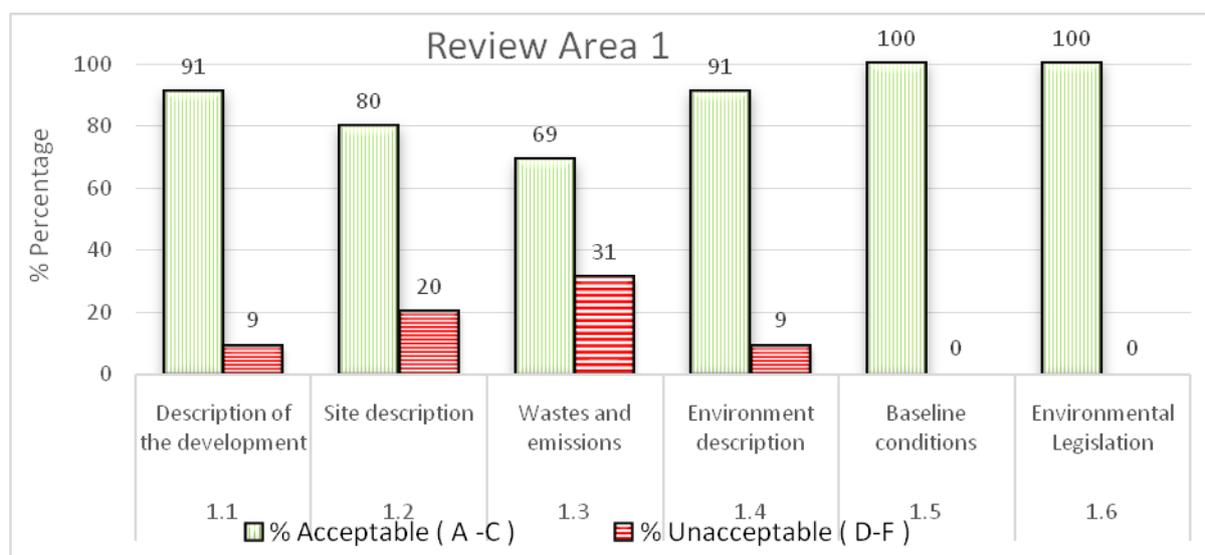


Fig. 3. Results of review area 1 of the complete EIA study reports in Alexandria, Egypt.

Review Category 1.3 "Waste and emission" which typically requires quantitative data, had the lowest performance among all review categories, with 31% (23) of the sampled EISs receiving an unacceptable rating. Prior research suggests that understanding the project's production rate is crucial, as it determines input and output volumes, product and by-product use, and waste generation (Shahbazi, 2015). Tasks that require more resources tend to be less efficient to perform. For instance, in category 1.5, describing baseline (reference) conditions, only 58% (38) of cases received a good rating, and several issues need to be considered in the baseline data of a project, as observed in Ethiopia (Ebissa et al., 2022).

## **Second, Identification and assessment of the major impacts (Review Area 2)**

This was the lowest-performing audit area, with only 58% (44) of EIS reports rated as acceptable and 42% (31) rated as unacceptable (Table 4). General shortcomings noted in review area 2 include failure to articulate and quantify environmental effect types, inadequate interpretation of impact assessment methodology, and failure to specify the scoping techniques or to explain problems identified outside of the study. Category 2.1 related to the definition of effects was evaluated as acceptable with 69% (52 EIS) and 25% (19 EIS) being good and 75% (56 EIS) being borderline. The reason for this is due to the consultants' interest in defining the main direct negative effects without paying attention to the indirect, cumulative, short, medium-term, temporary, or positive effects. Category 2.2 is rated as acceptable with a score of 64% (48EISs) and is the second best in Area (2). All EIAs described negative effects using regular ruling and their consultants experience as the method without using schematic methods (for example, checklists, matrices, grids, overlays) and next ticklish analysis to select a project option with minimal or no negative effects. Also, failure to merge geo-models such as GIS / RS with other methods of impact assessment hinders the description of the full effect and thus the identification of a project that has no or minimal negative effects and this is the same result according to **Anifowose et al. (2016)**.

Evaluation category 2.3 for scoping was rated acceptable for 56% (42 EIS) of the samples. The EIA process' public consultation procedures were deemed to be troublesome, with over a third of the sampled EISs rated as unacceptable. This is due to issues with the methodology of public consultation, community participation, and the involvement of citizens and project stakeholders in the planning and implementation phases of the evaluation process. Impact magnitude prediction (review category 2.4) was one of the key flaws in this review area, with 47% (35) of the sampled EISs receiving an acceptable evaluation. Table 4 and Fig. 4 indicate that only 64% of the EIA reports attempted to predict the severity of impact satisfactorily (impact identification). The most crucial element of an EIA has been determined to be the assessment of effects' significance (**Sadler, 1996; Wood, 2008**).

Significance evaluation was also the second lowest performer in review area 2, with 53% (40) of the EISs receiving an acceptable rating (Table 4). It is challenging to evaluate the impact's significance, but it also hinders the evaluation of mitigation measures' effectiveness and makes it difficult to prioritize specific effects. As a result, review area two's total performance was poor in quality since it involved the most challenging tasks, including impact projection, significance appraisal, scoping, and public engagement. This finding is consistent with previous similar studies on EIS quality reviews (**Badr et al., 2011; Ebissa et al., 2022**).

## **Third, Alternatives and mitigation measures (Review Area 3)**

Approximately, 68% (51) of the sampled EISs were rated as acceptable for consideration of alternatives and mitigation, with 43% (32) receiving a good rating (Table 4). However, almost half of the analyzed EISs (41%, 31) were rated as borderline, indicating substantial room for improvement. Consideration of the available alternatives (Category 3.1) was weak, with over a third of the sampled EISs (35%, 26) rated as unacceptable. This is a recognized issue internationally and is often a result of conducting the EIA process late in the project design cycle, after many key project characteristics were determined (Glasson et al., 2005). Monitoring program (subcategory 3.3.2) was rated as acceptable in 71% (53) of EISs cases. Category 3.3, Commitment to Mitigation, was the strongest review category in this area, with

71% (53) of the sampled EISs receiving an acceptable rating, and 48% (36) receiving a good rating (Table 4 and Fig. 5).

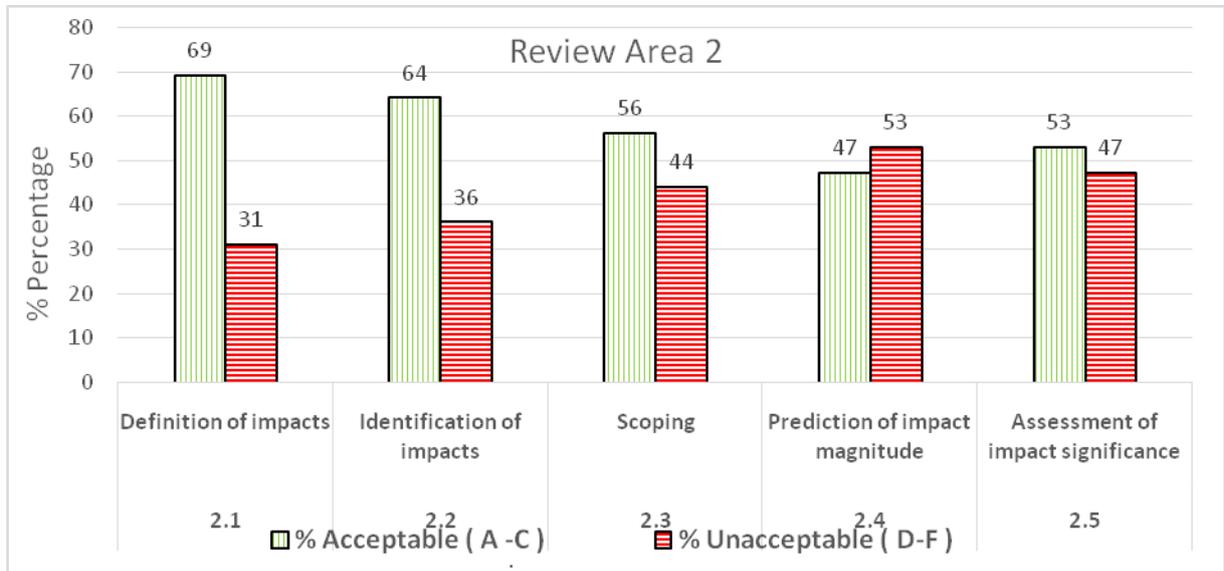


Fig. 4. Results of review area 2 of the complete EIA study reports in Alexandria, Egypt

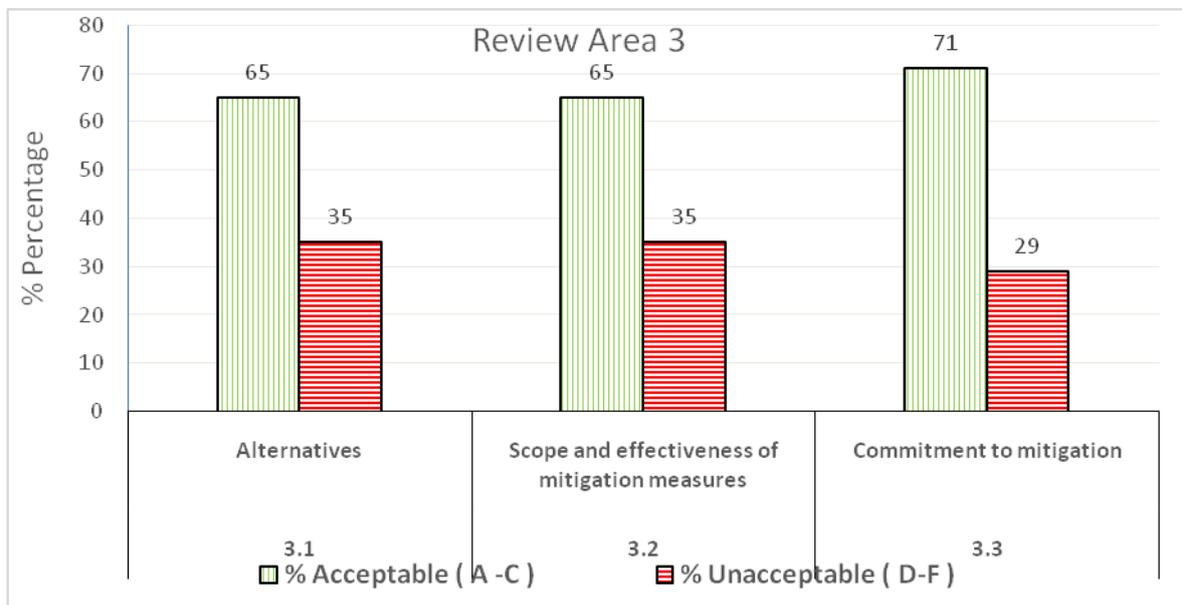


Fig. 5. Results of review area 3 of the complete EIA study reports in Alexandria, Egypt.

#### Fourth, Communication of EIA results (Review Area 4)

Communication of EIA result was the second highest review areas, with 85% (64) of the sampled EISs receiving an acceptable rating (Table 4 and Fig. 6). Tasks connected to the general organization, planning, and EIS submission (i.e., review categories 4.1 and 4.2) tend to perform well, according to previous quality review studies (Badr et al., 2011; Barker and

Wood, 1999; Lee et al., 1999). On the other hand, providing an acceptable non-technical summary (review category 4.4) was done well, with 84% (63) of the sampled EISs being evaluated as acceptable. This is a good step because proper communication of EIA results requires adequate non-technical summary. However, the worst-performing tasks in the fourth review area include glossary use, chapter summary, and citing references.

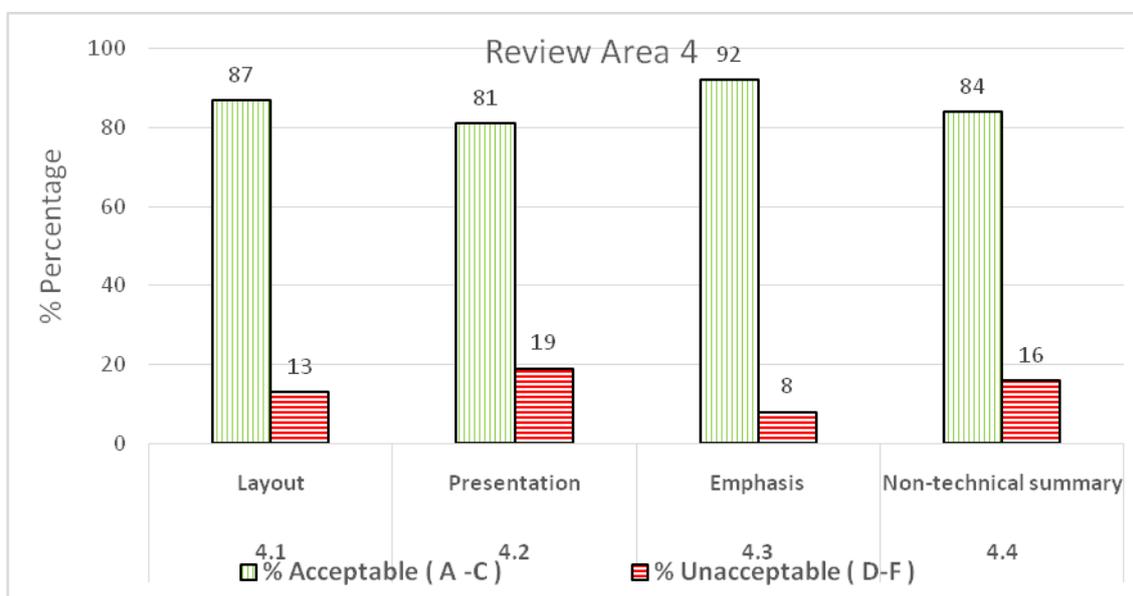


Fig. 6. Results of review area 4 of the complete EIA study reports in Alexandria, Egypt

### **EIA complete study (B scope and C) Key findings of EIA complete reports**

The evaluation of 75 EISs reports produced in Alexandria, Egypt from 2016 to 2022 for a high-risk industrial activity and category C and B scope revealed that 75% of the sampled EISs were of acceptable quality. Table 5 compares the findings of this study with other published review studies that utilized the same assessment review criteria. According to the current study, EIS quality findings in Egypt are similar with those of more recent research carried out in other nations, including the UK and other EU countries (Table 5). For instance, **Badr et al. (2004)** found that 68% of the EIA reports investigated in the United Kingdom from 1993 to 2001 were of acceptable quality, whereas **Barker and Wood (1999)** reported that 71% of the studied EIA reports selected from EU countries between 1994 and 1996 scored satisfactory in quality.

Results for the four Lee and Colley review domains showed that the order of the four performance appraisal domains with respect to performance preference is as follows - the best performing appraisal tasks were identified in review area 1, “development description, local environment, and baseline conditions” followed by the fourth review domain, “reporting EIA results” and then reviewing the third area, “consideration of alternatives and mitigation measures”. The least acceptable review domain was the second one, ‘identification and evaluation of key environmental effects’. The results of the current study are qualitatively consistent with those of several other studies on the quality of EIS; This means that descriptive and episodic jobs tend to be performed well, whereas poor performance is noted for basic quantitative and complex jobs.

Table 5. The changes in Environmental Impact Statements (EIS) overall quality of the current study in comparison with previous studies in the literature.

Authors	Years EIS produced	EISs number	Country	% Acceptable
Current research	2016 to 2022	75	Egypt	75%
Badr et al., 2011	2000 to 2007	45	Egypt	69%
Sandham and Pretorius, 2008	Unknown	28	South Africa	86%
Badr et al., 2004	1993 to 2001	50	United Kingdom	68%
Cashmore et al., 2002	1990 to 1999	72	Greek	40%
Barker and Wood, 1999	1990 to 1991	56	EU countries	50%
	1994 to 1996	56		71%
Lee and Dancy, 1993	1988 to 1991	83	United Kingdom	43%
Lee and Colley, 1992	1988 to 1989	12	United Kingdom	25%

### Factors controlling EIA process overall quality

Some elements influencing the quality of EIA studies include: - the nature and scale of projects; Consultant experience; EIS length; public participation; and EIA follow-up. The quality of environmental information systems introduced in Egypt seems to vary according to the types, nature of projects, according to (Badr, et al. 2011) and in Ethiopia according to (Ebissa et al., 2022). Previous research suggests that the quality of an EIS may be linked to its length (Cashmore et al., 2002; Lee and Dancy, 1993). In the current study, the reviewed EISs had a length range of 70-350 pages, and the quality of the study was related to its length. The average acceptable EIS was approximately 200 pages and met all the requirements, while the average unacceptable EIS was around 80 pages and did not cover all the requirements. It is worth noting that in 2016, the average page count for EISs ranged from 120-350 pages, and they were evaluated within 30 days, while in 2022, the EIS page count ranged from 70-250 pages.

Consultants and expertise must be accredited by the Environmental Affairs Agency, which has helped improve the EIA process. According to Article (13) bis of Law No. 9 of 2009 regarding the protection of environment and its executive regulations; "those who are not licensed by the EEAA are prohibited from working in environmental works". There are many individual EIA consultants, who are working independently, but there are just a few environmental consulting companies (Badr, 2009). Public participation is important to improve EIA effectiveness. After preparing a draft study for the environmental impact evaluation, the concerned parties are involved, including the EEAA and its regional branches, the competent administrative authorities - the governorate - the local people's councils - representatives of the establishments affected by the project – NGOs and governmental organizations interested in environment protection - universities or local research agencies - other parties concerned. This study revealed that the public consultation sessions do not represent all the interested groups.

EIA monitoring and follow-up provides constructive feedback to improve EIA quality. The EEAA has taken many measures to monitor and improve the environment, as well as follow-up to evaluate the EIA practices in Egypt as follows. First, increasing the number of monitoring stations to 120 monitoring stations and increasing the number of industrial establishments linked to the national network for monitoring industrial emissions. Second, accessing industrial establishments with 454 environmental monitoring points. Third, increase the number of noise monitoring stations to 40. Fourth, linking several industrial establishments to the real-time monitoring network to monitor the quality of the water of the Nile and the lakes, as the number of stations in the network reached 25 real-time monitoring stations. Fifth,

follow up and inspection of 3037 establishments in cooperation with the various authorities in the country. Lastly, provide technical support to 344 establishments and follow-up evaluation of the environmental status of 157 establishments.

### **Classes A and B (EEAA) and Low-risk industrial projects (IDA)**

Results of the 80 EISs (forms A and B) and the 100 EISs of low-risk industrial developments are presented in Table 6 and Fig. 7. These results indicated that review area 1 was well done followed by review area 4. On the other hand, review area 2 was the worst with an unacceptable score of 100%, followed by review area 3 with an unacceptable score Acceptable is 44%. Moreover, the four review areas performed well for the models (A and B), with revision area 4 being the least performing at 75% acceptable, followed by revision area 3 with unacceptable score of 95%, whereas review area 2 and 1 with acceptable scores of 96% and 99% respectively.

An evaluation of the EIA reports has found that the identification and analysis of effects during the evaluation process are inadequate. Frequently, the significance of effects is not properly evaluated, and project alternatives are not formally considered. Without predicting and justifying the importance of an effect, it is challenging to determine which consequences of a project are crucial and require priority. Final reports often do not address general interests, which hinders the evaluation's ability to focus on vital issues, interventions, and influences. This problem has arisen due to the increase in inexperienced practitioners undertaking environmental impact evaluation. Formal scores are rarely adhered to, and public participation is minimal. Most environmental proposal studies do not adequately address impact evaluation, analysis of alternatives, and monitoring requirements. This observation aligns with the findings of **George (2000) and Wood (2003)**, which suggest that developing countries are more struggles with predicting impacts.

Lack of understanding of sustainable development issues and their lack of presence on the development agenda is the main weakness that has been highlighted due to lack of willpower (**Doberstein, 2003**). The main problem with data in Egypt is not the lack of data, but rather the inability to access it as this information is maintained by the EEAA and the IDA. It is noted that insufficient public participation and lack of environmental awareness are weaknesses that are poorly addressed by EIA practitioners.

### **Overall, EIS quality for forms (A and B) and low-risk projects**

In the study of EIS samples using forms A and B (EEAA), it was found that 91% (73) of the samples were deemed acceptable in terms of quality. Of these, 55% (44) were rated as good, while 9% (7) were considered borderline. Only 17 EIS are rated with A (well Performed) overall. A complete investigation of the various components of the review hierarchy, including review areas, category reviews, and sub- category reviews, was done to acquire a more in-depth knowledge of the advantages and disadvantages of EIS quality in Egypt. The results of this analysis are discussed collectively under the four main areas of review.

In the limited environmental proposal study (Low-risk, IDA), it was found that 56% (56) of the EIS samples were acceptable in terms of quality. Of these, 31% (31) were rated as good, 33% (33) as borderline, and 26% (26) as considered poor. Only 14 EISs received an A grade overall.

Table 6. Summary results of reviewing EISs quality for classes form A and B (80 EISs) and low-risks industrial projects (100 EISs) in Alexandria, Egypt.

Review Category		Area	Good		Border line		Poor		% Acceptable (A -C)	%Unacceptable (D-F)	
Summary of preliminary grades			A	B	C	D	E	F			
1.1	Forms A and B	Area 1	64	0	10	6	0	0	93	7	
	Low risk		80	0	6	14	0	0	86	14	
1.2	Forms A and B		60	12	8	0	0	0	100	0	
	Low risk		60	0	20	0	0	20	80	20	
1.3	Forms A and B		47	33	0	0	0	0	100	0	
	Low risk		50	50	0	0	0	0	100	0	
1.4	Forms A and B		30	50	0	0	0	0	100	0	
	Low risk		50	50	0	0	0	0	100	0	
1.5	Forms A and B		27	27	13	13	0	0	84	16	
	Low risk		33	33	17	17	0	0	83	17	
1.6	Forms A and B		0	0	80	0	0	0	100	0	
	Low risk		0	0	100	0	0	0	100	0	
2.1	Forms A and B		Area 2	0	50	30	0	0	0	100	0
	Low risk			0	0	0	0	0	100	0	100
2.5	Forms A and B			0	40	40	0	0	0	100	0
	Low risk			0	0	0	0	0	100	0	100
3.1	Forms A and B	Area 3	0	40	40	0	0	0	100	0	
	Low risk		0	0	0	0	100	0	0	100	
3.2	Forms A and B		21	13	43	3	0	0	96	4	
	Low risk		33	17	50	0	0	0	100	0	
3.3	Forms A and B	30	23	17	10	0	0	88	12		
	Low risk	0	34	33	0	33	0	67	33		
4.2	Forms A and B	AREA4	0	40	40	0	0	0	100	0	
	Low risk		0	50	50	0	0	0	100	0	
4.3	Forms A and B		0	0	40	40	0	0	50	50	
	Low risk		0	0	50	50	0	0	50	50	
<b>Summary Of All Review Areas</b>											
1	Forms A and B	Area 1	38	20	19	3	0	0	96	4	
	Low risk		46	22	24	5	0	3	92	9	
2	Forms A and B	Area 2	13	37	30	1	0	0	99	1	
	Low risk		0	0	0	0	0	100	0	100	
3	Forms A and B	Area 3	17	25	33	4	0	0	95	5	
	Low risk		11	17	28	0	44	0	56	44	
4	Forms A and B	Area 4	0	20	40	20	0	0	75	25	
	Low risk		0	25	50	25	0	0	75	25	
Overall Grade	Forms A and B		17	27	29	7	0	0	91	9	
	Low risk		14	17	25	8	11	25	56	44	

**Results by review area for forms (A and B) and low-risk projects**

**Review Area 1, description of the development, local environment, and baseline conditions**

For forms A and B, the evaluation jobs that performed the best were in area 1, with 96% (77) of the sampled EIS being rated as acceptable, and a higher proportion of EIS being rated as good (72.5%,58) compared to any other review area. Similarly, in the Limited Environmental Proposal Study (IDA), the best-performing evaluation jobs were in review area

1, where (92%) of the sampled EIS were rated as acceptable, and a higher proportion of EIS were rated as good (68%, 68) than in any other review area (Table 6 and Fig. 8) .These findings are consistent with results from previous quality reviews of EIS standards (Barker and Wood, 1999; Cashmore et al., 2002 and Badr et al., 2011). However, there were still issues in this area, particularly regarding providing information on the anticipated duration of project phases, the number of workers in site, transportation of materials, and waste generation measurement methods.

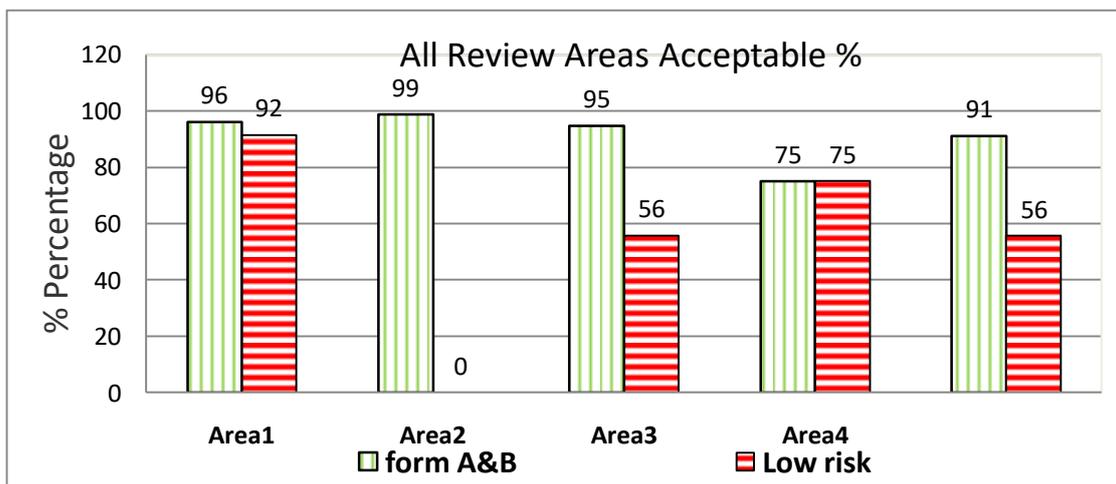


Fig. 7. Results of all review Areas of EISs for project type of forms (A and B) and low-risk industrial projects in Alexandria, Egypt.

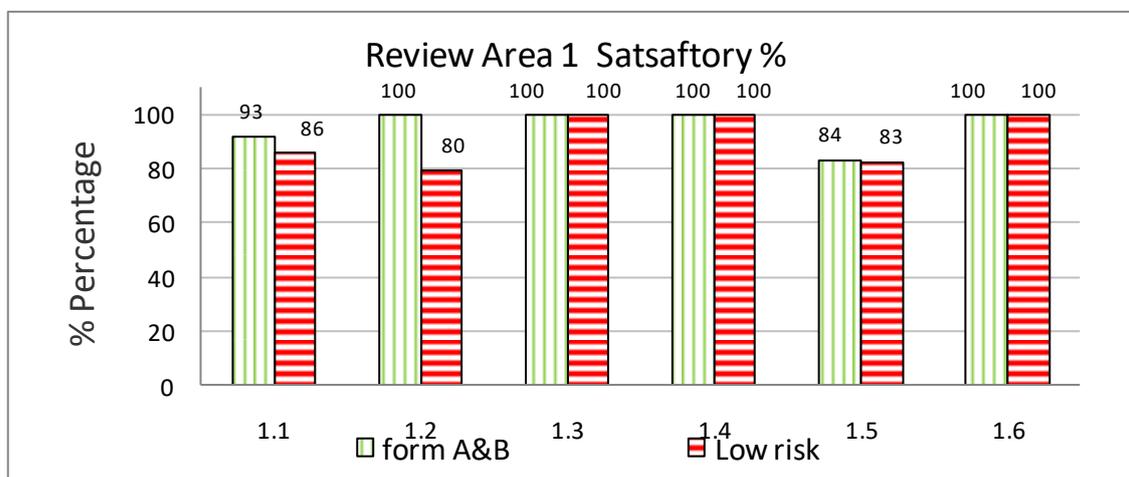


Fig. 8. Results of review area 1 of EIA forms (A and B) and low-risk industrial projects in Alexandria, Egypt.

**Review Area 2, Identification and evaluation of the key impacts**

For forms A and B, approximately (99%) of sampled EISs were rated acceptable, where the likely environmental impacts were identified and assessed. Whereas, for low-risk EIS projects, this audit area had the lowest performance with all (100%) of being rated as unacceptable (Table 6 and Fig. 9).The failure to define effect characteristics, a lack of adequate

explanation of the methods used to predict and evaluate impacts, and the inability to identify the methods used in scoping were common deficiencies noted in the limited environmental proposal studies. These tasks are crucial to the impact evaluation process (Lee et al., 1999), making it important to address these shortcomings.

### Review Area 3, Alternatives and Mitigation

Alternatives consideration and mitigation measures were addressed well for forms A and B, as (95%) of sampled EISs was assigned acceptable grade. Otherwise, in limited environmental proposal studies, this was the second-lowest performing review area. In terms of alternatives and scope of dilution review, 56% (56) of the EIS samples were rated as acceptable, with 28% (28) rated as good (Table 6 and Fig. 10). However, one-third of the EIS samples (28%, 28) received a borderline rating, indicating that there is significant room for improvement. The worst performing review category was the alternatives study (review category 3.1), with less than half of the EIS sample (44%, 44) being rated as unacceptable. This is a recognized issue internationally and is generally attributed to the fact that the EIA process is often conducted at a late stage in the project design cycle when several key characteristics of development have already been identified (Glasson et al., 2005).

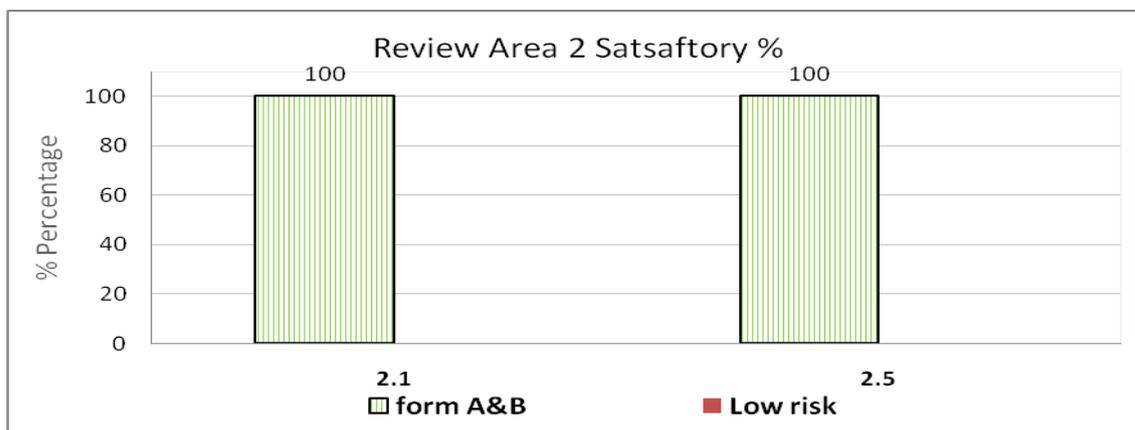


Fig. 9. Results of review area2of EIA forms (A and B) and low-risk industrial projects in Alexandria, Egypt.

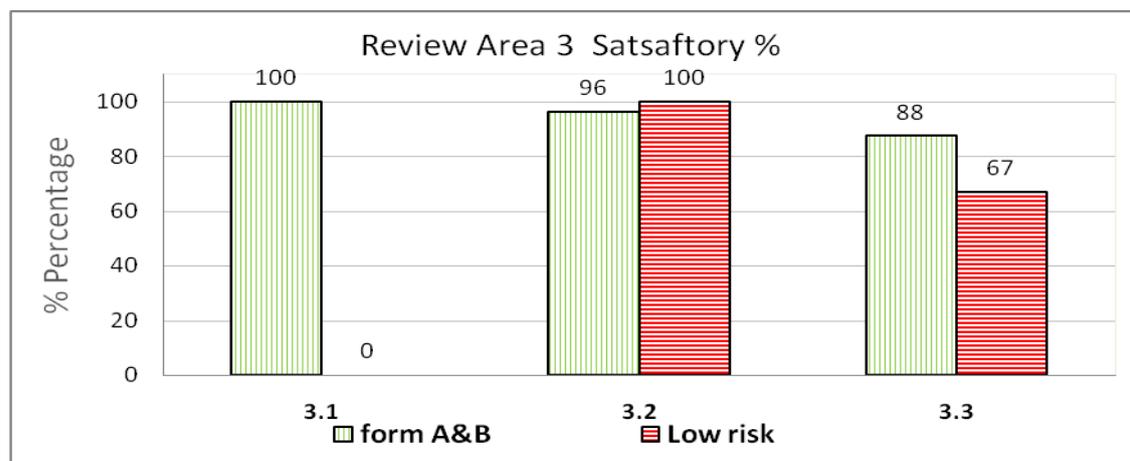


Fig. 10. Results of review area 3 of EIA forms (A and B) and low risk industrial projects in Alexandria, Egypt.

### Review Area 4, Communication of results

This was one of the best-performing areas of audit for limited environmental proposal studies (IDA), with (75%) of the EIS studied being rated as acceptable (Table 6 and Fig. 11). In the same manner (75%) of sampled EISs for forms A and B assign acceptable grade. Previous similar studies have shown that tasks relevant to EIS presentation (evaluated by review categories 4.2) tend to better in performance (Barker and Wood, 1999; Lee et al., 1999), and this was also observed in Egypt (Badr et al., 2011). However, the revision category 4.3 was the worst performing for 50% (50) of the sampled EIS, as well as for forms A and B.

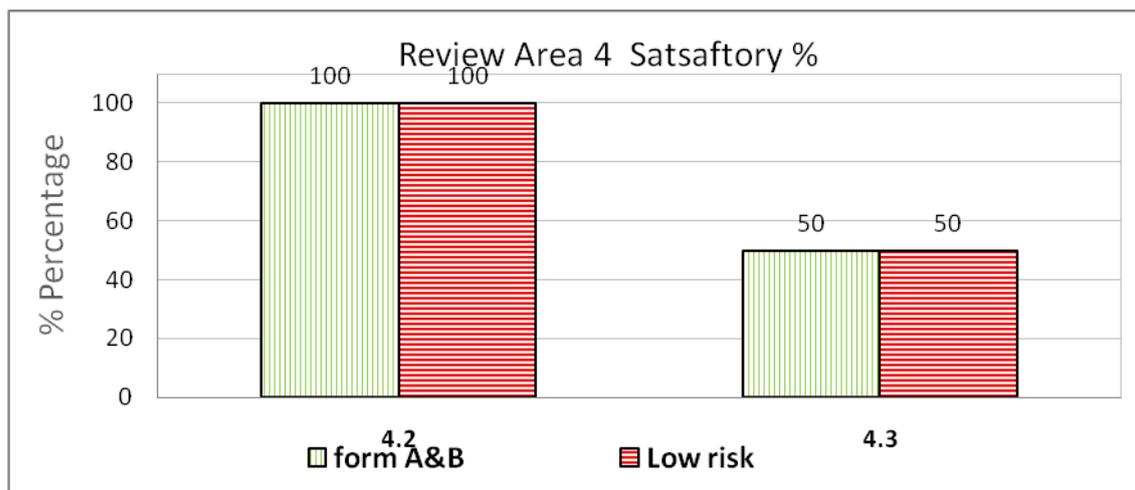


Fig. 11. Results of review area 4 of EIA forms (A and B) and low risk industrial projects in Alexandria, Egypt.

### Forms (A and B) and low-risk projects

A review of (80) environmental evaluation forms (A and B) in Egypt (2016 and 2017) point out that 91% of the sampled EIS samples were of acceptable quality. A review of (100) studies from the limited environmental proposal studies that were conducted and introduced in Egypt between 2018 and 2022 for a variety of low-risk industrial activity ranges revealed that 56% of the EIS samples were of acceptable quality. These findings indicated that the quality of EIA forms (A and B) submitted to the EEAA during the years 2016 and 2017 was much better than the EIA practice of low-risk projects submitted to IDA between 2018 and 2022.

When reviewing the EIA practice of limited environmental proposal studies, the findings for the four Lee and Colley review areas indicated that the best performing appraisal tasks were under review area 1, which covers "description of development and local environment". The fourth review domain, "reporting EIA results", followed this, and then the third area, "consideration of alternatives and mitigation measures". The least acceptable review domain was the second domain, "regarding impacts identification and assessment". This finding is consistent with several other studies on the quality of EIS, indicating that descriptive tasks have better performance.

### Conclusions

EIA process and the evaluation of the produced EIS quality are crucial in informing the public and decision-makers about the potential environmental impacts of proposed projects and

the necessary measures to mitigate negative effects. Based on the results of the current study, it can be concluded that over two-thirds of the EIS evaluations received by the EEAA met the acceptable quality criteria outlined in the Lee and Cooley Statement Environmental Review Package for Studies (B Scope - C) and (A - B Forms). These findings of the current review are similar in quality to those of several other studies. Review Area 1, which involves describing the development area, and review area 4, which involves communicating findings, are performing better on average than review area 3, which deals with considering alternatives and mitigation measures, and review area 2, which involves identifying and evaluating effects. However, the EIA process' technical and scientific components continue to pose challenges.

The quality of EIS tends to be better for larger projects. Shorter EIS documents often had unacceptable quality, while longer (but not excessively long) EIS documents tend to be of acceptable quality. EIS produced by a team of consultants, or a house of expertise were generally of better quality than those produced by an individual EIA consultant. The project proponent's dedication to conduct an EIA and the expertise of the EIA practitioners engaged may have had an impact on the quality of the produced EISs.

Some problematic EIA practices, such as the examination of alternatives and public participation may be connected to the legislative framework for EIA. It should be highlighted that Egyptian law does not have all necessary components for a thorough EIA procedure. In developing countries such as Egypt, it is important to acknowledge that environmental impacts cannot be ignored but development should not be hindered solely for this reason. Other factors such as economic, social, and political issues might be considered more relevant than environmental impacts and may receive more attention, resulting in limitations on the response to environmental protection pressures due to political priorities. Adapting good EIA system in practice along with environmental legislation, establishing environmental monitoring plan, increasing environmental awareness, and accrediting EIA consultants all will contribute to better environmental protection, achieving sustainability and abate climate change consequences.

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