



# \* INTEGRATED MANAGEMENT SYSTEM IN THE OFFSHORE OIL AND GAS INDUSTRY

## A CRITICAL REVIEW

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This presentation presents a critical review of the Integrated Management System (IMS) in the Offshore Oil and Gas Industry based on the available IMS studies in the Oil and Gas Organisations.

- Overview of Oil and Gas Industry
- What is IMS from the perspective of the Oil and Gas Organisations?
- History and Evolution of IMS in the Oil and Gas Industry
- Why the Offshore Oil and Gas Organisations embarked into the Integrated Management System?
- Offshore Oil and Gas Organisation's Approaches/Experiences on the integration of the management systems
- Integrated Management System Models in the Offshore Oil and Gas Organisations
- Further study



# Overview of Oil and Gas Industry

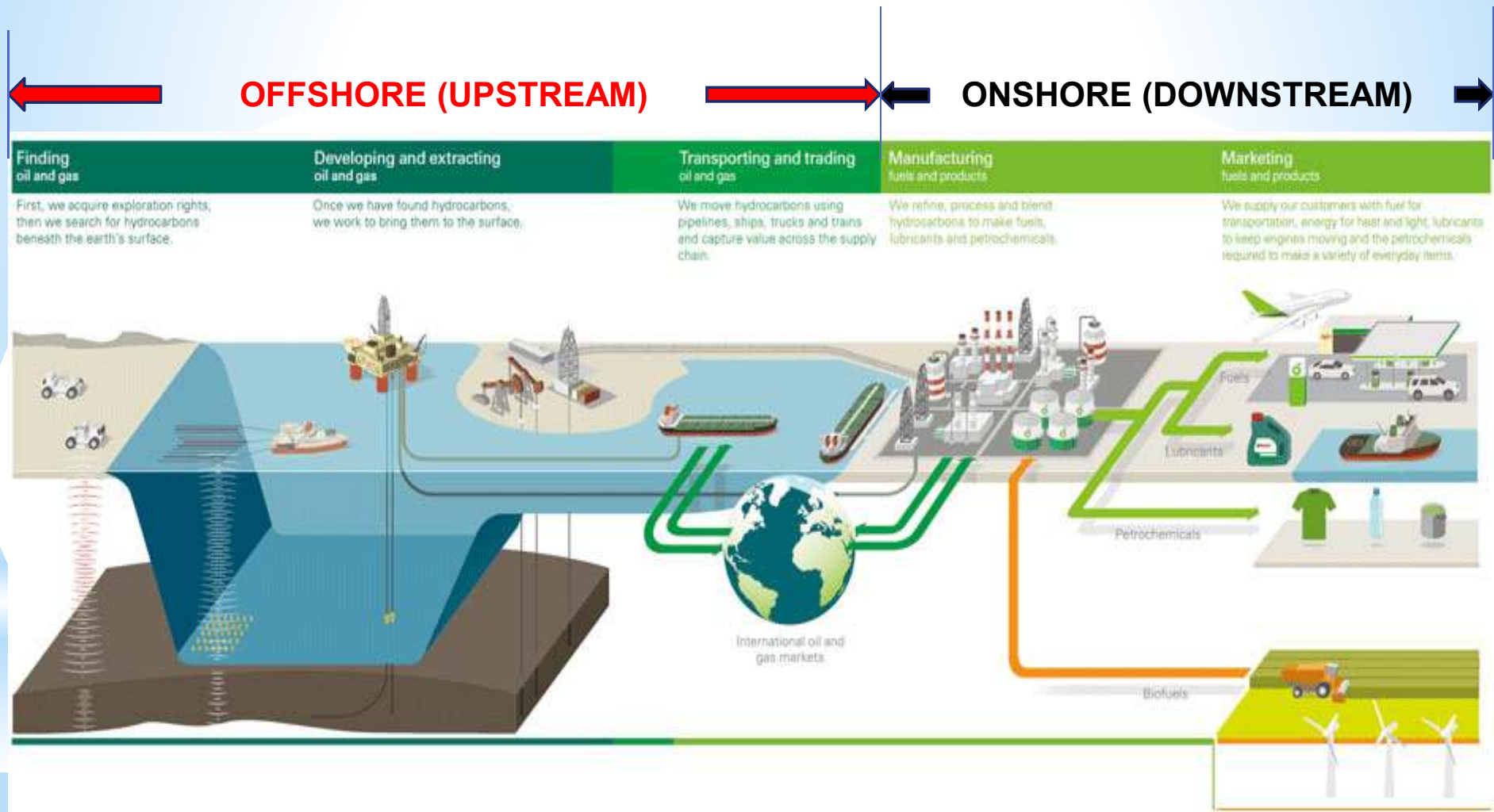
The Oil and Gas Industry is typically classified into two sub-industries:

- \* Offshore
- \* Onshore

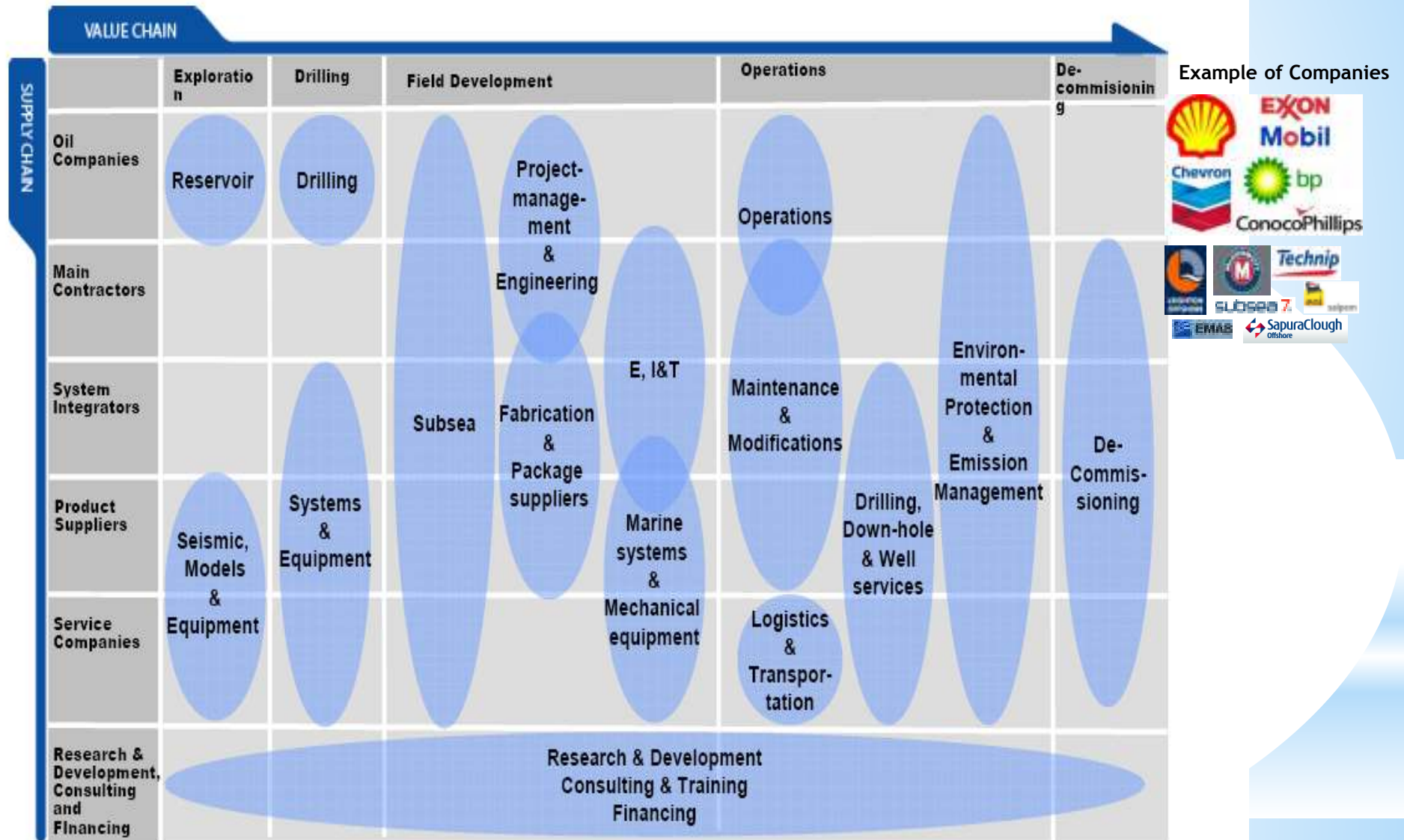
**OFFSHORE (UPSTREAM)**

**ONSHORE  
(DOWNSTREAM)**

# Overview of Oil and Gas Industry



# Offshore Oil and Gas Value and Supply Chain



## What is Integrated Management System (IMS)?

Alignment, compatibility, co-ordination, deployment and combination are some of the terms being used to define IMS in general.

IMS integrates all the components of Organisation business processes into one coherent system ([CQI, 2013](#)) or framework ([BSI, 2013](#)) in order to achieve the Organisation's unified objectives.

The typical standards that being used for integration of Management Systems ([BSI, 2013](#)) are as follows but the list is not finite and the range of standards that may be incorporated into the integrated management system may vary in some countries / regions:

- ISO 9001 (Quality)
- ISO 14001 (Environmental)
- OHSAS 18001 (Occupational Health & Safety)
- ISO/IEC 27001 (Information Security)
- ISO 22000 (Food Safety)
- ISO/IEC 20000 (IT Service Management)<sup>6</sup>

## **What is Integrated Management System (IMS) from the perspective of the Oil and Gas Organisations?**

Similar IMS definition was mentioned in the Oil and Gas literatures but ([Narayanan, 2006](#)) added that **Organisation, Resources and Processes** are the fundamental component for IMS. For systems to be an integral part of the Company's Management System there have to be linkages so that the boundaries between processes are seamless.

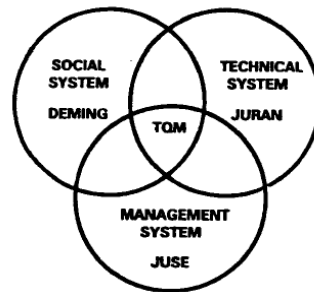
Scope of Integrated Management System in most Oil and Gas Organisations covers:

1. Occupational Health and Safety Management System
2. Environmental Management System
3. Quality Management System

# History and Evolution of Integrated Management System in the Oil and Gas Industry

Total Quality Management (TQM) is very popular in the 1990s. ([Cevenini, 1993](#)) used Total Quality Management to relate to the “Management System” in his model below :

TOTAL QUALITY MANAGEMENT IS AN  
AGGREGATE OF THREE SYSTEMS



Optimizing Upstream  
Processes Through Total  
Quality Management. -  
Adapted from Mauro Cevenini,  
Texaco E&P Inc. 1993

One of the earliest studies which use the word “Integrated Management System” ([Alderman & Donegani, 1994](#)) when he suggested for integrated Safety, Environment and Quality Management System is used in the oil and gas industry.

There were several literatures related to Integrated Management System presented in the following years.



1. ([Downey, 1995](#)) mentioned about the development of E&P Forum **Health, Safety** and **Environmental** Management System (HSE-MS) Guidelines
2. ([Clement, W, & Sulistiyono, 1996](#)) elaborated on the Business Integration of **Safety, Health** and **Environmental** Management,
3. ([de Jong, 1996](#)) suggested the Evolution from **Safety** Management System (SMS) to HSE MS by incorporating Health Aspects into the **HSE** Management System,
4. ([Wills, Frew, Hammond, & Rafn, 1996](#)) suggested the Use of Integrated Management Systems Assessments for Continuous Improvement of **EHS** Programs,
5. ([Fonseca & Filho, 1998](#)) mentioned about **Health, Safety** and **Environment** Integrated Management System in Amazonia.
6. ([Amaral, 2000](#)) shared his experience in the Implementation of an Integrated **Environment, Quality, Health** and **Safety** Management System in the Brazilian Oil Industry,
7. ([Kuijk & Kuijper, 2000](#)) made a study of **HSE**-Management System in Action,
8. ([Madkour, 2000](#)) introduced the Operating Company's (**HSE**) Management System (Guidelines, Practices & Results),
9. ([Tess, 2002](#)) presented a case study on the Implementation and Integration of a **Safety** Management System within an **ISO 14000** and **ISO 9000** Certified Facility,
10. ([Abernathy & Knode, 2001](#)) shared his experience in Creation of an Integrated Management System in the Oil and Gas Company (**QHSE**)
11. ([Beyk & Paradas, 2002](#)) looked into **Quality, Health, Safety** And **Environment** Synergy By Creating Alliances Between Oil And Service Companies In Integrated Projects,
12. ([Sohani & Haugnaess, 2002](#)) developed Contractor **QHSE** Management System By Integration Into The Safety Management System,
13. ([Tramier, 2002](#)) looked at the Future Overview of **Health, Safety, Environmental** Management,
14. ([Robson & Parsons, 2004](#)) explored the benefits and challenges of an **ISO**-Registered Management System in Atlantic Eastern Canada,
15. ([J. Nouri, 2005](#)) made the comparison of Environmental Performance in the **HSEQ** Management System for the International and Iranian Oil and Gas General Contractors,
16. ([Narayanan, 2006](#)) proposed for Integrated Management System- Implementing **QHSE** into the Project from Beginning to the End,
17. ([Roy, 2007](#)) looked into Integrated **Quality, Occupational Health, Safety** and **Environment** Management System in ONGC – A Pursuit of Excellence,
18. ([Unnikrishnan & Rajab, 2008](#)) proposed an Integrating Systems Approach in **Accident & Incident** Investigations,
19. ([Lopez et al., 2008](#)) shared about An Innovative Approach Towards a Sustainable Performance Excellence (**HSEQ**) in Qatar by Integrated Implementation of a Management System,
20. ([Faso, Khallaf, & Anelli, 2009](#)) showed the set up and implementation of an Integrated Management System (**HSEQ**) in Petrobel,
21. ([Wadi, 2009](#)) suggested an Integrated Approach to Managing **HSE** Requirements at Oil and Gas Facilities,
22. ([Galinetto, Celiento, & Rombaldoni, 2011](#)) shared the **HSE** Integrated Management System: A Framework Supporting Global Challenges And Sustainable Business Governance,
23. ([Campbell, Bouly, & Polo, 2012](#)) suggested to keep the **HSE** Management System SIMPLE!,
24. ([Wild & Middleton, 2012](#)) suggested to integrating **Social Responsibility** into Management Systems to Mitigate Risks.

# Evolution of Integrated Management System in the Oil and Gas Organisations

Although the Consultant ([Alderman & Donegani, 1994](#)) suggested for integration of Quality, Safety and Environmental Management (QSE) Systems, in the 1990s most of the Oil and Gas Organisations integrate Health, Safety and Environment (HSE) Management System as the scope of IMS. This is in line with the fact that the oil and gas industry involve a highly risk activities, thus the oil and gas Organisations focuses thoroughly on health, safety and environment, recognizing that field development poses major challenges.

Quality was added into the Integrated Management System scope together with Health, Safety and Environment in later years such as by Petrobras in 2000, followed by Halliburton in 2001. Other Oil and Gas Organisations started developing integrated Quality and HSE Management System as IMS until now.

In the recent study ([Wild & Middleton, 2012](#)), Social Responsibility was added into the IMS.

The earlier IMS literatures were on sharing of general strategies or “how-to” but the later literatures were more focus/specific and in depth to each Organisation needs

Note :

Most of the available literatures published since 1990s were by the Oil and Gas Companies during the E&P Oil and Gas Conferences and Seminars. Hence, conclusion on the IMS evolution in the Oil and Gas industry is limited to these available literatures only.

# Why the Oil and Gas Organisations integrated their management systems?

**Consultants** - ([Alderman & Donegani, 1994](#)) stated that the oil and gas industry is facing a number of quality, safety and environmental requirements imposed by the Regulators, Organisation and Industry Standards. Many oil and gas companies who are having “intolerable burden” in managing all these three requirements due to numerous audits and noncompliance actions are looking into integrating the requirements into one single system.

**Halliburton** started the Integrated Management System initiatives in late 1995 due to three problems faced on separate Quality and HSE management systems which are operational resource constraints, similar intention but non-alignment with the way work is performed and implementation of the systems was not part of the work process ([Abernathy & Knode, 2001](#)).

The implementation of an integrated Environment, Quality, Health and Safety Management Systems (EQHS) in an organisation such as **Petrobras** is a rational and efficient manner of increasing performance and optimising resources in the management of these functions ([Amaral, 2000](#)).

**Schlumberger** Oilfield Services hires various contractors or third party suppliers to help their operations. The need to manage them in a structured and systematic way has made them to consider the Contractor QHSE Management System which is based on the model recommended by Oil and Gas Producers (OGP) Forum (([Sohani & Haugnaess, 2002](#)).

**ONGC** acquire simultaneous certifications for QHSE as they believe it will result in a substantial saving in time, effort and money ([Roy, 2007](#)).

([Lopez et al., 2008](#)) stated that the **Schlumberger** that have a mature management systems with strong leadership and bottom up approach tend to use the integrated management system approach as an innovative approach towards a sustainable performance excellence.

The Oil and Gas Organisation embarked into the Integrated Management System due to many reasons but similarity of the reasons could be observed i.e for **IMPROVEMENT**

# Offshore Oil and Gas Organisations' Approaches/Experiences on the Integration of the Management Systems

Research Paper	Company	Approach
( <a href="#">Roy, 2007</a> ).	ONGC	ONGC synergised the requirements of the standards with the activities of the organization. Did not use external consultant, use internal staff to develop the IMS. The most challenging job was the development of QHSE documents based on the model documents which addressed the requirements of the standards as applicable to the basic functions of the Organisation
( <a href="#">Narayanan, 2006</a> )	-	He suggested three best approach to implement IMS depending on the current situation of the organization. <u>Conversion</u> – for organization that only have QMS, build by adding the necessary processes to cater for HSE and other standard requirements; <u>Merging Systems</u> – for organization that have more than one system and <u>Systems Engineering Approach</u> – design a top down system to fulfil a specific objectives, one coherent system which serves as business needs and does not tie the organization to a particular standard. He also suggested that to ensure effective design and implementation of IMS is done, the Company has to define the Business Model and Primary Functions
( <a href="#">Sohani &amp; Haugnaess, 2002</a> )	Schlumberger	Consider the Contractor QHSE Management System which is based on the model recommended by Oil and Gas Producers (OGP) Forum.
( <a href="#">Abernathy &amp; Knode, 2001</a> )	Halliburton	Started with separate Quality and HSE Management before the creation of Halliburton Management System (HMS) which is an integrated management system that provides a structure covering HSE and Quality within the framework of each activity.
( <a href="#">Amaral, 2000</a> )	Petrobras	Set up a Working Group to study the integration of management systems inside the Company. The Working Group was split into 3 sub-groups to deal with Integrated EQHS Policy, Guidelines for Integrated Auditing and Guidelines to Prepare a Manual of Integrated Management System. Implement all Management Systems at the same time
( <a href="#">Fonseca &amp; Filho, 1998</a> )	Petrobras	Started with integrated Environmental and Health Management System due to the nature of their projects which are in the Amazonia areas. It was followed by integrating the Safety Management into the H&E Management System and became HSE Management System

## **Offshore Oil and Gas Organisations' Approaches/Experiences on the Integration of the Management Systems**

Different approach at each Organisation as different starting level of integration but similarity observed on the followings:

- Use the ISO 9001, ISO 14001 and OHSAS 18001 standard requirements as references for integration.
- E&P Companies use the elements from the OGP (E&P) Forums
- Synergise or map the integration requirements with their business processes
- No external Consultant
- Use internal staff as Working Committee
- Management's commitment and involvement
- Project Management initiatives with budget and time
- Develop framework or model based on ISO 9001, ISO 14001 and OHSAS 18001 standard requirements
- Challenges faced at the development of the IMS Documentations
- Claim successful in the integration

# Integrated Management System Model in the Offshore Oil and Gas Organisations

There were few established IMS models published by the Oil and Gas Organisations in the literature.

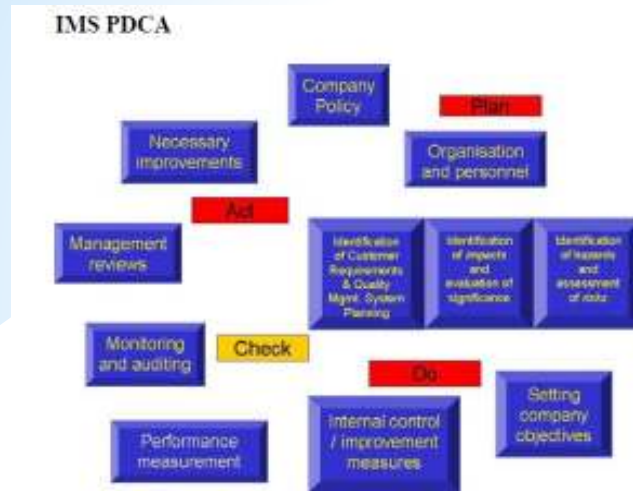
The basic Integrated Management System Model consists of five major components: (i) Policy, (ii) Planning, (iii) Implementation and Operation, (iv) Checking and Corrective Action and (v) Management Review. ([Roy, 2007](#)).

The Integrated Management System documentation consists of QHSE Management Manual, Common Procedure Manual, Environmental Procedure Manuals, Safety Procedure Manual, Operational Control Procedures, Legal Register, Year Planners and Records showing evidence of having complied with the requirements of the standards ([Roy, 2007](#)).

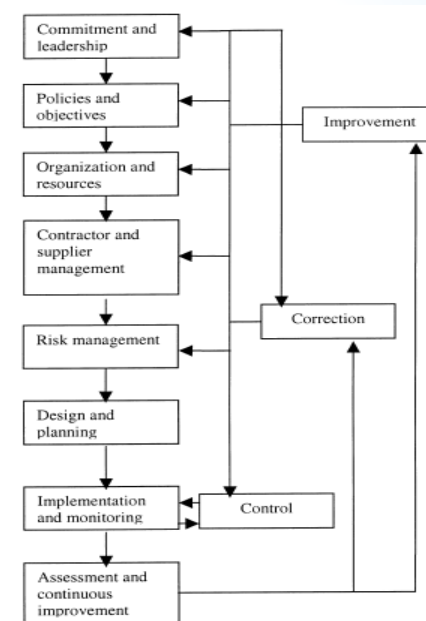
([Abernathy & Knode, 2001](#)) highlighted that the Integrated Management System Model must be **built around the way work is conducted**; Use a standards/process systems approach, based on ISO 9000, ISO 14001, and E&P Forum. Thus the Halliburton Management System (HMS) was designed based on Halliburton core business processes with the process-oriented management system that recognizes and links to its interdependent support functions, including Quality and HSE. Process maps developed at the global level **allow modification to incorporate local practices**. Local modifications may be made for unique geographical, geological, or business needs.

([Narayanan, 2006](#)) suggested similar model as ([Roy, 2007](#)) to use the PDCA Elements to identify areas that can be integrated and map the common management areas against **ISO 29001**, ISO 14001 and OHSAS 18001

# Integrated Management System Model in the Offshore Oil and Gas Organisations



IMS PDCA (Narayanan, 2006)



Contractor QHSE Management System (Sohani & Haugnaess, 2002)

- The ISO 9001, OHSAS 18001 and ISO 14001 standards are being referred at most cases to develop the IMS Model
- PDCA is the most commonly used approach and model by the Oil and Gas Companies
- The IMS documentation is built around their specific business process, but not specified in the published IMS Model

## Summary of Reviews

- Most of the researches on Integrated Management System are not segregated into specific industries. Sector specific IMS literatures are limited.
- Majority of the literatures on Integrated Management System presented at the Oil and Gas Conferences and Seminars were from Oil and Gas Companies' experiences
- Most of the literatures on the Integrated Management System in the Oil and Gas Industry focus on HSE Management System. This is in line with the fact that the oil and gas industry involve a highly risk activities, thus most study in particular for offshore oil and gas industry focuses thoroughly on health, safety and environment, recognizing that upstream segment poses major challenges.
- The IMS literatures in the Oil and Gas Industry are mainly on historical case studies on Oil and Gas Companies where actual experiences and best practices were shared.
- The evolution of the IMS can be seen from the elements being shared. Earlier IMS literatures focused on the development, strategies and benefits gained from IMS, whilst the recent ones focused on social responsibility inclusion into IMS as well as more specific to each Organisation needs such as risks, accident prevention etc.
- There were few IMS Models published in the literatures written by the Oil and Gas Organisations
- Three most popular Management System Standards used in the literatures are ISO 9001 (Quality), ISO 14001 (Environment) and OHSAS 18001 (Occupational Health and Safety). Other Guidelines from the OGP (E&P) Forums were also being referred to.
- There is lack of IMS literatures from the Offshore Oil and Gas Contractors in particular from the Engineering, Procurement, Construction and Installation (EPCI) business process perspective.



## Discussion

- The reasons for lack of researches on IMS in the Offshore Oil and Gas Contractor may be due to the nature of the projects which are short term where their project personnel are employed based on contracts basis (as per project duration) and their focus is only on complying with the contractual requirements to deliver the projects on time and within budget. There is limited time for them to improving the business processes or developing the Integrated Management System as it is not required by contract although it is an important part of internal initiatives for process efficiencies in the Company.
- Quality is a word notably lacking from many oil and gas company discussions. However, the Deepwater Horizon incident that occurs in April 2010 which resulted in 11 deaths of crewmen and tremendous oil spill in Gulf of Mexico (the worst in the US oil spill), trigger concern from Quality experts that not only HSE management system is the utmost important but the quality management system is equally important ([Coles, 2010](#)). Hence, it is about time that a more comprehensive integrated management system is developed to be compatible with the specific Company business processes for effectiveness and efficiencies.

## **Review Limitations/Implication**

The IMS literatures were focused on Organisations involved in the Offshore Oil and Gas Value Chain .

The Offshore Oil and Gas organisation experiences in developing and implementing the IMS are limited by the available literatures, so it may not reflect the latest IMS implementation status of these Organisations

## **Originality/Value**

This paper reviews the trend status of integration of management systems in the Offshore Oil and Gas Organisations, which have not been covered previously.

## Further Study



There is lack of literatures on the IMS for Offshore Oil and Gas Contractors, hence a study will be pursued further to assess their status of IMS design and implementation.

A survey questionnaire will be sent to the Offshore Oil and Gas Contractors that registered with International Marine Contractors Association (IMCA) and have been certified to more than one certification (ISO 9001, ISO 14001, OHSAS 18001 and others). The data from the survey will be analysed to identify the key aspects of IMS such as strategies, approaches, difficulties/barriers, model/framework when designing, implementing and maintaining it within the Organisations.

The majority of the literatures on the Integrated Management System in the Oil and Gas Industry are on historical case studies of the Companies. This reflects the uniqueness and need of the IMS research to be specific at Organisation level.

Therefore, a case study will be conducted at the Offshore Oil and Gas EPCI Contractors to design the **IMS-EPCI Compatibility Model**. The Model will then be validated by the focus group selected from the Offshore Oil and Gas EPCI Contractors available in Malaysia.



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Q & A



**THANK YOU**