

How Does the Quality of Environmental Impacts Assessment System Affect Decision- Making in the Sultanate of Oman?

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I, Shamsa Al-Khanjari, hereby state that this report is my own work and that all sources used are made explicit in the text

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Abstract

Ever since the Renaissance in 1970, the Sultanate of Oman has experienced rapid development which has changed the lifestyle of its people. Environmental protection concerns have increased along with development, so that Oman's vision has been to ensure sustainable development through providing a good quality of life and unspoilt environment as well as improving the economy. In 1982, therefore, the country enacted and implemented the use of Environmental Impact Assessment (EIA), to ensure environmental protection and pollution control. This research aims to answer the question 'how does the quality of environmental impacts assessment system affect decision-making in the Sultanate of Oman?' This was answered by adopting thorough research methodology that included the evaluation of EIA report (EIR) quality, and the evaluation of the EIA process through interviews conducted with regulators from the Ministry of Environment and Climate Affairs (MECA). The quality of the EIA system makes a significant contribution to decision-making in MECA. There are a number of factors that influence the quality of the EIA system in Oman. These include the quality of the EIA process, capacity building, the quality of consultants, and the knowledge of proponents. Strengths found in the EIA process include mitigation measures, environmental management planning, and emergency planning and climate change considerations. On the other hand shortcomings were found in the areas of screening, scoping, alternative considerations, impact assessment and public participation. A set of recommendations for enhancing and improving the process are presented in this dissertation. Finally, some recommendations are made for future research in order to explore the EIA system in Oman further.

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List of Abbreviations

EIA	Environmental Impact Assessment
EIR	Environmental Impact Assessment Report
EMP	Environmental Management Plan
ES	Environmental Statement
GCC	Gulf Cooperative Council
GDP	Gross Domestic Product
IAIA	International Association for Impact Assessment
IEMA	Institution of Environmental Management and Assessment
LNG	Liquefied Natural Gas
MD	Ministerial Decree
MECA	Ministry of Environmental and Climate Affairs
MENA	Middle East and North Africa
NEPA	National Environmental Protection Agency
NOC	No Objection Certificate
NTS	non-technical summary
Qmark	EIA Quality Mark
RD	Royal Decree
SEA	Strategic Environmental Assessment
SIA	Social Impacts Assessment

Chapter 1 Introduction

Over the last few decades there has been a notable growth of interests in environmental issues and sustainability. This growth was associated with an introduction of new legislations and laws that seek for environmental protection and environmental consideration within development nationally and internationally. Environmental Impact Assessment (EIA) one example of these legislation. EIA has become, therefore, an important design tool for sustainable development worldwide. The effectiveness of EIA and its quality are of particular interest in research field.

The sultanate of Oman has also introduced the EIA system in 1982. This research has a specific interest in evaluating the quality of the EIA system holistically in Oman. This is done through evaluating the quality of EIA reports and EIA process. This chapter introduces Oman with a brief overview of the country, and the term EIA is briefly explained. The development of the EIA context in Oman is highlighted, and finally, the context on which the dissertation has come to birth along with the aim and structure of the research are outlined.

1.1 Sultanate of Oman Country Overview

The Sultanate of Oman (or Oman) is located in the south east of the Arabian Peninsula, and has an area of 309,500 km² and a coastline of 3,165 km. It borders the United Arab Emirates (UAE) to the northwest, Saudi Arabia to the west and Yemen to the southwest (Figure 1.1). Oman have been developing remarkably, as in 2013 the population reached to approximately 3.6 million (The Demographic Profile of Oman, 2014).

Oman's main income is from oil resources, and it is heavily dependent on it, with a revenue contributing more than 77% of the total government revenue. In order to reduce the proportion of the oil sector's contribution to Oman's GDP, the government has pursued a development plan that emphasises industrialisation, diversification and privatisation. Oman is involved in a variety of industrial activities, such as crude oil production and refining, liquefied and natural gas (LNG) production, construction, copper, cement, steel optic fibre and chemicals. Besides these industries, Oman is focused on improving tourism (Cia.gov, 2015). Oman's Vision

for Oman's Economy 2020 aims to ensure sustainable development through providing its people with well-being, a suitable environment and an improved economy (Oman.om, 2015).



Figure 1.1: Location of Oman location in the Arabian Gulf (Cia.gov, 2015)

The geography of the land varies from valleys and desert (82%) to mountains (15%), with 3% consisting of plain coastline (Cia.gov, 2015). Oman is located in the subtropical arid zone of the world, which is known as the hottest zone. The average temperature is around 30°C, but can rise above 45°C in summer. Rainfall is occasional, and varies between regions; rainfall is more frequent in winter in the northern part, while in the south rainfall is a result of seasonal monsoons (Matlock, 2007). In the northern mountains the annual rainfall is 460 mm while in southern

region of the country heavy monsoon rains results an annual rainfall of 750 mm (Weather and Climate information, 2015).

Oman is a member of the Gulf Cooperation Council (GCC), together with another five countries:the UAE, Saudi Arabia, Qatar, Bahrain, and Kuwait. The GCC was established in 1981, with the vision of achieving effective unitybetween state members,for effective integration of strengths and resources, as well asease cross-border resources.

1.2 Environmental Impact Assessment Definition

The concept of EIA was first initiated in the United States in 1969, then spread over the years to the rest of the world. EIA is a process by which the potential adverseenvironmental impacts of a proposed development are assessed at an early stage of decision-making, for the sake of protecting the environment (Wood, 1999; Morris et al., 2009; Glasson et al, 2012). EIA is used as a tool to ensure the application of sustainable development in different projects.

Definitionsof EIA vary from the simple to the complex. The International Association for Impact Assessment (IAIA) have adopted the following definition: *'The process of identifying, predicting, evaluating and mitigating the biophysical, social and other relevant effects of proposed development proposals prior to major decisions being taken and commitments made'* (Glasson et al, 2012: 4). Despite the diversification of definitions they all carry the same meaning.

1.3Development of Environmental Impact Assessment Contextin Oman

The Ministry of Environmental and Climate Affairs (MECA) is the current formal environmental regulatory authority in the country. In fact, the environmental regulatory institutional framework went through several major changes until MECA was established, as illustrated in Figure 1.2. This indicatethe growing concerns of environmental protection and pollution control in Oman.

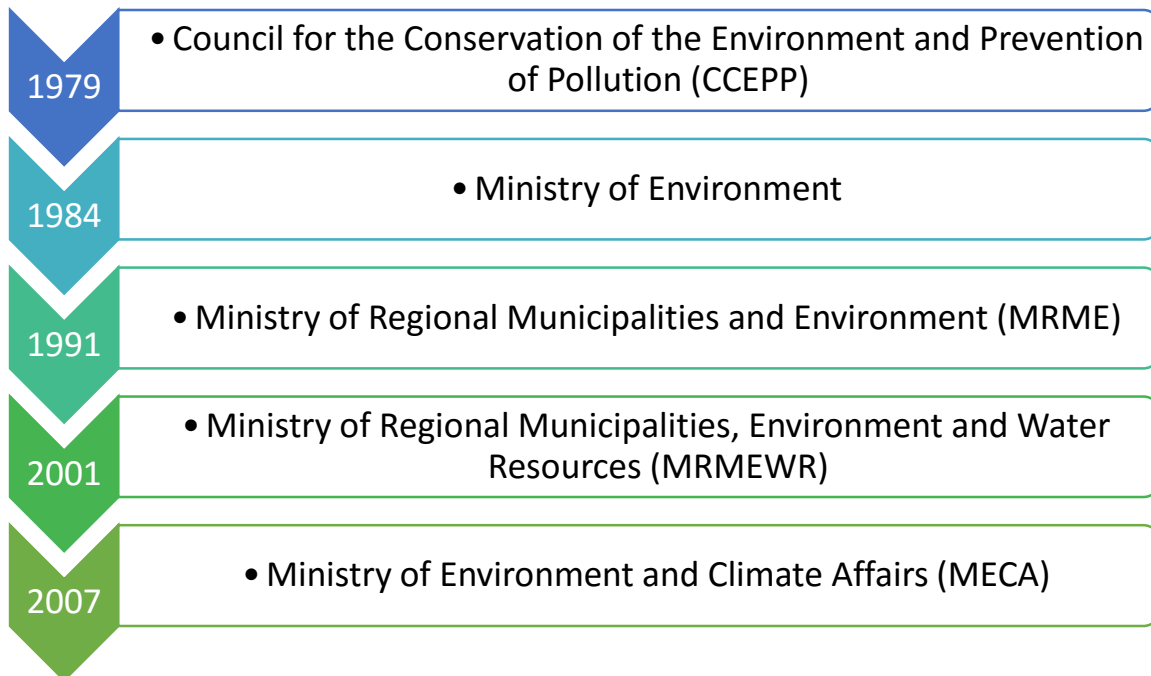


Figure 1.2: Chronological changes of environmental regulatory institutions in Oman (source: MECA, 2015)

Alongside environmental institutional development and improvement, laws and regulations were declared. The EIA have been explicitly enacted within the Omani environmental regulations since 1982, in the Royal Decree (RD) 10/1982: Law on Conservation of the Environment and Prevention of Pollution. This is where environmental planning consideration for developmental projects began. In 2001, this law (RD 10/1982) was updated to establish a number of regulations and procedures for issuing environmental approval and final environmental permits by the Ministry for Developments under law RD 114/2001. Article (16) of RD 114/2001 specifically states the requirements for EIA:

‘The owner of any source or area of work which – according to the basis specified by the Ministry – may constitute an avoidable or treatable risk to the environment, shall submit, prior to the application for the environmental permit, a detailed Environmental Impact Assessment (EIA) study confirming that the benefits of the source or area of work surpass the potential damage to the environment.’

In fact, Oman was one of the first countries in the Middle East and North Africa (MENA) region to grasp the importance of environmental protection; hence, EIA was implemented in 1982 (Al-Azri et al., 2014; El-Fadl, 2004). Nevertheless, EIA implementation was not well-founded

until 2001, when concerns about sustainable development and environmental management increased (Cotton et al., 2014).

1.4 The Aim of the Research

This research aims to investigate the extent to which the quality of the Environmental Impact Assessment (EIA) process affects decision-making in the Ministry of Environment and Climate Affairs (MECA). The study evaluates the quality of the EIA system in Oman, based on (1) evaluating the quality of five randomly selected EIRs for industrial developments; (2) measuring the quality of current EIA practice through interviews conducted with MECA staff; and (3) finding gaps and limitations in the EIA system in order to improve it and aid decision makers. EIA is used as a key tool to ensure environmental protection during development. For this reason having a high quality EIA system and process in Oman is significant in safeguarding the achievement of sustainable development.

1.5 Context on Which This Research Is Carried Out

EIA is a very important tool for sustainable development, thus performing efficiently in would lead to sustainability. Out of the authors' experience in MECA the idea and the context of this research were born. During the period of being part of EIA process in MECA, some strengths, weaknesses and gaps in the process were observed. The gaps and weakness have resulted delays in issuing permits and inefficient EIA process. Many MECA staff and project owners don't understand the value of EIA or, sometimes, don't even know what EIA is. Despite the weakness, there were strength that prevent the system from collapsing and holding it together. All those observation led to question the EIA quality; how and to what extent could the quality affect the decision making in MECA. Carrying out this research would provide an opportunity for improvement in EIA system in MECA.

1.6 Dissertation Structure

As previously explained, chapter 1 provides a brief definition of EIA and outlines the development of the EIA context in Oman, the context in which the topic of this research was developed and its aim. The literature review is addressed in chapter 2, including an overall literature of EIA in relation to its development, purpose and key principles. A general overview of the EIA system and process is given, along with an overview of the EIA system in Oman. Chapter 3 explains in detail the evaluation criteria and methodology adopted in this research. Chapter 4 outlines the findings from the EIA report quality review and the quality of Oman's EIA process. Finally, chapter 5 summarises the key of the dissertation linking it to decision-making and the contribution of the quality of the EIA system to decision-making. Recommendations for future research and practice are addressed toward the end of this dissertation.

Chapter 2 Literature Review

The existing literature and previous studies help the researcher to investigate areas which need further study and research. Literature review allows for a comprehensive understanding of the field of study. For that reason, this chapter highlights previous studies that have been conducted in the field of Environmental Impact Assessment (EIA), within the theme of this research topic.

This chapter introduces the concept of EIA and its development, and includes key principles and processes. Also, the importance of the quality of EIA reports (EIRs) and their contribution to decision-making is addressed. Further investigation in relation to EIA process and practice in Oman is also provided.

2.1 Environmental Impact Assessment

EIA is designed for use in the real world. It is a significant process, intended to inform decision makers and the public on projects. EIA initially emerged in the United States over 40 years ago, but was not paid enough attention at first. With time the concept of EIA became more popular, changed people's lives and protected the environment (Wood, 1995). The U.S. National Environmental Policy Act (NEPA) of 1969 was the first act that required EIAs, as it was a novel form of environmental policy. For many years the adaptation of the EIA system faced many challenges but led to success (Barker et al., 1999; Badr et al., 2011; Glasson, et al., 2012).

The concept has expanded worldwide, starting with more developed countries and spreading to less developed countries. The effectiveness with which EIA is carried out in each country varies, depending on the quality of that country's system (Glasson, et al., 2012). Altogether, these varied systems universally have the same broad aim of improving and integrating environmental consideration into planning and decision making. For many years now EIA has become a significant design tool in project planning and environmental protection and almost all countries around the world have it.

2.1.1 Purpose and Key Principles of EIA

As mentioned, EIA is a key tool for evaluating, predicting and identifying the environmental impacts of a proposed development. Social, health and cultural impacts are essential parts of an EIA. EIA aims are, as described by Glasson, et al., 2012:

- To provide adequate information for decision making on the environmental effects of a proposed action;
- A design tool for development action;
- To ensure stakeholder consultation and public participation; and
- To promote environmental awareness and act as an instrument for sustainable development.

With a rich and complex system such as EIA, setting out key principles is vital because EIA has a wider context than just a regulatory procedure. Morgan (1998) has discussed the key EIA principles under three main categories, as summarised in Table 2.1. The third category relates to the aim and context of this research in terms of evaluating the quality of EIA process and EIRs, and their contribution to decision making in MECA.

Table 2.1: Summary of key EIA principles discussed by Morgan (1998)

Main Category	Principles
1. General principle related to the nature and scope of EIA	<ul style="list-style-type: none"> • Understanding the impacts on environment • Public participation in the process • Application of EIA: policies, programs, plans and projects • Alternative consideration • Timing of EIA
2. Principles related to the main activities and process within EIA	<ul style="list-style-type: none"> • Prediction of impacts • Risk and hazard assessment • Monitoring • Evaluation and communication
3. Principles related to the quality and use of EIA information	<ul style="list-style-type: none"> • Quality control and quality review • Audits • Links to decision making

2.1.2 EIA System

EIA is a comprehensive system consisting of fundamental elements (Figure 2.1). Firstly, there is the legal and institutional framework, where all regulations, standards, and guidelines are established, and EIA is a legal requirement. Secondly, there is the EIA process and its activities. Finally, there is the performance and practice of EIA in the field, through the quality of EIA documentation, decision making, and the practice of positive outcomes (UNU, 2006).

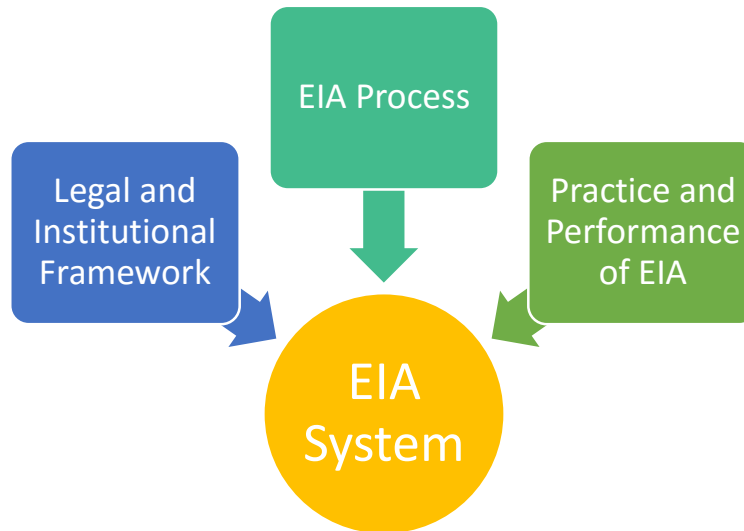


Figure 2.1: EIA system components

“Quality’, ‘good/best practice’ and ‘effectiveness’ are all expressions in common use in EIA. They are all concerned with the goal of ensuring that EIA maximises its potential as an environmental management tool’ (Fuller, 1999: 55).

Undoubtedly, ever since the emergence of EIA, many have debated the effectiveness of EIA systems worldwide. Thus, different evaluation criteria have been developed and adapted to measure the effectiveness of the EIA system, and identify ways in which it can be improved (Sadler, 1994; Wood, 1995; Fuller, 1999; Ahmad et al., 2002; Panigrahi et al., 2012). The review criteria provide a comprehensive picture of the EIA system, including the institutional framework, legislation provision, guidelines and EIA process elements.

The International Association for Impact Assessment (IAIA) have conducted a study that examined the effectiveness of environmental assessment worldwide. It clearly showed how environmental assessment has influenced and improved decision making. EIA process can only be evaluated and understood in relation to the institutional framework that it operates in (Sadler, 1996).

EIA is an integrated systematic process consisting of different components, as shown in Figure 2.1. As a consequence, there are different quality and effectiveness evaluation criteria on which to evaluate the whole system or individual elements, as further explained in this chapter.

2.1.3 EIA Process

The heart of the EIA system is the EIA process, and activities within the process. Not necessarily all countries worldwide follows the same stages and components, yet most EIA processes follow the common steps illustrated in Figure 2.2. The application of the main steps of the EIA process is usually a standard of good practice. Typically, the EIA process starts with determining whether EIA is required or not. Then scoping is performed to identify the key topic that should be addressed in the assessment. Finally the EIA is documented and compiled in an EIA report to determine suitability and identify actions to be taken (Wood, 1995).

2.1.4 Key Stakeholders in the EIA Process

Key aim of the EIA process is to provide adequate information on the likely environmental impacts of a proposed project. The information provided usually concerns the developer, the public and decision makers. Ensuring the participation and involvement of these groups is essential for a good approach in EIA practice (Glasson, et al., 2012). Their involvement contributes to great extent to the quality and success of the EIA process and system, as investigated further in this research.

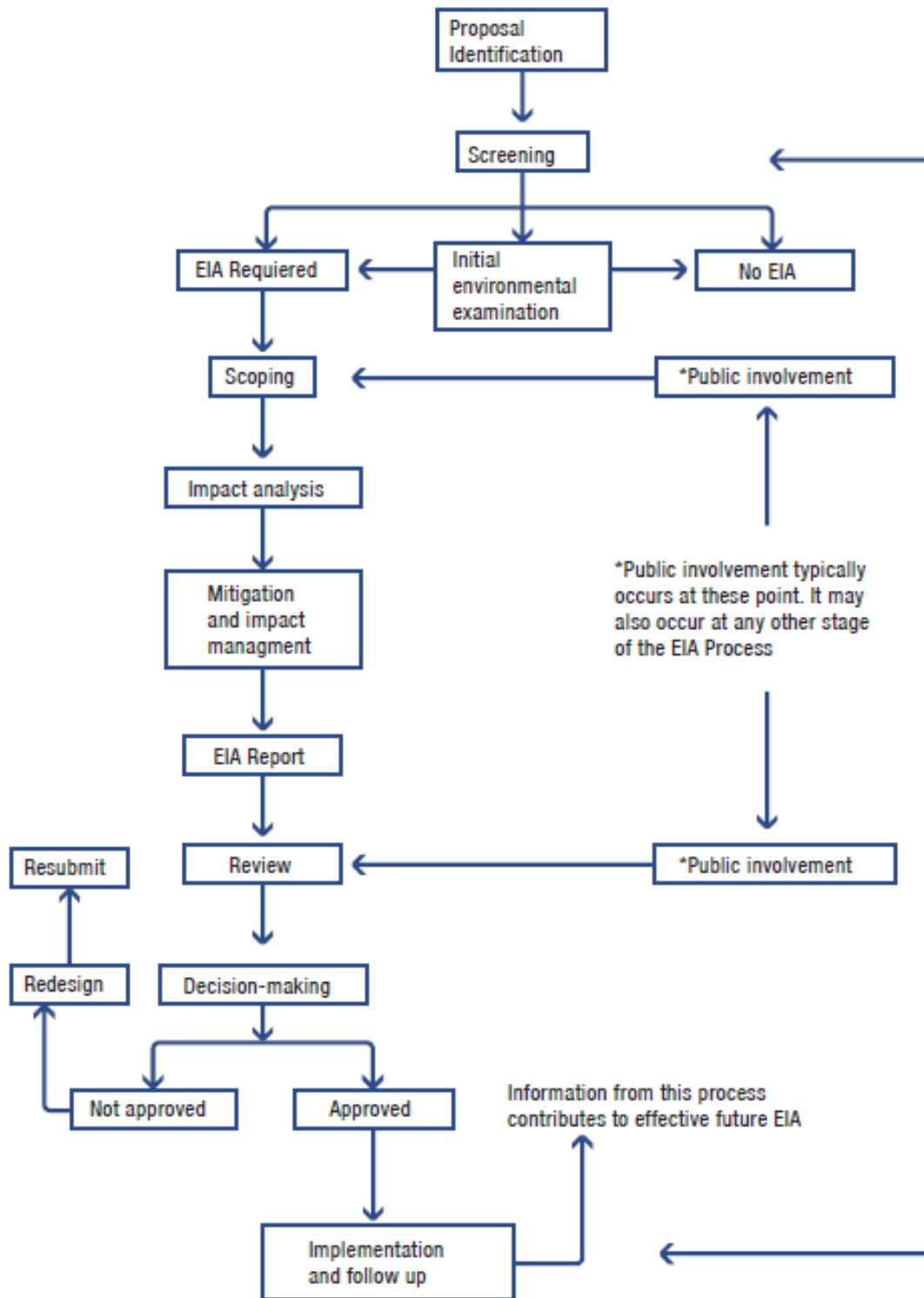


Figure 2.2: EIA process flowchart (Source: UNU, 2006)

2.2 Environmental Impact Assessment Reports

Another significant component of the EIA process is the documentation and presentation of the process in the form of EIA reports or Environmental Statements. Nomenclature may vary depending on the EIA system of each country, but they serve the same goal, which is the communication of EIA outcomes to the stakeholders (Glasson, et al., 2012). The term EIA report (EIR) is used throughout the research to describe this component. EIR is a key communication tool between the regulators and developers (stakeholders), and therefore should be prepared effectively.

Since the EIR is a product of the EIA process, the quality of the EIR is likely to be linked to the quality of the EIA process. For that reason, the quality of EIRs can contribute to better decision making processes where there are environmental considerations. The review and evaluation of EIR quality is therefore an essential component of measuring the effectiveness of the EIA process (Sadler, 1994; Wood, 1995; Fuller, 1999; Sandham et al., 2008; Badr et al., 2011).

There are various methods which have been used worldwide to review the quality of EIRs, such as the European Commission EIR checklist for EIR review, and the Lee and Colley review package (Sandham et al., 2008). However, the Lee and Colley review package (1992) has been widely used on a global scale. This review package was initiated and developed in 1992 in order to review EIRs in the UK to promote EIA best practice, but has since been used widely in various other countries for the review of EIA reports (Barker et al., 1999; Sandham et al., 2008; Badr et al., 2011; Sandham et al., 2013).

Findings of these studies show that the quality of EIRs is improving over time. However, the findings show another common trend: areas of project and environment description and the presentation of EIA process tend to perform better than the areas of impact identification and assessment. This indicates that despite the continuous improvement in the process, there are some weaknesses and omissions in the EIA process that cannot be easily overcome.

2.3 The Environmental Impact Assessment System in Oman

Oman, as mentioned in the introduction, is located in the hottest zone of the world, where resources are scarce. Consequently, the government is concerned about protecting the available resources and preventing environmental pollution. Oman's continuous efforts in protecting the environment are made evident by the enacting of different environmental protection and nature conservation laws, as well as involvement in different international agreements, protocols and conventions. The EIA system implementation is further evidence of Oman's efforts; in fact, it is one of the first countries in the Middle East and North Africa (MENA) region to show concern over environmental issues.

This research aims to investigate the quality of the EIA process in Oman, and it is important to provide a clear description of the legislative framework on which EIAs are carried out in Oman. Thus, this section provides an overview of environmental regulations and guidelines in the Ministry of Environment and Climate Affairs (MECA). It then outlines the EIA system and processes in Oman, specifically in MECA. Finally, previous studies and their findings are discussed in relation to the aim of this research.

2.3.1 Environmental Legislative Framework in Oman

MECA is the regulatory institution and authority responsible for all environment-related tasks. These tasks include setting regulations, preparing programs, plans and policies for environmental management, and climate affairs. They also include conserving and managing natural resources such as wild spaces, the marine environment, flora and fauna. MECA as well, is responsible for issuing environmental licences and permits, and evaluating and monitoring environmental impact assessments for different types of projects. Figure 2.3 illustrates the main organisational structure, and the main departments that are involved in the EIA process and the issuance of environmental permits.

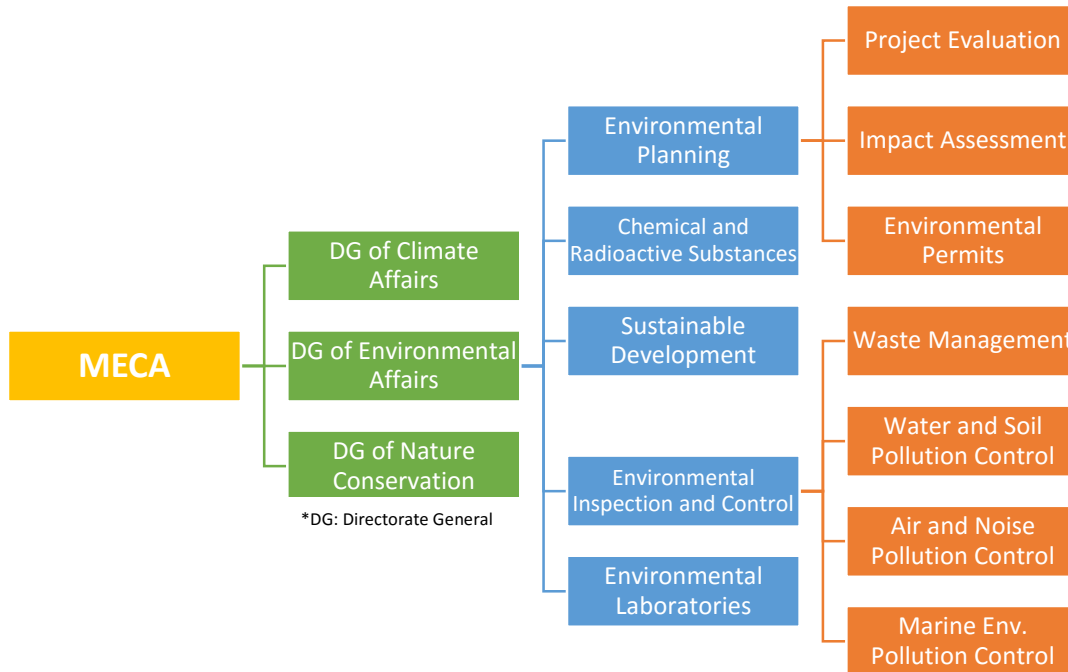


Figure 2.3: Institutional structure of MECA (Source: MECA, 2015)

In Oman, the regulations and laws are in the form of Royal Decrees, (RDs) which are declared by His Majesty Sultan Qaboos (Oman’s president), and Ministerial Decrees (MDs), along with the guidelines developed by each ministry. The laws and regulations regarding environmental protection, pollution control and management are all covered in two Royal Decrees:

- *The Law on the Conservation of the Environment and Prevention of Pollution, promulgated as RD 114/2001; and*
- *The Law on the Protection of Potable Water Sources from Pollution, promulgated as RD 115/2001.*

Under the context of these primary laws, detailed regulations and guidelines have been issued and enacted. Law No. RD 114/2001 states that an EIA is a requirement for projects that are likely to have an adverse impact. Further detailed regulations regarding the issuance of environmental approvals and final environmental permits are issued in MD No. 187/2001. Further clarification of the process the ministry have developed guidelines for obtaining environmental permits were developed.

In order to facilitate the identification of projects type when obtaining the environmental permits, different projects were categorised into eight groups, summarised in Table 2.2. The categorising of the project types were in relation to their technical aspects during different phases of the project.

Table 2.2: Projects type classification (source: Omani EIA guidelines)

Group Name	Type of projects
Group 1	Industrial projects: <ul style="list-style-type: none"> • Chemical and petrochemical • Oil and gas production and Power stations • Water purification and desalination plants • Organic fertilisers • Textile, tannery and leather manufacturing
Group 2	Mining projects <ul style="list-style-type: none"> • Quarries and crushers • Gypsum production • Marble production and ceramic tiles factories • Extraction of minerals
Group 3	Agricultural projects <ul style="list-style-type: none"> • Poultry farms, livestock pens and slaughter house • Agricultural and animal feed production
Group 4	Food Projects <ul style="list-style-type: none"> • Dairy production • Bakeries and flour mills • Food production and packaging and fish wrapping
Group 5	Service projects <ul style="list-style-type: none"> • Roads and Electric and telephone lines • Commercial and residential complexes • Storage & recharge dams • Hospitals and health centers • Permanent and temporary workers camps • Wastewater treatment plants
Group 6	Marine and coastal projects <ul style="list-style-type: none"> • Commercial ports and fish harbors • Marine clubs, marinas and bridges • Fish agriculture and artificial lakes
Group 7	Tourism projects <ul style="list-style-type: none"> • Hotels, resorts and temporary tourist camps • Tourist boats
Group 8	Light industries <ul style="list-style-type: none"> • Small bricks factories • Gas cylinders storage and sale • Carpentry, blacksmith and metal workshops • Car wash, oil change and car repair workshops

2.3.2 EIA Process in MECA

2.3.2.1 EIA Process Overview

Even before the introduction of the EIA system in Oman, obtaining environmental approvals and permits was necessary before commencing with any activity. After introducing the EIA system into Omani legislation, the EIA process was combined, together with the process of obtaining permits. Law No. MD 187/2001 explains in detail the process for obtaining environmental permits. Any developer wishing to commence a project should submit an application that states the details of the project and location, and addresses the environmental impact and mitigation measures, along with supporting documents. In the Omani context this application is called an environmental impact statement (EIS), or the green form. The project application then goes through a screening process to determine whether the project requires an EIA or not.

If an EIA is not required, a No Objection Certificate (NOC) will be issued, for the development to proceed. The proponent will then have to follow a different process to obtain an environmental permit for their project. However, if an EIA is required, the proponent will be asked to conduct a full EIA and submit an EIR for assessment and evaluation.

Within approximately two months of submission, a permit will either be granted or rejected. The issued permit includes all conditions regarding the proposed development. These conditions may specify the type of technologies which should be used in the project, as well as the related laws and regulations which ought to be followed. However, if the application is not approved, the developer has the right to appeal the verdict within 30 days of the notification date (DGEA, 2001).

It is important to mention that the EIA process is usually conducted by certified international and local environmental consultant bodies. Normally, any industry or company planning to commence any type of project should first to consult the ministry, to have an initial idea of the environmental sensitivity of the selected location, and then submit the permit application form (also called the green form). It is the proponent's choice at which point they hire consultants: at the early stages of project planning, or when an EIA is required to be submitted.

Depending on the agreement and contract between the proponent and the consultants, the completion of obtaining environmental permit is decided. In many cases the key communication between MECA and the developer is through a consulting company.

3.3.2.2 EIR Review Process in MECA

The aim of this research is to 'assess and evaluate the quality of EIA process holistically, through evaluating the quality of EIA reports. Thus, it is essential to examine in detail the EIR review process in MECA.

The process of reviewing, evaluating and deciding on EIR acceptability is done by its circulation between different specialised departments in the ministry. Each department reviews the relevant section in the EIA, and then provides feedback and comments. At the final step in the circulation, the environmental planning department revises the feedback obtained from different departments, and decides upon acceptance or rejection. While the circulation process is being undertaken, a team of inspectors from the environmental planning department visit the project location to evaluate its suitability. In the case of any comments or complications arising from the EIR review process and site inspection, meetings are sometimes held between MECA and consultants or proponents, to discuss issues related to the project details before issuing the permit. Figure 2.4 illustrates the EIA process in relation to the EIA review.

There is no specific review body, nor are there specified review method guidelines or EIR evaluation criteria in MECA. Each employee involved in the review study the section relevant to their department, according to their knowledge and experience. However, the circulation process may not be efficient enough, and may encourage subjectivity, as suggested by Dr Ross Marshall, who works in the UK Environment Agency. Reviewing the EIA separately may increase the subjectivity of the decision, and the separate streams of feedback may contradict each other. This is due to the fact that in order to achieve efficiency, an integrated and collective decision making process should exist. For that reason, the EIR review process is poor to some extent, and affects the quality of the EIA system as a whole, as discussed in research by Bashir (2011).

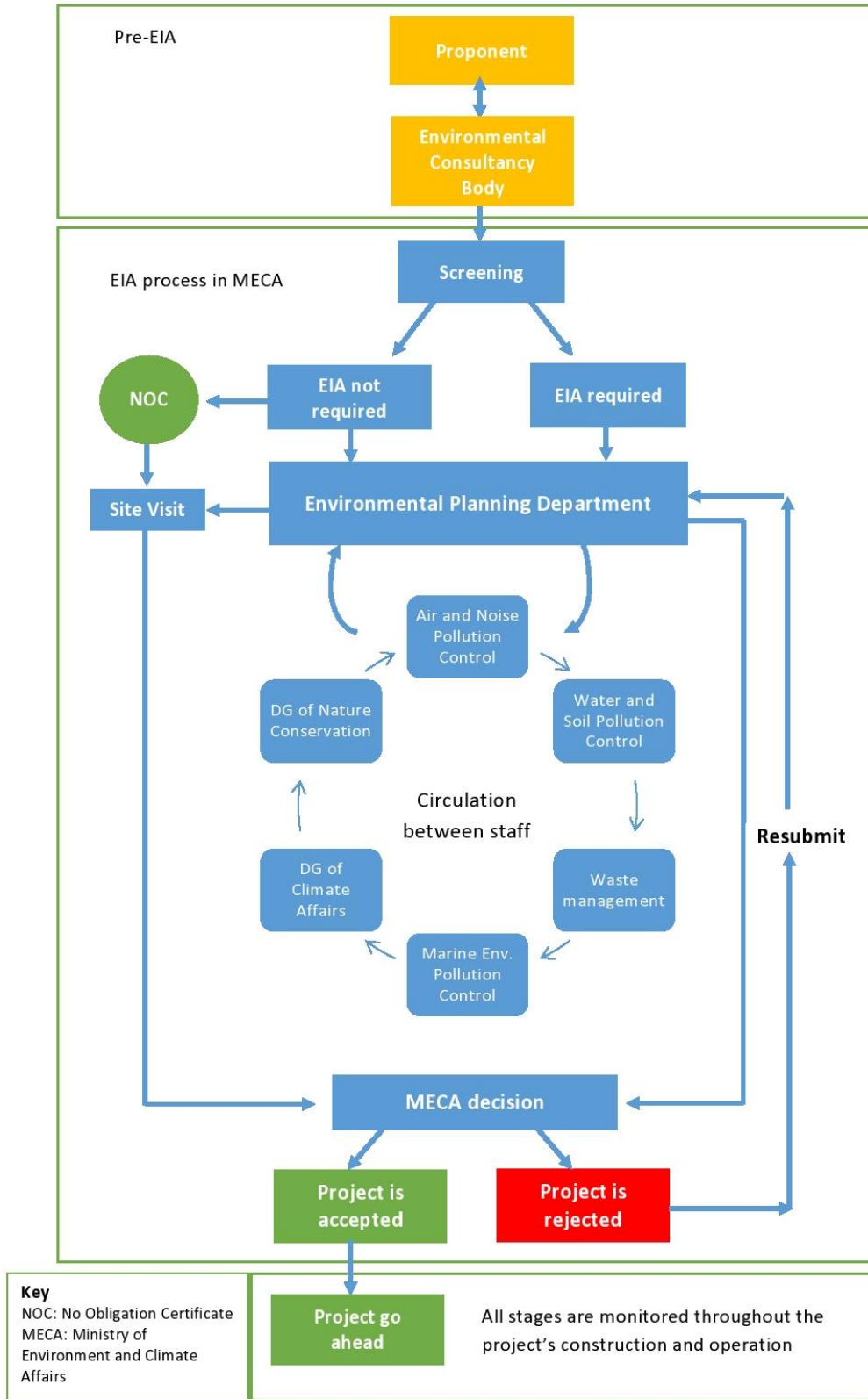


Figure 2.4: Oman EIA process flowchart

2.3.3 Effectiveness of the EIA System in Oman

Many studies worldwide have looked into the effectiveness of the EIA system and whether it improved environmental protection and decision making or not (Wood, 1995; Barker et al., 1999; Ahmad et al., 2002; Panigrahi et al., 2012). Furthermore, many studies have evaluated the quality of EIRs in order to assess the EIA process performance. The evaluation of EIR quality in these studies has been done in many different countries, for various types of developments and different aspects of EIA (Lee et al., 1992; Fuller, 1999; Canelas et al., 2005; Sandham et al., 2008; Peterson, 2010; Smart, et al., 2014). EIR reviews assist in identifying problems, gaps and limitations existing within the EIA process, and provide opportunities for improvement. These studies clearly show how the quality of EIRs have influenced and improved decision making.

Few studies were found regarding the evaluation of the effectiveness of the EIA system for the Middle East and North Africa (MENA) region (Ahmad et al., 2002; Elfadl, 2004; Badr, et al., 2011). One recent study published a comparative evaluation of EIA systems in Gulf Countries (GCC) (Al-Azri et al., 2014), which provided an overview of different EIA systems' implementation in the GCC. Another research, by Bashir (2011), evaluated EIA procedure and practice in Oman. However, there are no previous published studies on reviewing and evaluating EIR quality, neither in Oman, nor in the other Gulf Countries. Findings of these studies are summarised in Table 2.2 as it shows an overview of the current Omani EIA system (Elfadl, 2004; Bashir, 2011; Al-Azri et al., 2014).

The main strengths were found to be in environmental management plans and monitoring reports, and in addressing the environmental issues. The main weakness found was the lack of specified policies and guidelines at different stages of EIA. Also, there are a lack of alternative considerations, inadequate performance at different stages of EIA, a lack of integral communication between the bodies concerned, and low experience levels among MECA employees (Elfadl 2004; Bashir, 2011; Al-Azri et al., 2014). Bashir (2011) has noted that public participation is found to some extent, depending on the scale and size of the project.

Table 2.3: Findings from Al-Azri et al (2014) of a review of the current EIA system in Oman

Systematic measures	Oman
1. EIA legislation	
1.1. Legal provisions for EIA	Enabling legislation: RD No. 114/2001 on conservation of the environment and prevention of pollution
1.2. Provisions for appeal by the proponent or the public against decisions	Article 5 in RD 114/2001 provides provisions for appealing against any decision or action taken by the authority
1.3. Legal or procedural specification of time limits	The decision is made within 60 days of submission of application and appealing against decisions to be within one month from the date of notification
1.4. Formal provisions for SEA	None
2. EIA administration	
2.1. Competent authority for EIA and determination of environmental acceptability	MECA specifically DGEA by RD 86/2001
2.2. Review body for EIA	DGEA responsible for EIA review
2.3. Specification of sectorial authorities' responsibilities in the EIA process	Specified in the guideline for obtaining environmental permit by DGEA
2.4. Level of coordination with other planning and pollution control bodies	Committees and regular meetings between ministries, sectorial authorities and local municipalities
3. EIA process	
3.1. Specified screening categories	Not specified; one category
3.2. Systematic screening approach	Applications to MECA for permit on case by case basis to determine the issuance of NOC or EIA required
3.3. Systematic scoping approach	DGEA responsible to define scope. EIA format is specified in EIA regulations and may provide special provisions for some developments
3.4. Requirement to consider alternatives	Required in EIA regulations
3.5. Specified EIA report content	General guidelines comprehensive EIA
3.6. Systematic EIA report review approach	No defined systematic approach to review EIA report
3.7. Public participation in EIA process	Required, in some cases, as SIA through public consultation during EIA study. Public participation not involved after EIA submission
3.8. Systematic decision-making approach	DGEA must give permit before commencing any development projects
3.9. Requirement for EMP	Article 16 in RD 114/2001 provisions for EMPs as part of EIA report
3.10. Requirement for mitigation of impacts	Article 16 in RD 114/2001 requires the description and analysis of the project's environmental impact and mitigations
3.11. Requirement for impact monitoring	Articles 10, 17 and 30 in RD 114/2001 require the proponent to prepare environmental monitoring and audit plans and maintain records; DGEA undertakes to follow up inspections
3.12. Experience of SEA	None
Foundation measures	
4. Existence of general and/or specific guidelines including any sectorial authority procedures	DGEA guidelines for environmental permit specify the requirements of each sector
5. EIA system implementation monitoring	Not performed
6. Expertise in conducting EIA	Registered consultancies with MECA
7. Training and capacity building	No information available
Key:	
-DGEA: Directorate General of Environmental Affairs -SEA: Strategic Environmental Assessment	-SIA: Social Impact Assessment -EMP: Environmental Management Plan

2.4 Key Findings from Literature Review

Detailed research examining the quality of EIRs in Oman is needed in order to understand the performance of the current Omani EIA system. Generally, EIA provides a systematic process of assessment and analysis of planned developments, ensuring environmental protection and sustainable development (Glasson et al, 2012). As a means to communicate the output of an EIA, an EIR is produced. Indeed, an EIR should be clear and focused, to deliver adequate information to decision makers and the public regarding the environmental consequences of proposed activities before verdicts are given regarding acceptance. In addition, it recommends mitigation measures to prevent or reduce environmental degradation, and guarantee enhanced development. Consequently, investigating and reviewing the quality of EIRs in Oman would improve decision making, and hence enhance environmental protection. Studying the attitudes of decision makers toward EIR quality, and examining whether they succeeds in communicating information that is sufficient and clear enough to make decisions, may also be an opportunity to facilitate the identification of strengths and weaknesses within the system.

Chapter 3 Evaluation Criteria and Methodology

It was emphasised from the literature review that there was a clear need to establish a study of current EIA practice in Oman and its quality. Hence, designing a multistage study that covered the EIA system from various aspects was important. A meeting with Dr Ross Marshall, an expert in EIA who works in Environment Agency (England and Wales) was held on 19th March, 2015 to discuss the practicality of the research methodology. He emphasised the importance of designing a multi-phase methodology which would allow data collection from different aspects in relation to the EIA process in Oman.

The aim of this research is to *“assess and evaluate the quality of EIA process holistically, through evaluating the quality of EIA reports.”* In order to do so the research methodology adopted a combination of two stages:

- Quality review of Environmental Impact Assessment (EIA) reports (Section 3.1).
- Quality assessment of current EIA practice in the form of interviews (Section 3.2).

This chapter discusses in detail the research methods, justifying the use of each method, explaining how the data was collected and analysed, and highlighting the advantages and limitations of those methods.

3.1 Quality Review of Environmental Impact Assessment Reports

EIA reports (EIRs) are the major element in the EIA process; the quality of the reports both contributes to and eases the process of decision making (Sandham et al., 2008). Therefore, evaluating the quality of EIRs can determine the quality of the EIA process itself. The main aim of the research is to evaluate the quality of the EIA process in Oman, through evaluating and assessing the quality of EIRs of industrial projects.

The review package used by the Institute of Environmental Management and Assessment (IEMA) has been improved and amended over time. After many years of experience in the field, IEMA have developed an EIA Quality Mark (QMark) from the British perspective of good EIA practice. The QMark originally derives from the EU EIA Directive and the Lee and Colley (1992) review package. It has proved to be very effective in practice, and is recommended for use as a best practice approach (Fothergill, 2015). Therefore, with some amendments to fit with the aim of this research, the QMark was used to review the quality of EIA reports in Oman.

The EIR is a significant step in the EIA process, and good quality EIR can result in better decision making, and thus a better EIA system. Reviewing the quality of EIRs using substantial and well-established criteria would be a good indicator of the performance of the current Omani EIA process in practice.

3.1.1 IEMA Quality Mark

Despite the fact that the internationally-used Lee and Colley review package (1992) has been the most common in many researches, it was necessary to develop new criteria to adapt it to the aim of this research and to suit the characteristics of the Omani EIA system. Since IEMA have developed and updated the quality review criteria (QMark), the use of which is advised to promote best EIA practice, the QMark criteria was adapted with minor changes, in order to be suitable for the research undertaken. Using the QMark criteria in this research would help in identifying the main weaknesses and strengths in EIA process, as this is one of the research objectives.

IEMA designed the QMark to assess organisations to help them achieve excellence in their EIA activities in the UK, being based on best EIA practice approaches. The QMark was designed as a commitment scheme, to allow those organisations to independently review their EIA system. However, the QMark has proved that the quality of EIA practice of QMark registrants has improved (Fothergill, 2015).

The QMark has seven EIA commitments (COM 1-7) which all registrant organisations should commit to all of them in order to achieve excellence in their EIA practice (see Box 3.1). COM 1, 2 and 7 are related to EIA administration and management of the organisation. While

COM 3 to 6 are related to EIA reports review (IEMA, 2014). In relation to this research aim, COM 3 to 6 were used.

Box 3.1: List of the main commitments (categories) of QMark EIA Statements review criteria

<p>COM1: EIA Management</p> <p>COM2: EIA Team Capabilities</p> <p>COM3: EIA Regulatory Compliance:criteria relate to the requirements set out in the UK’s EIA Regulations. (Description of development, description of environment, alternatives, and impacts)</p> <p>COM4: EIA Context & Influence</p> <ol style="list-style-type: none">1. Scoping2. Alternatives, including iterative design3. Consultation <p>COM5: EIA Content</p> <ol style="list-style-type: none">4. Baseline5. Assessment6. Environmental mitigation & management <p>COM6: EIA Presentation</p> <ol style="list-style-type: none">7. EIS Quality8. Non-Technical Summary (NTS) <p>COM7: Improving EIA practice</p> <p style="text-align: right;">(IEMA, 2014)</p>
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3.1.2 Quality Criteria Used the Research

Based on Oman’s guidelines for EIA reports, and the findings of the Al-Azri et al. 2014 research on the performance of EIA systems in GCC (Table 2.2), several changes were made to the QMark criteria. Therefore, the alterations that were made in the current quality criteria, such as subtraction and addition of some sub-categories, are summarised in the Table 3.1. The criteria used in this research is structured around four main review categories which includes; EIA legal context, EIA context, EIA content and EIA presentation. Altogether there are 41 criteria under those main categories, outlined in Box 3.2 and the more detailed criteria is in Appendix 1.

Table 3.1: Amendments to the current Qmark to development new review criteria

Category	Developed Quality Review Amendments
Removed:	
2 Sub-categories from COM 3	These are related to UK legislations and have therefore been removed.
COM4: EIA context and influence category; the sub-category consultation	The consultation process is not well established in the EIA process in Oman. The environmental consultancy companies who conduct the EIA produce reports as contract between the consultants and the project owners. Also, there is little public consideration within the EIA process, even though it is mentioned in the Omani EIA guidelines.
Added:	
Related legislations and standards	These are required to be addressed in the EIA reports as per the Omani EIA guidelines.
Climate affairs	Consideration of climate affairs is a requirement for EIA reports as per the legislations.
Consideration of Environmental Management Plan during construction and operation phases	As per the Omani EIA guidelines
EIA Report length	Information regarding the length was added in order to compare it with its contents

Box 3.2: Current EIR review criteria

<p>1. EIA Regulatory Compliance</p> <p>1.1 Regulatory context</p> <p>1.2 Development description</p> <p>1.3 Alternatives</p> <p>1.4 Data required for assessment</p> <p>1.5 Baseline</p> <p>1.6 Impacts on environment</p> <p>1.7 Mitigation measures</p> <p>1.8 Difficulties encountered</p> <p>2. EIA Context & Influence</p> <p>2.1 Scoping</p> <p>2.1.1 Environmental topics</p> <p>2.1.2 Sensitive receptors</p> <p>2.1.3 Scoped out topics</p> <p>2.1.4 Scoped in topics</p> <p>2.2 Alternatives</p> <p>2.2.1 Alternative consideration</p> <p>2.2.2 Reasons for alternative selection</p> <p>2.2.3 EIA process influence</p> <p>3. EIA content</p> <p>3.1 Baseline</p> <p>3.1.1 Current conditions</p> <p>3.1.2 Sensitivity</p> <p>3.1.3 Baseline information limitation</p> <p>3.2. Assessment</p> <p>3.2.1 Assessment methods</p> <p>3.2.2 Evaluation of significance</p>	<p>3.2.3 Impact evaluation for all stages</p> <p>3.2.4 Prominence to positive and negative</p> <p>3.2.5 Impact significance after mitigation</p> <p>3.2.6 Inter-relationship of impacts</p> <p>3.3. Climate Affairs</p> <p>3.3.1 Climate affairs consideration</p> <p>3.3.2 Climate change risk</p> <p>3.3.3 Climate change alternatives & mitigation</p> <p>3.3.4 Climate affairs risk reduction plan</p> <p>3.4. Environmental Mitigation & Management</p> <p>3.4.1 Mitigation measures</p> <p>3.4.2 Mitigation effectiveness</p> <p>3.4.3 Mitigation commitments</p> <p>3.4.4 Environmental management plan</p> <p>4. Presentation</p> <p>4.1. EIA Quality</p> <p>4.1.1 Effective use of figures and tables</p> <p>4.1.2 Development site</p> <p>4.1.3 Timescale</p> <p>4.1.4 Penetration and readability</p> <p>4.1.5 Technical terms</p> <p>4.1.6 EIA length</p> <p>4.2. Non-Technical Summary (NTS)</p> <p>4.2.1 Sufficient information</p> <p>4.2.2 Maps and diagrams</p> <p>4.2.3 Self-contained</p>
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3.1.3 The EIR Quality Review Grading System

The IEMA QMark uses a different grading system from the previous review criteria; the QMark uses the traffic light grading system: green for 'Pass', yellow for 'Concerns' and red for 'Failure' (IEMA, 2014). Such a grading system is easy for even an inexperienced reviewer to use and adapt, and was therefore used in the current quality review criteria.

The grades were awarded to each criterion based on their significance in the EIA process, and the reviewers' judgment. For example, if there were no alternatives or mitigation measure considerations in the reports, the criterion would be awarded red (Fail), as these are very significant in the EIA.

3.1.4 Access to EIA Reports and Review Sample

EIA is a mandatory requirement for different projects in Oman by law, and MECA is the empowered authorization to issue such environmental permits and decisions. All EIA reports received by MECA are restricted to MECA staff only and not available to the public. Fortunately, since the author of this study is a current employee in MECA; access to EIRs and to the system itself was granted.

However, the main objective of EIA report quality review is to assess the performance of the EIA system through evaluating the quality of EIRs. Therefore, a total of five EIA reports were randomly selected and reviewed using the amended review criteria (Appendix 1). The EIRs for industrial projects (group 1, see table 2.2) were selected for the review because they are the type of project that require full EIA reports, and the selected EIR were produced recently as the research aims to evaluate the quality of the current system. The full name of the EIR is kept anonymous for confidentiality reasons. Table 3.2 shows the code given to each EIR, date of issue and the project type for research purposes. Finally, each EIA report required an average of two to three hours to complete a review.

Table 3.2: Project type of the EIRs study sample

EIA Code	Issue Date	Project Type
EIA_1	March 2015	Petrochemical Plant
EIA_2	April 2015	Power Station
EIA_3	March 2014	Liquefied Natural Gas Pipelines
EIA_4	April 2014	Galvanisation Plant
EIA_5	January 2015	Industrial Estate

In order to ensure that both stages (sections 3.1 and 3.2) of the research are linked, the participants should be involved in at least one the selected EIR sample. Therefore, during the interviews, participants were given the list of EIA reports that would be selected for quality review.

3.1.5 Advantages and Limitations of EIR Quality Review

EIR review criteria have, over the years, evolved through different versions and been tried and tested internationally, as shown in the literature. In many studies, the quality review have identified the strengths and weaknesses of EIRs, which can represent an overview of the quality of EIA practice. Moreover, the quality review QMark has been designed to be self-reliant so it can be used conveniently even if the user has only basic knowledge of the environmental assessment field.

On the other hand, there are several limitations to the use of this method. First of all, going back to the roots of the Lee and Colley (1992) EIA report review package, it was advised that EIA reports should be reviewed by a group of reviewers rather than by individuals (Peterson, 2010; Sandham et al., 2013). This is because group assessment is more critical, and assessment by individuals could result in weaknesses in the methodology. However, group assessment was not possible in this research, as necessity required that it be completed individually.

3.2 Assessment of the Quality of the Current EIA Practice through Interviews

EIR quality review alone is not enough to draw a clear picture of the whole EIA system. For that reason, it is important to understand the thoughts and perceptions of the employees who are involved in the EIA process, and their ability to interpret different EIA reports (See Figure 2.4 for the important role MECA staff have for the evaluation of EIRs and granting permits). In order to do so, semi-structured interviews were conducted with employees in MECA. A significant part of this research is therefore based on the judgments of employees and experts.

The semi-structured interview method was used to collect information from individuals and allow them to communicate their knowledge and experience. Indeed, interviews are commonly used in qualitative research due to their flexibility and ability to provide insights into what the participants believe and think in relation to the research topic (Creswell, 2003; Bryman, 2008; Braun et al, 2013).

Since the quality of EIA reports is assessed during the first stage of research, it was necessary to also assess the quality of the EIA process itself, and this can be determined through interviews conducted with those who are involved in the process. The main objectives of this method are; to identify the difficulties faced by individuals who are involved in the EIA process. As well as to recognise factors on which would constrain the regulators' ability to interpret information within the EIA reports.

3.2.1 Interview Guide Design

Semi-structured interviews were used in order to allow an in-depth investigation of the perspectives and thoughts of the participants. This was their opportunity to voice their thoughts, and discuss areas that should be given more attention in order to improve the quality of the EIA system in MECA. Indeed, an interview guide was designed in the form of questions to be asked of participants. The questions were designed to be open-ended, to ensure sufficient depth and allow the participants to share from their experience. The interview questions were also designed to cover the areas which were initially thought important to aid the purpose of the research (Figure 3.1). Additionally, the demographic information and professional experience of each participant was gathered at the beginning of each interview.

Experience of EIA process	<ul style="list-style-type: none"> • How convenient is the EIA process? • According to your knowledge and experience, what should an effective EIA system look like?
Experience of EIA reports	<ul style="list-style-type: none"> • What areas or chapters in the EIA report do you find it easy or hard to read and interpret? • How many times do you usually read an EIA report before you can fully understand and interpret?
Response in the case of significant impacts	<ul style="list-style-type: none"> • What do you usually do in the case of finding significant impacts on the environment without any mitigation or alternatives consideration
Consultant role	<ul style="list-style-type: none"> • What role you think consultants play in terms in the quality of the EIA process?
Recommendations for improvement	<ul style="list-style-type: none"> • Can you express your thoughts on how either the process or the reports can be improved ?

Figure 3.1: Interview guide

The interviews were conducted face-to-face in the workplace (MECA). Each participant was interviewed individually to increase credibility and reduce the subjectivity of their answers. The interviews were recorded, translated and transcribed precisely. Also, all participants and their data were anonymised and treated with high confidentiality, according to ethics guidelines by the University of Strathclyde.

3.2.2 Participants

The current EIA process in MECA passes through several stages, and the EIA reports are typically circulated among different departments until the final approval is issued (see Figure 2.4 for EIA process in MECA). That being the case, this study selected participants from the departments that EIRs are received more often, such as Environmental Planning and Environmental Inspection and Control departments (see Figure 2.3 for departments' structure). As the interviewing process started, it was noticed that the amount of information collected from less experienced individuals was small compared to that from those who are more experienced. The interviews length reflected the amount of information participants provided and that was very highly related to the experience, thus more experienced people tend to have longer interview (See table 3.3). The total number of interviewees was eleven. According to Braun and

Clarke, 2013, the amount of data collected from between six and twenty interviews for such a study is sufficient.

Table 3.3: Participants details and their experience

#	Department	Work Experience	Amount of EIR involved	EIA experience	Code	Length of interview	Date
1	inspection and pollution control department	More than 10 years	More than 100 EIRs	High	H1	40 minutes	June 29, 2015
2	Climate affairs expert			High	H2	1 hour	June 29, 2015
3	Environmental expert			High	H3	1 hour	June 30, 2015
4	Inspection and pollution control department			High	H4	1 hour	June 30, 2015
5	Inspection and pollution control department	10-5 years	20-50 EIRs	Medium	M1	30 minutes	June 30, 2015
6	Pollution operation monitoring center			Medium	M2	25 minutes	June 28, 2015
7	Planning department	Less than 5 years	Less than 20 EIRs	Low	L1	30 minutes	June 28, 2015
8	Planning department			Low	L2	20 minutes	June 29, 2015
9	Inspection and pollution control department			Low	L3	25 minutes	June 28, 2015
10	Inspection and pollution control department			Low	L4	20 minutes	June 28, 2015
11	Inspection and pollution control department			Low	L5	20 minutes	June 28, 2015

Key:
H: High experience, M: Medium experience, L: Low experience
(For more details of participants coding see section 4.2)

3.2.3 Data Analysis

The selection of the qualitative approach in the research was granted for its special feature of allowing a group of people to voice their ideas, experiences and recommendations. Furthermore, the thematic analysis is most commonly used in qualitative analysis; and thus the thematic analysis was applied to analyse the qualitative semi-structured interview data. Thematic analysis, as identified by Braun and Clarke(2013:174) is a *'Method for identifying themes and patterns of meaning across a dataset in relation to a research question; possibly the most widely used qualitative method of data analysis'*

Thematic analysis usually follows the bottom-up approach in generating the analysis, as themes are generated from the interview data. The main objective of using this method of analysis is to describe, understand and discuss the interview data.

3.2.4 Advantages and Limitations of Interviewing Method

Interviews, as a data collection method, have a number of advantages and limitations. Interviews are commonly used to generate a rich supply of data, as individuals elaborately speak about their experiences and perspectives. Semi-structured interviews are usually flexible, providing opportunity for the researcher to probe and ask unplanned questions which allows further investigation around the research topic. In addition, with a limited data collection period, interviews allow the researcher to select a smaller sample and still generate an adequate quantity of data (Braun et al., 2013).

Nevertheless, there are some limitations that have hindered the data collection process. Firstly, language differences, as the study involved interviews with non-English speakers. Due to the many differences between Arabic and English, it was time-consuming to transcribe and translate the interviews beside maintaining the integrity of the data and preserving its real meaning. Al-Amer et al.(2015) provided a few recommendations for researchers working on cross-language qualitative research, in order to overcome the differences and reduce the potential loss of meaning while translating the data. It was advised that the translator should be experienced in the same field as that of the research topic, and that the researcher should keep minimum distance from the data. In the case of this study, the researcher was the person who collected, translated and transcribed the data, hence the trustworthiness of the data was maintained.

In addition, semi-structured interviews are usually time-consuming in terms of organising and conducting, as well as transcribing, the interviews. They also had to be conducted in Oman within a very limited time frame, made data collection process more complicated. Staff who are willing to participate in the data collection were informed earlier and meeting appointments were set.

This Chapter have provided in details the two main adapted methods for the research; quality review of five EIRs of industrial projects in Oman and interviews conducted to MECA staff who are involved in EIA process to determine the quality of EIA process. The following chapter presents the results of those methods and highlight the main findings.

Chapter 4 Quality of EIA Reports and EIA Process in Oman

This chapter is the heart of the research; it represents the outcomes of data collections undertaken during the study period. This research aims to “*assess and evaluate the quality of EIA process holistically through evaluating the quality of EIA reports.*” Hence, this chapter clearly elucidates how this aim was achieved.

Since the research methodology has adopted a combination of two separate stages, the findings of each stage will be analysed separately, in order to determine the significance of the findings of each stage. As emphasised in chapter 3, the objective of stage 1 is to assess the quality

of Environmental Impact Assessment Reports (EIRs) for Omani industrial developments, by using quality criteria. In stage 2, on the other hand, the main objective is to evaluate the quality of the current Environmental Impact Assessment (EIA) process by conducting interviews with Ministry of Environment and Climate Affairs (MECA) staff. Combining the findings of both stages has demonstrated how the quality of EIA reports and process contributes to decision making.

4.1 Quality of EIA Reports

In this first section of the chapter the quality of EIA reports (EIRs) is discussed in detail, and the findings of the review conducted at an earlier stage of the research is analysed. The strengths and weaknesses of EIR quality in Oman were identified by analysing and comparing different elements of each of the categories and sub-categories of the review criteria. The results, regarding the overall quality and that of each main category, are discussed under the following sub-headings.

4.1.1 Overall Quality of EIRs

The grades of EIR review criteria were awarded as follows: green for those which passed, satisfactorily fulfilling the criteria; yellow for those causing concern and not fully complying; and red for failure to comply.

In addition to the individual scoring for each criterion, for each category the overall is calculating not as an average score, but taking into account the importance of the criterion. For example, an EIR without mitigation measures would be poorer than an EIR without effective use of figures or tables. Knowing the category overall score would allow the understanding of where the strengths and weaknesses in EIRs lie, exactly.

Detailed results of the EIR quality review are summarised in Table 4.1. By looking at the overall result, it appears that the overall quality of all reviewed EIRs to some extent is only at concern level. That is because the reports have missed out key elements from the EIA reports to be considered as high quality. Due to the importance of EIRs for decision making they must adopt best practice approach and fulfil all requirements. Without doubt, not including important elements in EIRs will result in inadequate reports and would make it harder for decision makers.

Table 4.1: Results of EIA reports quality review

Review Criteria*	EIA_1	EIA_2	EIA_3	EIA_4	EIA_5
1. EIA Regulatory Compliance					
1.1 Regulatory context					
1.2 Project description					
1.3 Alternatives					
1.4 Data required for assessment					
1.5 Baseline					
1.6 Environmental impacts					
1.7 Mitigation measures					
1.8 Difficulties encountered					
Category Overall					
2. EIA Context & Influence					
2.1 Scoping					
2.1.1 Environmental topics					
2.1.2 Sensitive receptors					
2.1.3 Scoped out topics					
2.1.4 Scoped in topics					
2.2 Alternatives					
2.2.1 Alternative consideration					
2.2.2 Reasons for alternative selection					
2.2.3 EIA process influence					
Category Overall					
3. EIA content					
3.1 Baseline					
3.1.1 Current conditions					
3.1.2 Sensitivity					
3.1.3 Baseline information limitation					
3.2. Assessment					
3.2.1 Assessment methods					
3.2.2 Evaluation of significance					
3.2.3 Impact evaluation for all stages					
3.2.4 Prominence to positive and negative					
3.2.5 Impact significance after mitigation**	N/A				
3.2.6 Inter-relationship of impacts					
3.3. Climate Affairs					
3.3.1 Climate affairs consideration					
3.3.2 Climate change risk					
3.3.3 Climate change alternatives & mitigation					
3.3.4 Climate affairs risk reduction plan					
3.4. Environmental Mitigation & Management					
3.4.1 Mitigation measures**	N/A			N/A	
3.4.2 Mitigation effectiveness**	N/A			N/A	
3.4.3 Mitigation commitments**	N/A			N/A	
3.4.4 Environmental management plan**	N/A			N/A	
Category Overall					
4. Presentation					
4.1. EIA Quality					
4.1.1 Effective use of figures and tables					
4.1.2 Development site					

Review Criteria*	EIA_1	EIA_2	EIA_3	EIA_4	EIA_5
4.1.3 Timescale	Green	Yellow	Green	Red	Yellow
4.1.4 Penetration and readability	Green	Green	Green	Green	Green
4.1.5 Technical terms	Green	Yellow	Green	Green	Green
4.1.6 EIA length	Green	Green	Green	Green	Green
4.2. Non-Technical Summary (NTS)					
4.2.1 Sufficient information	Green	Green	Yellow	Green	Green
4.2.2 Maps and diagrams	Red	Green	Red	Red	Green
4.2.3 Self-contained	Green	Green	Green	Yellow	Green
Category Overall	Green	Green	Green	Yellow	Green
Length of EIA without appendices (No. of pages)	169	102	137	127	130

* Full quality review criteria description is in Appendix 1

** Some documentation was missing from the full EIA report during the analysis, therefore the criteria was marked as Not Applicable (N/A)

Furthermore, Figure 4.1 illustrates the performance in each main category of the EIR, based on the review results.

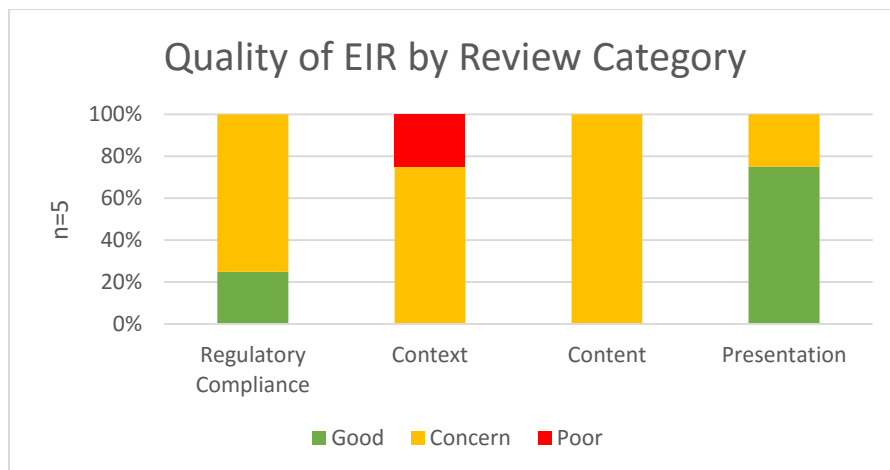


Figure 4.1: Quality of the reviewed EIRs according to the main review categories

Clearly the Figure illustrates a trend indicating that in the majority of EIRs the quality in the main categories are at a concern level. Comparing the categories, 80% of the EIRs have succeeded in terms of presentation, while all reports have not completely succeeded in addressing the main requirements of EIA content. The lowest performance was in the EIA context category; 20% failed in providing effective EIA context, while 80% were at a concern level. Finally,

20% of the reviewed EIRs have succeeded in complying with the Omani EIA regulations, and 80% of EIRs were at a concern level.

4.1.2 Main Category 1: EIA Regulatory Compliance

This category was included in the quality review criteria to evaluate the regulatory compliance that is stipulated in Omani EIA guidelines. The results show that the majority of EIRs (80%) do not fully meet the requirements established within the guidelines, as shown in Figure 4.2.

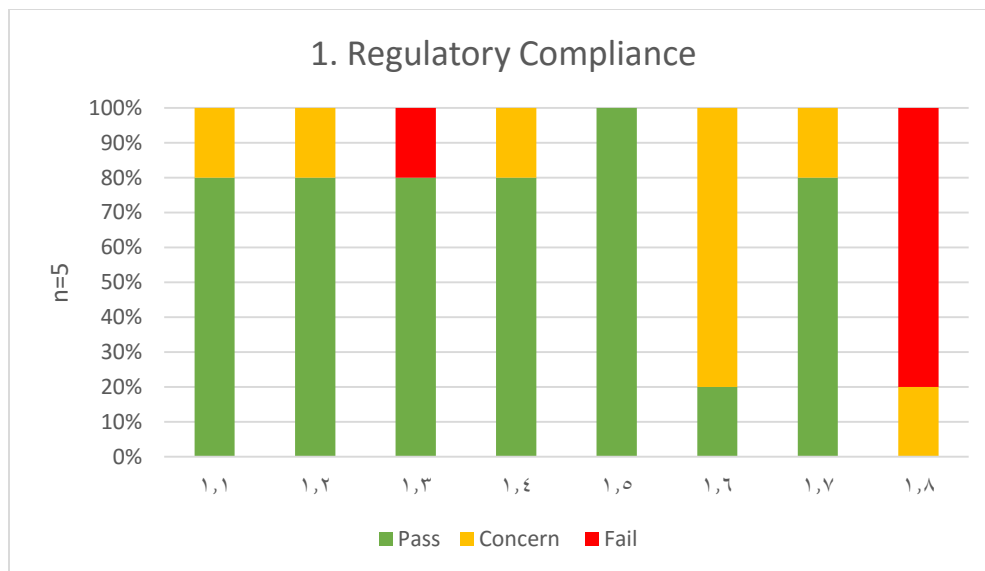


Figure 4.2: Quality of the reviewed EIRs according to the category of regulatory compliance
Key: 1.1: regulatory context; 1.2: project description; 1.3: alternatives; 1.4: data required; 1.5: baseline; 1.6: environmental impacts; 1.7: mitigation measures; 1.8: Difficulties encountered

The best performance in the assessment was in baseline topic identification (criterion 1.5). The provision of an indication of difficulties encountered in compiling the required data for the EIR (criterion 1.8) is not even attempted in most of the EIRs (80%), while 20% of EIRs have included such information, only briefly. Despite the fact that addressing the regulatory context (1.1) is very basic, 20% of the EIRs reviewed have not performed well. Also, 80% of reviewed EIRs have not fully described the likely significant effects of the development on the environment (1.6). In terms of description of development (1.2), consideration of alternatives (1.3), data required for assessment (1.4) and mitigation measures (1.7), 80% of the EIRs have addressed

these requirements. It appears that most of the EIRs complied and included most of the key elements of an EIA, such as project and site description, environmental topic, the likely impact of the development and the mitigation measures.

4.1.3 Main Category 2: EIA Context

This category scored the lowest grade with 80% of EIRs assessed were concern and 20% failed in terms of EIA context (see Figure 4.1). Scoping is a very significant step in the EIA process, yet the assessment showed that it is not performed effectively. Clear deficiencies were found in this area; there was insufficient explanation of methods used to identify the key environmental topics and why they were scoped in. All EIRs failed to identify which topics were scoped out of the study and why. The consideration of alternatives was another area where particular weaknesses were shown, with 40% assessed as a fail, and 40% considered satisfactory (see Figure 4.3).

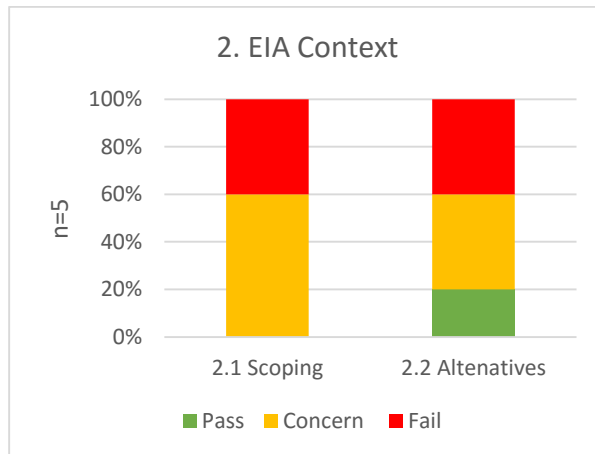


Figure 4.3: Quality of the reviewed EIRs according to scoping and alternatives

The main omissions were in the identification of alternatives and in identifying reasons for alternative selections and their impacts. However, the lack of consideration of alternatives is known to be an international issue, because it is considered in the later stage of project design. Also, the alternative location for development is not usually considered because in many cases the EIR is submitted when project planning is almost completed, and location is decided and fixed

(Steinemann, 2001). Scoping is the key to a good EIR quality; failure to sufficiently scope could lead to including excessive information in the EIR and unnecessary impacts assessment. Conversely, if not much consideration was given to particular topics, it could result inefficient EIA (Wood et al., 2006).

4.1.4 Main Category 3: EIA Content

In relation to EIA content, the majority of the reviewed EIA reports were not completely compliant in conducting effective and robust environmental assessments (Figure 4.4).

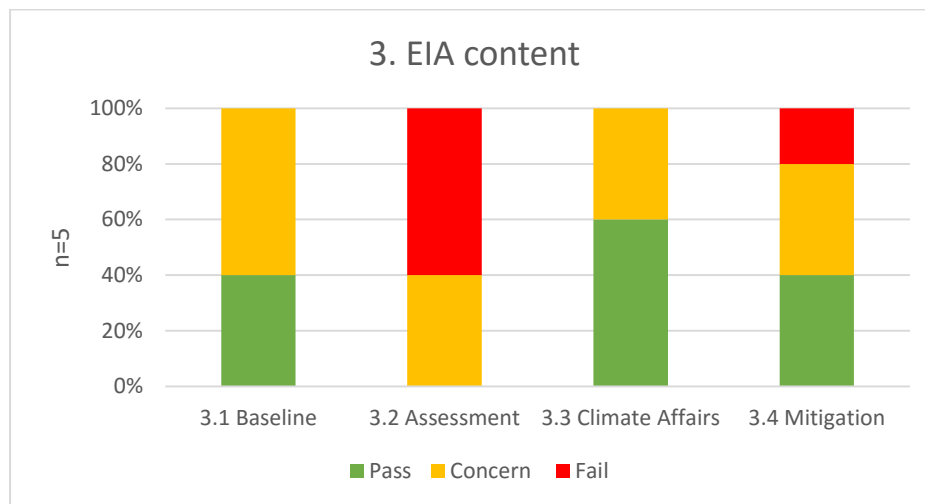


Figure 4.4: Quality of the reviewed EIRs according to EIA content

The sub-category with lowest performance was the assessment (3.2), with 60% of EIRs failed to perform well. More than half of the EIRs performed inadequately in terms of mitigation measures, with 40% and 20% of EIRs achieving concern and fail scores, respectively. However, in climate affairs, and in baseline, they have performed slightly better than in the other sub-categories: 60% and 40% scored pass in climate affairs and baseline, respectively.

The description of the current conditions of the environmental area likely to be affected by the development was covered very well in the reviewed EIRs. Additionally, the majority of the EIRs evaluated the sensitivity of the baseline, some performing better than others. The best performance was in the climate affairs category, except for 20% scored concern because they combined climate affairs with mitigation measures, despite their importance.

The assessment of impacts was not performed adequately in the reviewed EIRs. There were clear omissions in terms of identification of the effectiveness of mitigation and the impacts that would remain even after the implementation of mitigation. There was also failure to consider the inter-relationship of impacts and not identifying secondary, cumulative and synergistic effects. Considering the inter-relationship of effects is of great importance during the assessment, as it adds robustness to it; however the EIRs failed to address them.

The environmental mitigation and management chapter was missing from 20% of the EIRs, which resulted in some deficiencies in evaluating the quality of this sub-criterion. Yet the remaining EIRs have not performed well either. Indeed, there is clear failure to assess the effectiveness of mitigation and implementation. Nevertheless, all EIRs have succeeded in including the environmental management plan which is considered very important in Omani legislation.

4.1.5 Main Category 4: Presentation

This category has been allocated the best grades compared to other review categories. As 80% and 40% of the reviewed EIA reports have succeeded in delivering good EIA report quality, and non-technical summary (NTS) in terms of presentation, respectively (see Figure 4.5). In relation of EIR layout quality, the reviewed EIRs mostly performed well (80%). However, one deficiency was observed: the development’s construction and operation timescales were not clearly set out. Setting out clear timescales for the development is very important for decision makers, and should not be neglected.

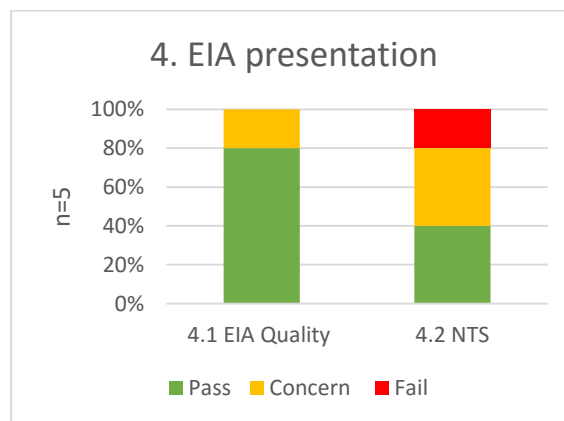


Figure 4.5: Quality of the reviewed EIRs according to EIA presentation

Conversely, the quality of performance in producing NTS was not good, with 40% concern and 20% fail. NTS (sometimes called Executive Summary) is a component of EIR that summarises the main findings of the EIA, including project and site description, alternatives, impact assessment and mitigation measures in non-technical way. That can be easily read and understood by the decision makers, public and non-experts (Jesus, 2009). Therefore, it can be argued as the most important document in an EIR for both decision makers and the public, because it summarises the whole EIR simply and briefly for them to understand. The main weakness was in the effective use of maps and diagrams to illustrate the proposed project location, although this is a very basic thing to include. One strength observed in NTSs was that the majority included an NTS in both English and Arabic, which is especially commendable for a country where Arabic is the first language.

4.1.6 Key Findings of EIR Quality Review

The results from the EIR quality review show that the quality of the reports were to some extent at a concern level. There were significant elements not included in the reports, so that they were not of very good quality. The quality review showed that most EIRs performed better in the descriptive and presentation sections, while performing less well in analytical sections such as the impacts identification and assessment.

The greatest weakness was shown in the scoping stage, in consideration of alternatives and in the impact assessment. All reports failed to address the cumulative and secondary impacts of the projects. Consideration of mitigation measures was to some extent at a satisfactory level. On the other hand, the main strengths were found in addressing the environmental topics and describing their conditions. Also, in layout and presentation the EIRs performed well.

4.2 Quality of EIA Process

This section of the chapter identifies the challenges faced by employees involved in the EIA process, and recognises the shortcomings of the EIA process, by allowing employees to voice their thoughts and perspectives. This will enable evaluation of the quality of the EIA process and identification of key strengths and shortcomings within the process itself.

The total number of interview participants was 11, from different departments of the ministry and with a variety of experience. Three participants had more than 20 years of experience in the environmental field and had been involved in different stages in the EIA process, while two participants had 10 – 15 years of experience, and the rest (6) less than 10 years of experience in the field. The length of each interview and the depth of the information provided were according to their years of experience and level of knowledge. Table 4.2 summarises the participants' EIA experience.

For the purposes of results analysis the participants' experience was given certain codes according to their level of experience. High (H) for those who were involved in more than 50 EIRs, medium (M) for involvement in 20 - 50 EIRs, and low (L) for less than 20 EIRs. The names of participants were kept anonymous for confidentiality reasons. For further classification during the analysis, the participants were numbered according to their years of experience, and then codes were given according to their work experience and EIA experience. For example, participant (H2), has 24 years of experience, the second highest number of years of experience and high EIA experience (for more details, see Appendix 2).

Table 4.2: participant experience

Experience (years)	Number of EIRs involved	Number of participants	Code
More than 15	More than 50	4	H
5 – 15	20 -50	2	M
Less than 5	less than 20	5	L

4.2.1 Analysis of Interview Findings

Full transcription of interviews was followed by manual coding using thematic analysis. Coding allowed for the categorising of the interview data, as described in the methodology. For further identification during the analysis, colour coding was used during code generation. Full details of the participants' interviews can be found in Appendix 3. Table 4.3 summarises the codes derived from interview transcripts, and themes that were conceptualised from the codes. The findings and analysis of interview data are discussed according to themes, under the following sub-headings.

Table 4.3: Codes and themes obtained from thematic analysis of the interview data

Codes	Themes
Not updated	EIA process in MECA
Slow process	
Lack of review guidelines	
EIA is not at satisfactory level	
Not well digested	
Standards are not based on Oman's climate	
Inefficient process	
EIA process purpose	
Mitigation measures	
Alternative consideration	
Public Participation	
Climate change consideration	
Factors that enlighten	
Time consuming process	
Lack of experience	Staff experience and training
Staff lack of experience	
Large number of technical words	
Critical position	
Work load	
Lack of manpower	
Lack of training	
Consultant quality	Consultants and project owners
Lack of consultant guidelines	
Business and profit	
Consultant subjectivity	
Lack of proponent knowledge	
Much negotiation	
Hard to enforce	
Improving	Opportunities
Emergence of SEA concept	
Negotiation	
Decision making	
Communication	

Figure 4.6 illustrates the percentage of occasions each theme has occurred in interview transcripts. EIA process was mentioned and cited in 34% of the participants' feedback, having the highest occurrence of all themes. It appears that the EIA process itself needs more exploration. Meanwhile the themes of experience and consultants were repeated 26% and 25% of the time, respectively.

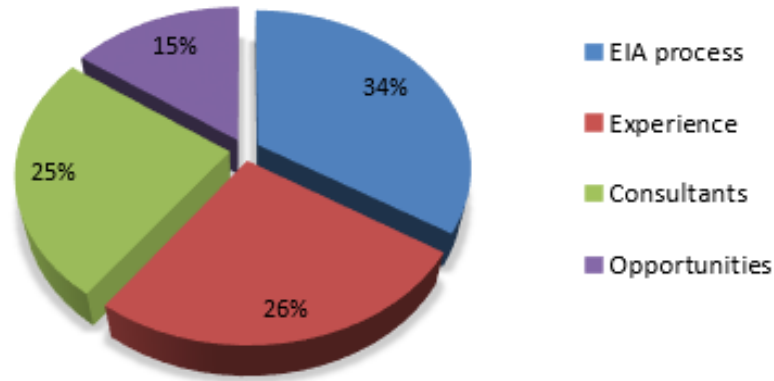


Figure 4.6: Percentages of theme repetitions in the interview data

4.2.1.1 EIA process in MECA

All the participants shared their thoughts and comments regarding the EIA process in Oman, with different points of view. As evaluating the quality of EIA is the main aim of this research, the topic was repeated often in the interviews (34%). Many participants have described deficiencies and omissions within the process that made it slower and more inconvenient.

Despite the fact that EIA legislation in Oman has been established since 1982, some of the participants have commented that it is not fully embraced in decision making: *'I believe that the concept of EIA is not well digested both here in MECA, and in the government as a whole.'* (H4, 2015). In the same way, many believed that the process has gaps needing to be filled and that it needs updated: *'It is sad that EIA is done just to fulfil the law, and not taken as a design tool or as best practice. I don't think it is at a satisfactory level. There are some gaps in the process that make it slower or incomplete.'* (H2, 2015). Notably, comments regarding the process not being updated, the existence of gaps, the lack of guidelines, and the quality level of the process were mainly mentioned by high- and medium-experience participants.

One of the interviews' objectives was to identify the difficulties faced during employees' involvement in the EIA process. Low-experience participants mainly mentioned the technicality of EIA reports, as they could not grasp some EIR terms, and it was taking them more time to interpret them, as one commented: *'They are written in a complicated way, and a lot of technical terms are used that I am not familiar with. This is usually time-consuming, as I have to try to understand its meaning first, before giving any judgment or comment'* (L4, 2015). Different interviewees thought that the circulation of EIRs between different departments is what makes the process inconvenient and difficult, as one thought *'After circulation of an EIR around the departments, I read over all the comments. Here is where I find the difficulty, because most of the time there is conflict between the requirements of our department and the requirements of other departments; I have to follow up all of them, which is usually time-consuming'* (L1, 2015).

Although the Omani EIA guidelines have to some extent set out guidelines of what a good EIA should be like, there are yet some deficiencies in the process. Highly experienced participants shared their thoughts on EIA procedures, and Table 4.4 summarises the main elements of the EIA process that were pointed out during interviews.

The main omissions found under this theme included lack of specific guidelines, the existing guidelines and standards being outdated, circulation of EIRs for review, and inadequate performance in screening, scoping, consideration of alternatives and cumulative impacts. It appears that screening and scoping are conducted based on expert judgment as there is no specific guidelines to help in these stages of the EIA process. Major procedures such as consideration of cumulative impacts and alternatives are usually neglected during the process.

Despite the omissions found in the system, there are some strengths. The Omani legislation imposes a great emphasis on environmental management plans, emergency and contingency plans, and consideration of climate affairs.

Table 4.4: Participant feedback according to EIA process in MECA

EIA Procedures	Comments and Quotes
Screening and Scoping	<i>'The issue is in identifying when an EIA should be submitted; EIA should not be done for every single project, and if it is, not everything should be included. There are no specific guidelines for decisions on screening and scoping. It is not given enough attention.'</i> (H4, 2015).
Consideration of Alternatives	<i>'Site selection alternatives are usually neglected, as the project owners don't want to consider them. The site and project design are pre-selected.'</i> (H4, 2015)
Cumulative Impacts	<i>'Cumulative impacts are usually not addressed clearly in EIRs; we have to identify them based on our knowledge and skills. I am sure that it is usually not studied or given attention in EIA review.'</i> (H2, 2015)
Public Participation	<i>'Just recently after Sohar protest event regarding the industrial estate and port of Sohar as the public concerns of environmental pollution and health effects started to grow bigger. MECA started to request social impacts assessment for big developments, but it is still vague'</i> (H4, 2015)
Environmental Management Plan (EMP)	<i>'We focus here on the emergency and contingency plans for most of the projects, as each project has to address their environmental management plan (EMP), emergency plan and health and safety very clearly'</i> (H1, 2015)
Climate Affairs	<i>'After the significant impacts of Cyclone Gonu in 2007, the government started to take action, and realised how important the impacts of Climate Change are. Since then it has become a requirement in EIA'</i> (H2, 2015)

4.2.1.2 Staff experience and training

Staff experience and training were spoken of on many occasions during the interviews conducted (26%). Surely this indicates the contribution of capacity-building to the quality of the EIA system. It also shows that the staff are aware of the importance of training in improving the quality of the system.

Clearly the lack of experience and training obstruct the process in MECA. Participants with more experience elaborated more on this argument, saying, for example, *'EIA reports are given to staff that are not well trained in these areas. How they can evaluate reports when they don't even have an idea of what an EIA is and why it is required?'* (M1, 2015). Sometimes big tasks are given to inexperienced employees; they can't give appropriate judgements when they don't have enough experience or are not adequately trained. *'EIA review requires a trained and experienced person to do it, in order to evaluate the impacts of the project design; but here we are the ones who review EIRs. We don't have enough training and experience to decide. It requires a lot time to read and understand the report to be able to judge'* (L2, 2015).

Interestingly, participants with high and medium levels of experience expressed their need for more training and experience in order to be called an EIA expert: *'Well, after all these years in MECA I still feel that I am not experienced enough and I need more training.'* (H4, 2015) *'Even though we get the chance to attend different EIA courses, it is not enough, and they are not provided on a regular basis. There are also other factors that need to be improved or added'* (M2, 2014).

The high-experience participants complained about the workload: *'I am in a very critical position and I have a heavy work load, so I don't have enough time to go through the whole report. We receive large numbers of applications and submissions, but there are not enough employees and experts to cover the complete review.'* (H3, 2015). Due to the workload and lack of capacity the quality of the EIA process is being compromised, which is a drawback: *'Due to work pressure and a lack of experts to review the scoping reports, the project owners initiate the study without*

waiting for the scoping comments, then they submit the EIR' (H4, 2015). All in all, lack of adequate training, lack of experts, and workload are the main weaknesses found here. Providing adequate training for those who are involved in EIA is a basic requirement in order to excel in EIA practice.

4.2.1.3 Consultants and project owners

Consultants and project owners are major contributors in EIA process completion. Since environmental consultancy companies are the bodies responsible for conducting EIAs and compiling EIRs, the quality has a significant impact on the quality of EIRs produced. This is commented on by almost all interview participants, for example: *'If they are of excellent quality then their EIA reports will be excellent, and easier and faster to review. Vice versa, if they are poor quality consultants then their outcome will be poor'* (H3, 2015).

There are no specific guidelines used by consultants to conduct an EIA; they follow the Omani EIA guidelines, and sometimes go further and follow US or UK EIA guidelines. There are no published quality control criteria for the consultant company: *'In some cases they provide poor quality EIR; then we inform them and ask them to resubmit, following our comments, yet sometimes they submit poor EIRs again. However, if there were some guidelines or quality control they would improve'* (H1, 2015).

The financial interests of consultancy companies can outweigh environmental motives, as they seek financial profit for conducting an EIA rather than having concern for the outcome. This can create a conflict of interests between all players: MECA, project owners and consultants. Additionally, in some cases the consultants' judgement in environmental assessment is influenced by subjectivity: *'Good consultants should be neutral and give appropriate prominence to both positive and negative impacts of the development, not hide the negative impacts because they were hired by the project owners. They let feelings direct the decision rather than science and the facts, as I have noticed'* (H4, 2015).

'Project owners come to us aggressively; they think MECA is a barrier working against their development and businesses. In many cases they don't understand the real concept of EIA.' (H2, 2015). The lack of knowledge and environmental awareness of project owners is another obstacle, and another factor in the conflict of interests.

Lack of consultants' guidelines and quality control can affect the quality of the EIA process through providing inadequate services and EIRs. Conflict of interest between the three sectors could implicitly weaken the system.

4.2.1.4 Opportunities

Few participants have actually grasped the opportunities lying behind the EIA system in MECA. Although they were mentioned on some occasions it was deemed likely that there were prospects for improvement. Some of the participants' feedback suggested that different EIA stages and decisions are carried out depending on their judgment and knowledge in the area. For example, the Social Impacts Assessment (SIA) is not mentioned in the Omani EIA guidelines, but it is requested in some cases such as large developments.

In spite of the deficiencies found in the EIA process in MECA, some participants agreed that in many cases they have to use their position of authority and knowledge in the field to communicate with both consultants and project owners. *'In some cases we ask for meetings to discuss the alternative location, or design of the project. Sometimes we ask them to use certain technologies instead of the ones they mentioned. We don't reject some projects completely, instead we add some requirements in the permits so that the development should follow the law'* (H1, 2015).

It appears that the participants are aware of good EIA practice, as they expressed their thoughts in suggesting what a good EIA process should be like: *'The EIA report is circulated for review to different departments; obviously it will take time. But when a team of multi-disciplinary experts review and evaluate the EIA, the process will be faster and permits will be issued in a shorter period of time and result in better outcomes'* (H1, 2015).

The idea of Strategic Environmental Assessment (SEA) is to some extent incorporated in decision making, but not officially (Box 4.1). There is some potential for change and improvement in the EIA system in MECA, the participants believe. The initiation of the SEA concept is a good indication of the prospects of improvement. SEA is a process used to evaluate the environmental impacts of a proposed policies, plans, or programmes to inform the decision making and to ensure sustainability. The main aim of SEA is to improve the strategic actions. In Oman, however,

if SEA is implemented in the future policies, plans, and programmes would be improved (João, 2005).

Box 4.1: Initiation of Strategic Environmental Assessment (SEA) concept

‘The government of Oman has established (the Public Establishment for Industrial Estates, PEIE) as there are areas set to be as an industrial estates which most of the industrial developments should be constructed within certain boundaries. These locations was designated for developmental projects. Then when a certain company or industry request for approval of the project the process should be issued faster. Because the location have been previously studied and assessed. By definition this could be considered as Strategic Environmental Assessment (SEA) as it was designed on the level of plans and policies not just on the project levels. Also, for residential areas there were previously designated and approved as a residential areas to avoid industries no matter in which level to mix up with residential and housing’ (H4, 2015)

4.2.2 Key Findings from Interview Data

The participants feedback showed that there are several weakness found in the EIA process. The main weaknesses include a lack of specific and technical guidelines for sectoral procedures. Due to such a lack, many technical deficiencies have occurred that reduced the quality of the EIA system in Oman. Although there are guidelines that cover the whole EIA system, which were adopted from the World Bank, they have not been updated and are not very specific.

The EIR review process itself is poor; EIRs are reviewed by circulating them between different departments in MECA, but this process has many weaknesses, including time-consumption, conflict of interests between departments, lack of communication, and increased subjectivity. Also, the staff involved in the process are not well trained or experienced. Besides this, the experienced staff are burdened with large workloads, due to the lack of experts, and this prevents them from working efficiently.

Apart from this, there are several further deficiencies found in the process, in that: it is not carried out adequately in the areas of screening, scoping, and consideration of alternative and cumulative impacts. In the absence of specific and technical guidelines, most of these processes are carried out based on expert judgment only.

The environmental consultancies are the bodies responsible for conducting EIA and compiling EIRs, thus their quality has a significant influence on the quality of the EIA process and documentation. The results show that the lack of consultants' guidelines and quality control results in a lack of enforcement. Apart from this, the project proponents' lack of awareness and knowledge could compromise the quality of EIA in many ways, including creating a conflict of interest between the three bodies (MECA, consultants, and proponents).

Nevertheless, some strengths were found that could lead to the conclusion that the EIA system in Oman is relatively good. Different stages of EIA process that are performed based on expert judgment and their ability to identify the impacts of the proposed project. The regulation bases are good, and they only need to be updated in order to remain dependable. Great attention is given to environmental management plans and to some extent environmental monitoring reports. Finally, there is some potential in emerging the concept of SEA into decision making which would improve the policies, plans and programmes.

This Chapter have included the results obtained from EIRs quality review and highlighted the main feedback from participants' interviews. The following Chapter discuss those findings to answer the research question, link them to decision-making and identify the key influences to decision-making.

4.3 Contribution to Decision Making

The quality review of EIRs, together with interviews with MECA staff, have revealed that the quality of the EIA system in Oman has some concerns. The quality of the EIA system makes a significant contribution to decision making in MECA. Good EIR quality can facilitate good decision making. However, having good quality EIRs in itself will not result in a good system, as there are several factors that influence the quality of the EIA system in Oman. Those factors include the quality of the EIA process, capacity building, the quality of consultants, and proponents' knowledge.

Several deficiencies were found in the EIA process that has weakened its effectiveness. Firstly, the lack of updated, specific and technical EIA guidelines, which has created uncertainties

in the EIA process. Secondly, key stages in EIA are not performed adequately, such as screening, scoping, and consideration of alternatives, impact assessment and public participation. Nevertheless, some strengths were also found in the EIA process, including mitigation measures, environmental management planning, emergency planning and climate change considerations.

Another factor found in the EIA system that has influenced decision making is capacity building. MECA staff, or the regulators, are the body responsible for evaluating EIRs and deciding upon acceptance or rejection of the proposed project. A lack of adequate training and experience has limited the number of experts that can carry out sufficient EIR reviews and decision making. In addition, the large number of proposal applications, and resultant heavy workload, have influenced the quality of the EIA system.

Consultants and project owners also play a significant role in the quality of the EIA system. The lack of guidelines and quality control for consultants has affected the quality of what they produce. Besides which, a lack of proponents' knowledge and environmental awareness have created conflicts of interest between regulators in MECA, consultants, and the proponents.

In conclusion, all of these factors have limited the effectiveness of the EIA system in Oman, and influenced decision making. All of the strengths found should continue to be improved, and all of the weaknesses should be considered opportunities for improvement, as discussed further in the following chapter.

Chapter 5 Conclusions and Recommendations

The previous chapters have answered the research question, which was ‘How does the quality of the EIA system affect decision making in Oman?’ Several factors were found within the EIA system that are affecting decision making in practice. This chapter summarises key research findings. Recommendations for future EIA practice in MECA, and future research that would have potential of valuable additions to the literature are addressed.

5.1 Summary of Key Findings

After presenting the findings of the research methodology in chapter 4, it is necessary to discuss those findings and link them to the literature. Also, the results from the two stages of the research undertaken are both discussed here in order to answer the research question and achieve the aim of this research.

Decision making in Oman has been shown to be influenced by the quality of the EIA system, including the quality of EIRs. The findings show that there are several factors that affect both the quality of the EIA system and of decision making, and these are discussed further in this section, as well as linked to the literature.

5.1.1 Legislative and Institutional Factors

The findings of this research show that EIA practice in Oman has to some extent produced EIRs of mostly a concern quality. Current Omani EIA legislation is considered to have a firm basis and cover the basic EIA requirements of best practice, however, the implementation and enforcement of the legislation and guidelines is incomplete, which has resulted in some deficiencies. In addition, the EIR quality review findings were based on five industrial project EIRs; the quality patterns should be confirmed by a larger research sample and a greater variety of projects. The quality of the EIRs could be affected by the relative complexity of the projects, therefore including diverse types of projects would confirm this (Badr et al., 2011).

The quality review of EIRs concluded that they have generally performed better in descriptive areas than in analytical areas. For example, in project and environment description and EIR documentation and presentation they have performed relatively well, while performance was inadequate in the areas of scoping and impact assessment, which are considered to be the core of the EIA. A similar pattern of results has been found in many other studies (Canelas et al., 2005; Badr et al., 2011; Kabir et al., 2012; Sandham et al., 2013). This could be linked to findings from the interview data, such as a lack of technical and specific guidelines, and the current guidelines being out of date. Based on experience and literature from the UK and Europe, the quality of EIRs improves with time, and with regulation amendments (Wood, 1999; Fuller, 1999; Canelas et al., 2005; Glasson et al., 2012). Additionally, good performance in environmental and baseline descriptions could indicate the quality and experience of consultants. Sandham et al. (2008) suggest that despite the lack of adequate environmental assessment, they tend to depend on their disciplinary background to help them in compiling the rest of the EIA document.

Participants' feedback highlighted one major weakness in the EIA system in Oman, which is the lack of capacity building in MECA. Most of the staff involved in EIA process in MECA are not competent to review the EIA, nor to contribute in decision making. Clearly there is a lack of adequate training and experience. Even though there are well-trained and experienced employees in MECA, they are overloaded with many different tasks. There are many project proposal applications submitted in MECA, along with EIRs and scoping reports, and there is not enough expertise to complete these tasks effectively. The lack of human resources has affected decision making and therefore compromised the quality of the EIA process (Kakonge, 1999; Morrison et al., 2001; Clausen et al., 2011; Smart et al., 2014).

Additionally, the process MECA has adopted for the review of EIRs is not efficient enough to allow employees to conduct adequate and comprehensive reviews. The circulation of EIRs between departments, and the fact that the staff reviews each EIR individually, have resulted in a lack of communication, and in conflicts between those involved. Reviewing the EIRs individually, together with inadequate competence, increases the subjectivity of the review (Lee et al., 1992; Peterson, 2010; Badr et al., 2011).

5.1.2 EIA Process Factors

In relation to the EIA process and stages, findings show that screening and scoping are performed inadequately. The decision on whether the project requires an EIA or not is made based on expert judgment and basic guidelines stated in the Omani EIA legislation. The types of projects are classified into groups according to the technical aspects of their construction and operation phases, as described in the literature review (see section 2.3). In the scoping stage, the scoping report is required to be submitted as per the EIA guidelines. However, the quality of scoping identified by the EIR quality review was scored fail, and performance was low compared to other EIA stages. In addition, the participants' feedback showed that due to workload and lack of expertise the scoping reports are not evaluated, so the consultants continue the rest of the EIA process and submit the final EIR. The scoping stage is an important stage in facilitating the process of EIA. Scoping allows the practitioner to focus specifically on the significant environmental impacts, rather than wasting time and resources by including a wide range of environmental topics (Snell et al., 2006; Wood et al., 2006). While at sometimes including very little information could result in neglecting the assessment of significant impacts, and affect the quality of EIA process.

Impact assessment identification is the core of an EIA, and performing poorly will clearly result in a poor quality and ineffective EIA (Glasson et al., 2012). The quality review showed that in relation to EIA contents, failure in performing adequately in the area of impact assessment. There was no consideration of alternatives, nor were inter-relationship impacts such as secondary and cumulative impacts assessed. Some participants, however, explained more: while reviewing the EIRs of large projects they try to identify the cumulative impact of this project on other projects in the area. Identifying the impacts and their magnitude can be achieved if the reviewer is well-trained and experienced, however, the lack of expertise was clearly emphasised previously. Consequently, this would affect the quality of the process. Perhaps the undertaking of a cumulative impact assessment is a difficult process, and Oman is experiencing rapid development growth. Also the lack of clear guidance, and limited resources, could be factors contributing to the absence of this element in the Omani EIA process (Smart et al., 2014).

The timing at which EIA is involved in a project's lifecycle is also an important factor. If EIA is involved in the early stages of project planning it will be very effective, while involving it only in the later stages of project planning would be a waste of time and resources (Glasson et al., 2012). As the project designed and location are already decided, what if the EIA showed that there are significant impacts on the selected location or of the project design. More time and financial cost will be required to mitigate the impacts.

5.1.3 Stakeholders Influence

Stakeholders here refer to the public, consultants and proponents. The involvement of the public in the EIA process is not well-implemented in Oman, while consultants and proponents are the key factors in the EIA process success.

In spite of the fact that the public participation requirement is included in the Omani EIA Guidelines, it has not been implemented properly until the last few years, when the public made complaints regarding existed projects and their impacts. The government then started to request Social Impact Assessments (SIA) from some projects, which means there is a good prospect of improvement in this particular area of the EIA system. However, there are unclear guidelines as to when the public should be involved in the process, and whether their involvement really affects decision making in MECA. Also, interview participants' emphasised that the level of public involvement depends on the scale of the project.

The consultants are the body responsible for conducting EIAs and compiling EIRs, hence their quality and competence are vital for a good and effective process. However, the findings show that there are a few factors that could influence the quality of the consultants and their judgments, and thereby affect the quality of the EIA process. Since the consultants' income comes from the proponents, this could be a factor that would affect their objectivity. A lack of environmental awareness in proponents is another challenge; the project owners usually believe that MECA is a hindrance to their business, and many negotiations take place between the three parties regarding the project before the decision is made.

5.2 Recommendations for Future EIA Practice

The basis of the Omani EIA legislation is relatively good, but not well-enforced or implemented. Awareness of this fact should be taken advantage of, and the positive development of the system taken forward again. This section is, therefore, providing some recommendation for future EIA practice that by adopting them, robust system would result.

The lack of updated and specific legislation has weakened the quality of EIAs, including the different stages within it. Perhaps MECA could work with international and professional EIA bodies such as, IEMA, IAIA or the World Bank in order to develop and improve the EIA system holistically. Those international bodies have established EIA procedures guidelines or handbooks that are based on best practice approach (Glasson et al., 2012). Taking advantages of the experience of other countries advanced EIA systems and adopting with some changes to fit to Oman's system would be beneficial. EIA legislation in Oman should be updated including more specific EIA guidelines that could be used by consultants while conducting an EIA.

MECA should Establish a comprehensive EIA body including multi-disciplinary experts that is responsible for responsible for regulating, evaluating and reviewing all the various components of the EIA system. This body, with support of international EIA bodies, should establish comprehensive EIR library database and EIR review criteria. However, improving the legislation alone is not enough to improve the system; the EIA body should develop adequate programs to build its' staff capacity.

The research findings showed several weaknesses within the EIA process that need to be improved in order to enhance the effectiveness of the EIA. More specific screening and scoping criteria is required. As due to the importance of scoping, more attention should be given to it, scoping stage is not performed well in EIA process in MECA mostly due to lack of specific guidelines and staff capacity, thus, improvements are necessary in this area. Details methods on predicting and evaluating the impacts magnitudes are not usually provided, hence failure in the performing adequate impacts assessment. Therefore, more attentions and improvement are required in impact assessment area and more defined guidelines should be established. However, establishing more specific EIA guidelines would improve the overall process.

Capacity building is required for the key EIA practitioners such as, MECA staff, consultants, and project owners. Firstly, competent workforce is required for robust procedural and regulatory EIA system. Adequate training and workshops to MECA staff would boost their expertise and would build firm foundation. Additionally, launching consultant guidelines and quality control would allow only competent consultants to conduct an EIA, on which would result in effective EIR. Finally, proponents' knowledge is important; they need to understand the value of EIA to know that EIA is not just legal requirement but also as design tool. Based on those three practitioners' roles in EIA system, integrated workshops should be conducted to facilitate the identification of strengths and shortcomings in every aspect of EIA. These workshops would increase the knowledge and awareness of proponents regarding EIA and its purposes. Figure 2.1 was used to summarise and illustrate recommendations of future practice and improvement needed in each area in EIA system, see Figure 5.1

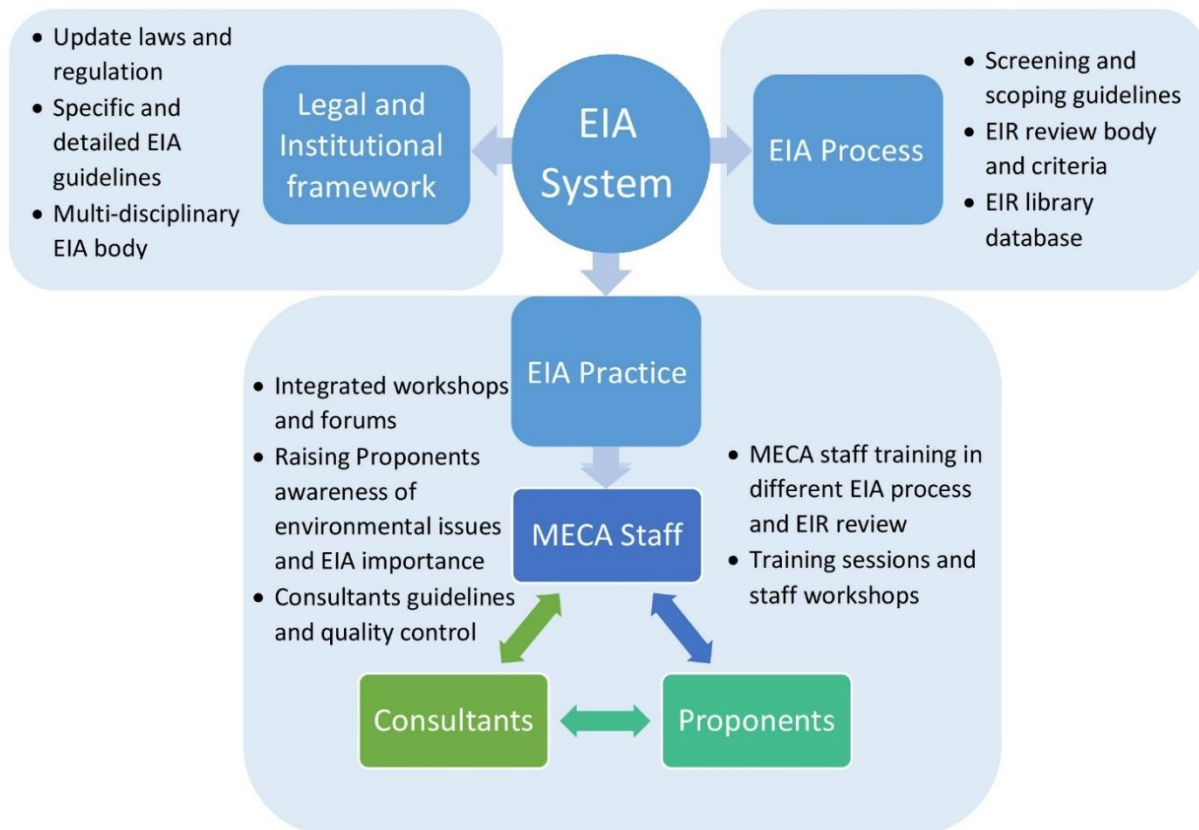


Figure 5.1: Recommendation for future EIA practice in MECA

5.3 Recommendations for Future Research

The current research found there is little literature in relation to the EIA system and practice in Oman (Elfadl, 2004; Bashir, 2011; Al-Azri et al., 2014). This research aimed to identify the influence of the quality of the EIA system on decision making, through reviewing the quality of EIRs and interviewing regulators in MECA. The main research objective was to explore the strengths and weaknesses of the Omani EIA system. However, the study sample of EIRs was small (5 EIRs) for confirming the quality patterns found in this research. Therefore, a larger sample of EIRs would confirm the quality trends of EIRs in Oman. This study have chosen to review the quality of EIRs of industrial projects only, perhaps reviewing the EIRs quality of different project types would provide a wider understanding and identification the EIRs and EIA quality in Oman.

This study has only explored the perspective of MECA regulators on the EIA system. As this research is a pilot study of EIA system in Oman, hence, starting from MECA was important to recognise the strengths and weaknesses from regulatory point of view. More studies should examine the perspective of the different bodies involved in the system, such as consultants, developers and the public. This would add more value the evaluation of the quality of the EIA system in Oman. Also, would allow a wider understanding of the whole EIA system and its components. Since consultancy bodies are the responsible body for conducting an EIA, they would be more aware of the strengths and shortcomings in the system. Conducting a research that focuses on consultant perspective would add more value to literature and to EIA practice.

The EIA system is a very broad and complex field, and there is a lot to explore and study within it. A research is, therefore, should be conducted to study and evaluate different stages of EIA process individually with more depth. For example, a thorough study could be done to evaluate and examine the screening and scoping processes in EIA process in Oman to provider more identification of the process quality. Additionally, more studies should be conducted including public participation and its influence in EIA process. Finally, since there is a positional in emergent of SEA concept, more research should be done to explore the possibilities and challenges of SEA implementation.

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Appendices

Appendix 1: EIR Quality Review Criteria

1. Grading system:

Pass	
Concern	
Fail	
N/A	Not Applicable

2. Criteria:

1	EIA Regulatory Compliance	Grade	Comments
1.1	Does the EIA report (EIR) contain clear section providing all related legislation, standards and applicable permits for construction and or operation phases?		
1.2	Does the EIR contain a clear section, or sections, providing a description of the development comprising information on the site, design and size of the development during construction and operation?		
1.3	Does the EIR contain a section, or sections, that outline of the main alternatives studied by the developer and an indication of the main reasons for his choice, taking into account the environmental effects?		
1.4	Does the EIR contain a clear section, or sections, that provides the data required to identify and assess the main effects which the development is likely to have on the environment?		
1.5	In the light of the development being assessed has the EIR identified, described and assessed effects on the following sub-criteria: <ul style="list-style-type: none"> - Population - Fauna & Flora - Soil - Water - Air - Climatic factors - Landscape - Cultural Heritage - Material Assets - Other 		
1.6	Does the EIR contain a section, or sections, that describe the likely significant effects of the proposed development on the		

	environment, including as reasonably required: direct, indirect, secondary, cumulative, short, medium, long-term, permanent and temporary, positive and negative effects?		
1.7	Does the EIR contain a clear section, or sections, that provides a description of the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects?		
1.8	Does the EIR contain a section, or sections, that outline any difficulties encountered by the developer in compiling the information presented in the EIR?		
	Overall:		

2	EIA Context & Influence	Grade	Comment
2.1	Scoping		
	2.1.1. Has the ES clearly stated what environmental topics will be addressed and how this decision was reached?		
	2.1.2. Are the main sensitive receptors and their locations clearly identified with an explanation of the risks posed from the development?		
	2.1.3. Does the EIR identify the environmental topics, raised during the scoping process, that will not be assessed and explain why they are not being considered further?		
	2.1.4. For those environmental topics scoped into the EIA, is it clear that the assessment has focussed on sub-issues relevant to the proposed development effects on each topic?		
2.2	Alternatives, including iterative design		
	2.2.1. Does the EIR set out the main alternatives / iterations that were considered at different points during the development of the proposal?		
	2.2.2. Are the main reasons, environmental or otherwise, for the selection of the proposal over distinct alternatives and design iterations easily identifiable?		
	2.2.3. Does the EIR clearly indicate how the EIA process, environmental effects and consultee responses influenced the iterative design process that led to the proposed development?		
	Overall:		

3	EIA content	Grade	Comment
3.1	Baseline		
	3.1.1. Does the EIR describe the condition of those aspects of the environment that are likely to be significantly affected by the development?		
	3.1.2. Is the 'sensitivity' of the baseline environment clearly evaluated?		
	3.1.3. Where limitations in the baseline information exist, which could influence the assessment findings, are they easily identifiable?		
3.2	Assessment		
	3.2.1. Are the methods for establishing the 'magnitude' of effects on the receiving environment clearly defined?		
	3.2.2. Where the EIR sets out a generic method for evaluating significance, is this applied throughout the EIR? Where an overarching approach is not followed are the specific methods used to evaluate significance for each environmental topic clearly justified?		
	3.2.3. Does the evaluation of significance consider the different stages of development (construction, operation) and relate the effects identified to the condition of the baseline environment?		
	3.2.4. Does the EIR give appropriate prominence to both positive and negative effects relative to their significance?		
	3.2.5. Does the EIR identify the significance of effects that are anticipated to remain following the successful implementation of any mitigation described in the EIR?		
	3.2.6. Is it clear that the EIA has considered inter-relationships in order to identify secondary, cumulative and synergistic effects?		
3.3	Climate affairs		
	3.3.1. Have the EIR addressed the Climate Change Issues, and considered assessing the resilience of a proposed development to the impact of climate change?		
	3.3.2. Does the EIA clearly indicate the Climate Change risk & impact assessment of the proposed development?		
	3.3.3. Does the EIR clearly identified the alternatives and mitigation Measures of the proposed development?		

	3.3.4. Does the EIR contain a section that clearly address the Climate Affairs Risk Reduction Plan (CARRP)?		
3.4	Environmental Mitigation & Management		
	3.4.1. Does the EIR describe the measures proposed to be implemented to avoid, reduce, or offset significant adverse effects of the proposed development?		
	3.4.2. Is an attempt to indicate the effectiveness of the influence of the stated mitigation measures on the significance of the environmental effects provided?		
	3.4.3. Does the EIR set out how mitigation measures are to be secured and implemented and with whom the responsibilities for their delivery lies?		
	3.4.4. Does the EIR contain a section, or sections, that describe clearly the environmental management plan (EMP) during construction and operation phase?		
	Overall:		

4	Presentation	Grade	Comments
4.1	EIR Quality		
	4.1.1. Does the EIR make effective use of maps, figures, tables and diagrams? In particular covering: - The location of the site, its boundary and site layout; - operational appearance (where available); - main environmental receptors; and - environmental effects (where visual representation is appropriate).		
	4.1.2. Is the proposed development site clearly described?		
	4.1.3. Are the anticipated timescales of construction, operation and (where appropriate) decommissioning of the proposed development clearly set out in the main text?		
	4.1.4. Is the EIR presented in a manner that would allow a member of the public to logically locate the environmental information they were seeking?		
	4.1.5. Are technical terms kept to a minimum, with a glossary (/ list of acronyms) provided?		
	4.1.6. Is the length of the main text of the EIR appropriate to the: proposed development, sensitivity of the receiving environment and significant environmental effects identified?		

4.2	Non-Technical Summary (NTS)		Called executive summary
	4.2.1. Does the NTS provide sufficient information for a member of the public to understand the significant environmental effects of the proposed development without having to refer to main text of the EIR?		
	4.2.2. Are maps and diagrams included in the NTS that, at a minimum, illustrate the location of the application site, the boundary of the proposed development, and the location of key environmental receptors?		
	4.2.3. Is it clear that the NTS was made available as a separate stand-alone document?		
	Overall:		

Appendix 2: Research Abstract and Set of Recommendation Provided in Arabic for MECA

تقييم نظام دراسة التأثيرات البيئية في سلطنة عمان

أجريت دراسة لرسالة الماجستير من قبل الطالبه شمساء بنت عبدالله الخنجري في جامعة ستر اثكلايد بمدينة جلاسكو البريطانية. هذه الدراسة قامت بمراجعة و تقييم جودة دراسة التأثيرات البيئية التي تستقبلها وزارة البيئة والشؤون المناخية للمنشآت الصناعية. تمت هذه الدراسة عن طريق استخدام معايير عالميه لدراسة جودة دراسة التأثيرات البيئية بمعرفة نقاط الضعف و القوى في النظام التأثيرات البيئية. معرفة هذه النقاط ستساعد الوزارة في عملية تطويرها و ارتقاءها من أجل الحصول على بيئة نظيف و خالية من التلوث الناتج عن المنشآت الصناعية و التنمية المستمرة. بالإضافة الى هذا التقييم اجريت مقابلات مع موظفي الوزارة من أجل معرفة وجهة نظرهم في جودة نظام دراسة التأثيرات البيئية بشكل متكامل و واسع و منتظم.

من خلال عمل هذه الدراسة وجدت بعض العوامل التي تقلل من جودة نظام التأثيرات البيئية

- الاطار القانوني قديم و بحاجة الى تجديد مفصل
- نقص التدريب الازم للموظفين و نقص الخبراء المدربين
- قلة الوعي البيئي بين المراجعين و العامة
- نقص القوانين المفصلة و الارشادات التوضيحية للنظام
- نقص الارشادات التوضيحية الخاصة بالاستشاريين البيئيين و ضبط الجودة

الصورة التوضيحية التالية توضح بعض المقترحات الازمة من أجل تطوير نظام التأثيرات البيئية و تحسين عمل الوزارة:

