

## **Managing Knowledge to Promote Sustainability in Petrochemical Industry**

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### **Abstract**

Sustainable Development (SD) is essential to sustain the ecosystem and the natural resources from depletion while creating new products/ services for business sustainability. And for sustainability, knowledge plays an important role to transform information and intellectual capital to achieve organizational goals. Both Knowledge Management (KM) and Sustainable Development (SD) have been coined up as an essential solution to the global crises.

Petrochemicals are one of the fastest growing economies as it contributes significantly in the economic and social development of the country by fulfilling the needs of major industries like textiles, telecoms, power, cables, plastics, etc. The Petrochemical industry has contributed a great deal to the world development but development brought by the industry has been accompanied by considerable environmental adversity. So, the entities are expected to implement sustainable practices through knowledge management into their business strategies and to take the social and environmental responsibility for the aftermath of their actions.

In this liberalized era, it is therefore essential that petrochemical industry focuses on sustainable business practices, leading to their sustainable development and society as a whole.

The petrochemical industry should widen their understanding regarding sustainable business practices and strategies and should interpret how employing such practices, strategies may affect the business and market in all three dimensions viz, economic, social and environmental issues. The present paper is an attempt to provide a comprehensive framework of sustainable development of the petrochemical industry through knowledge management practices.

## **Keywords**

Sustainable Development (SD), Knowledge Management (KM), Petrochemical Industry, Knowledge Management Practices (KMP) and Environment.

## **1. Introduction**

The petrochemical industry has contributed and is still contributing to the growth of the world economy. There is something important that must be considered in this development; is it a negative or positive development? The concept of dwindling natural resources, global warming, and sustainable development has drawn more consideration recently. It has been scientifically proven that the way we live is unsustainable and will lead to the destruction of the planet's natural resources and, potentially, to the extinction of the Human race (Rees, 2009).

World Commission on Environment and Development popularised the concept of sustainable development. Sustainable development is described as "evolution that meets the needs of the present, without undermining the future's ability to meet its own needs" (Brundtland, 1987). The biggest impact on the environment when carrying out petroleum operations are the release of waste into the atmosphere affecting the value of soil, air, and water. The adverse effects can be minimized or eliminated through the implementation of a proper Knowledge Management System (KMS).

In the 2030 agenda, a study was created to prospect the relation between the oil and gas industry and the Sustainable Development Goals (SDGs) to "map the oil and gas industry to the Sustainable Development Goals: An Atlas." The goal of the atlas was to encourage petrochemicals to incorporate relevant SDGs further into their organization in to validate their current efforts and spark new ideas. Sustainability is an important opportunity for businesses that can lead to higher efficiencies, cost savings and competitiveness, and enhance social licensing.

The transfer of environmental knowledge to support sustainable development strategies requires an organization to extend its knowledge transferring ability to across the organizational boundary (Paquette and Wiseman, 2006). The importance and value of fostering an organizational learning environment through knowledge management are manifold. To identify new threats and opportunities, an organization should adapt and respond to a changing environment, which inculcates

organizational learning and brings out possible strategies as a response (Husted and Michailova, 2002; Marquardt, 2002).

In view of the environmental compulsions, the change in the expectations of consumer and emerging technologies, the petrochemical industry is undergoing tremendous changes globally. The petrochemical companies are taking knowledge management as the key asset and effective tool by which they can go through these changes.

The present paper is an attempt to provide a theoretical framework for the contribution of knowledge management in the sustainable development of the petrochemical industry. The remainder of this paper has been organized into 5 sections. Section 1 presents the outline of the literature review in the form of a table. Section 2 outlines the purpose of the study and research objectives. The research methodology is described in section 3. Section 4 presents the theoretical framework for the objectives framed in the research paper. Finally, section 5 presents the findings of the study followed by a conclusion.

## 2. Literature Review

In an attempt to initiate a better comprehension of knowledge management and sustainable development in the petrochemical industry, the works of numerous scholars were reviewed who were highly involved in the research and practice. A brief review of the existing literature has been presented in the table below:

<b>Author</b>	<b>Year</b>	<b>Study</b>
Rodriguez et al.	2002	In this report, the author highlighted the significant changes in the competitive landscape through sustainable development that influence companies to improve their capital, skills, and activities, fostering the persistence of knowledge and innovation-based competitive advantage.
Roth	2003	This study develops a knowledge management initiative that facilitates knowledge creation and sharing resulting in the production of practical knowledge for action. The study examines the complex and relational nature of information by creating methods that can be used to build lateral knowledge and transfer knowledge.

Paquette & Wiseman	2006	The author has explained explores the networks that create access to the knowledge for the members of the organisation and the external environment. The author has used knowledge management based theories of networks and knowledge transfer to hypothesize about how the organisation may create and acquire environmental knowledge to increase sustainable development within the organization.
Meer & Sinnappan	2008	The author studied the role of knowledge management in the development of a sustainable organization. Key factors were examined for the use of knowledge management that could be used to provide a measure in achieving sustainability. His study has helped to advance the body of knowledge on the role of IT in sustainable development.
Mohamed and Stankosky	2009	He suggested the Knowledge Iterative Supply Network (KISN) model defining the lifecycle of knowledge which diminishes the negative impact of technology and would be a helpful guide for KM practitioners preparing to implement KM technology to support sustainable development.
Nejati et al.	2010	The author emphasized the importance of putting a sustainable development view at the core of knowledge performance evaluation effort and proposes a sustainable development framework for evaluating knowledge management performance.
Wong	2010	The author researched the relationship between KM and SD to establish a competitive advantage for businesses. A structure was built on the Mckinsey 7s Framework's underlying principles which explained Knowledge Management Practices offering a very good basis for sustainable development.

Gurumo & Lixin	2011	The author studied the environmental concerns posed by the petroleum industry and examined the importance of international conventions and challenges facing convention application. He analyzed that the change in behavior on the part of all variables in the petroleum industry as a means to conduct business in a manner that promotes sustainable development.
Anis & Siddiqui	2015	The author studied the concept of sustainability and the role played by the industry of oil and gas in achieving sustainable development. He analyzed the various threats obstructing the sustainability practices being carried out by companies in the industry. His finding suggests that sustainability programs followed by an industry of oil and gas are not satisfactory and he listed out the strategies and methodologies enhancing the effectiveness of sustainability strategies and programs for the sector.

### **3. Purpose of the Study**

The study aims to promote a better understanding of sustainable development and the importance of information management to the petrochemical industry's sustainable development.

### **4. Research Objectives**

To achieve the above purpose of the research, the following objectives were framed:

- a) To provide a comprehensive understanding of sustainable development in the petrochemical industry.
- b) To investigate the contribution of knowledge management in the sustainable development of the petrochemical industry.

### **5. Research Methodology**

The research is facilitated using secondary data analysis that involved the works of numerous scholars who have worked on the various dimensions of knowledge management and sustainable development in the petrochemical industry. The comprehensive studies were evaluated to

undertake further research and add value to the knowledge management system based literature. The paper carries an in-depth literature review of the research papers published in various national and international journals. The research objectives were framed based on the past studies and the knowledge was reused for idea generation to provide a comprehensive understanding of sustainable development in the petrochemical industry.

## **6. Sustainable Development for Petrochemical Industry**

Since the industrial revolution and the discovery of oil on the face of the earth, the oil industry became the main supplier of energy in the world. The world economy is highly dependent on oil (Ferrier and Fursenko, 2016). Frank et al. (2016) argued that the "oil and gas industry is internationally recognized as one of the most economically important industries for society".

India is one of the world's fastest-growing economies. The 2018 World Economic Situation and Prospects Report,' India's outlook remains largely positive, based on strong private consumption and public investment and ongoing structural reforms. Growth in GDP is expected to rise from 6.7% in 2017 to 7.2% in 2018 and 7.4% in 2019.' The growth rate projections for 2018-19 and 2019-20 as per the Global Economic Prospects: January 2018 Report of the World Bank are marginally higher at 7.3% and 7.5% respectively.

While the petroleum industry has strong commercial advantages, there are also some issues. The oil and gas industry is notorious for damaging the environment, destroying ecosystems and adversely affecting the health of people living near production sites. (George et al., 2016). The petroleum industry has been criticized by researchers, Non-Governmental Organizations (NGOs) and environmentalists for its high environmental impacts, health and safety issues and environmental damages which is mainly attributed to the lack of effective sustainability management and processes to decrease the negative effects of it (Krupnick and Gordon, 2015). They believe that sustainability approaches and systems are essential for better-performed petroleum operations, less carbon dioxide emissions and more social, economic and environmental benefits. Advancement in engineering and technology

have improved petroleum operational effectiveness concerning production and sales, but sustainable development has been neglected (Fuchs, 2007).

The priorities have increased for Energy Access, Energy Efficiency, Energy Sustainability, and Energy Security. For achieving this, several initiatives have been framed by the world's leading sustainability consultancy, ERM (Environmental Resource Management), and are listed below:

- a) Sustainable Planning and Development Services: Developing and implementing sustainable business plans, initiatives and tools.
- b) Transaction Services: Support successful mergers and acquisitions of companies.
- c) Impact Assessment and Planning: Achieve project approvals by evaluating and managing environmental, social and health impacts, obtaining licenses and supporting stakeholder engagement.
- d) Air Quality and Climate Change: Air quality, energy efficiency and carbon reduction issues are tackled in a constructive way to maximize shareholder value.
- e) Contaminated site management: helping consumers handle their polluted sites better, reducing liability and generating quality.
- f) Performance and assurance: helping businesses achieve their potential for performance.
- g) Risk Management: Quantify and monitor the safety risks associated with unsafe facilities and procedures to protect people, property and the environment.

## **7. Contribution of Knowledge Management in Sustainable Development of Petrochemical Industry**

The transformation of managerial views with a growing focus on knowledge has become the need to retain knowledge resources and monitor their effectiveness to know how they are used in the organization (Nejati, et al., 2010). At the present time, the petrochemical industry is seeking their competitive advantage in the effective and unique use and development of their knowledge so that it creates new areas of core competencies for them. Undertaking a sustainable approach will bring about numerous benefits, including brand value and reputation

enhancement, increasing innovation, increased revenues and many more (Sigma Guidelines, 2003 and Nejati et al., 2010), while failure to take sustainable development responsibilities can result in a loss of competitive advantage and business opportunities and lower long-term performance (Robinson et al., 2006 and Nejati et al., 2010). Therefore, it is now widely accepted that knowledge assets and technological enhancements are an essential strategic resource for any organisation to achieve sustainability and competitive advantage.

The present state of the environment and the increased interest in sustainable development bring up the motivations that are shifting organizations toward a knowledge economy (Paquette and Wiseman, 2006). In this era of knowledge work, knowledge about the position of the environment is in abundance and the petrochemicals are learning to recognize the potential of their knowledge assets for generating value and how to use natural resources in methods that increase their value and quantity over time.

There are two different activities that organizations must continuously be involved in to capitalize on the benefits of transferring experience and knowledge. The first activity involves effectively translating ongoing experiences into distinct knowledge entities. The second operation includes the transition of these objects through time and space boundaries (Roth, 2003, Paquette and Wiseman, 2006). It is difficult to transfer information through time and space, but the knowledge transfer process can bring enormous benefits to an organization (O'Dell and Grayson, 1998, Paquette and Wiseman, 2006). One of the most important components of organizational training and success is the diffusion of information across an enterprise (Koch, 1999, Paquette and Wiseman, 2006).

STAP (Scientific and Technical Advisory Panel, Global Environment Facility) has long been a champion of KM in the GEF (Global Environment Facility). Under this KM parasol as applied science, STAP has already made KM's scientific case an important activity to be included in all GEF investments. STAP recommended from this study:

- a. Knowledge exchange and training throughout the GEF Alliance should be improved.
- b. Guided learning questions are an effective way to support knowledge management.

- c. Knowledge management and knowledge management system functions should be included in project/program monitoring and evaluation activities.
- d. The GEF should develop an Open Data Policy.
- e. The GEF results-based management system should include measures of success in information management.
- f. A GEF information management system across the enterprise should be implemented.
- g. The new GEF platform offers the opportunity to build a corporate system across all organizations with apps that strengthen the usability of collecting, editing and filing data for knowledge generation purposes, and
- h. Incentives to effectively disseminate task results, such as prizes and pay incentives should be considered.

Sustainable development and processes of formation of knowledge-based society and knowledge economy is a very complicated field where correct conceptual attitudes need to be used. The attitudes are characterized by orientations towards exceptionally broad and profound scientific knowledge and the suitability to apply them under conditions of great uncertainty. Using such theoretical attitudes, it must be possible to identify, describe and evaluate different "cause-effect" connections, identify existing subordination between different phenomena and processes, and foresee development trends and possible effects of different management actions (Melnikas, 2010).

## **8. Findings of the Study**

Based on the literature review research, the study's key findings indicate that the petrochemical industry must emphasize the need to place sustainability at the heart of the performance evaluation process for knowledge management. Mapping sustainable development and knowledge management should build "cause-effect" ties where both variables play an important role for the growth of the petrochemical industry in a sustainable manner.

## **9. Conclusion**

In the sense of knowledge management, this paper discussed the value of sustainable development for the petrochemical industry. The petroleum industry is among important industries for the world development but

activities of the industry have been involved in the depletion of natural resources at a large extent. Managing knowledge and sustainable development would help to solve this problem. The study has revealed that these two approaches have cause and effect relationships when it comes to the economic growth of the economy. As the framework depicts, sustainable development has overlapping activities on the knowledge management effort. It is also practical to conclude that petrochemical industry competitive advantage entails knowledge management. From the studies above, it is apparent in the various sectors of industries, the prudent use of knowledge while factoring in the importance of societal demands and the conservation of the ecosystem will derive great returns to the stakeholders of the industry.

## References

1. Aldabaldetreku, R., Lautiainen, J., Minkova, A., (2016), The Role of Knowledge Management in Strategic Sustainable Development-Comparing Theory and Practice in Companies Applying the FSSD, *School of Engineering, Blekinge Institute of Technology, Karlskrona, Sweden*.
2. Anis, M.D., Siddiqui, T.Z., (2015), 'Issues Impacting Sustainability in the Oil and Gas Industry', *Journal of Management and Sustainability*, 5(4).
3. Borissas Melnikas (2010), Sustainable Development and Creation of the Knowledge Economy: The New Theoretical Approach, *Technological and Economic Development of Economy*, 16(3), 516-540.
4. Ferrier, R. W., & Fursenko, A. (2016). *Oil in the world economy*. Routledge.
5. Frank, A.G., et al. (2016). An Integrative Environmental Performance Index for Benchmarking in Oil and Gas Industry. *Journal of Cleaner Production*, 13(3), 1190-1203.
6. Fuchs, C., (2007). *Internet and Society: Social Theory in The Information Age*. Routledge.
7. George R.A., Siti-Nabiha, A.K., Jalaludin, D. and Abdalla, Y.A., (2016), Barriers to and Enablers of Sustainability Integration in the Performance Management Systems of an Oil and Gas Company. *Journal of Cleaner Production*, 136, 197-212.

8. Global Environment Facility (2018), Managing Knowledge for Sustainable Future, *Scientific and Technical Advisory Panel (STAP)*, UN Environment.
9. Gurumo and Lixin, Tumaini and Han (2011), 'Petroleum and Sustainable Development: The Role of International Conventions', *International Conference on Petroleum and Sustainable Development*, IPCBEE,26.
10. Husted, K., and Michailova, S. (2002), 'Diagnosing and Fighting Knowledge Sharing Hostility', *Organizational Dynamics* 31(1), 60-73.
11. Koch, N., (1999), Process Improvement and Organizational Learning: The Role of Collaboration Technologies, *Idea Publishing Group*, Hershey.
12. Marquardt, M.J., (2002), *The Learning Organization: Mastering the 5 Elements for Corporate Learning*, Davies-Black Publishing, Palo Alto, California.
13. Mohamed, M., Stankosky, M., et al., (2009), An Empirical Assessment of Knowledge Management Critically for Sustainable Development, *Journal of Knowledge Management*, 13(5), 271-286
14. O'Dell, C., and Grayson, J. (1998), 'If Only We Knew What We Know: Identification and Transfer of External Best Practices', *California Management Review*, 40(3), 154-174.
15. Paquette, Scott and Wiseman, Erica (2006), "Knowledge for Sustainable Development: The Role of Knowledge Networks & Organizational Learning". *AMCIS 2006 Proceedings*. Paper 215.
16. *The World Commission on Environment and Development: Our Common Future (Brundtland Report)* Oxford University Press, New York, NY, 1987.
17. Van Der Meer, R. & Sinnappan, S. (2008). The Role of Knowledge Management in an Organisation's Sustainable Development, *Knowledge Management International Conference* (pp. 1-6).
18. Wong M.L. (2010), Knowledge Management Catalyst for Sustainable Development.
19. Robinson, H.S., Anumba, C.J., Carrillo, P.M. and Al-Ghassani, A.M. (2006), 'STEPS: A Knowledge Management Maturity Roadmap for Corporate Sustainability', *Business Process Management Journal*, 12(6), 793-808.

20. Rocca, V., Dario, V., (2013), 'Environmental Sustainability of Oil Industry', *American Journal of Environmental Science*, 9(3), 210-217.
21. Rodriguez, M.A., Ricart, J.E., Sanchez, P., (2002), 'Sustainable Development and Sustainability of Competitive Advantage: A Dynamic and Sustainable View of the Firm', *Blackwell Publishers Ltd*, 11(3), 135-146.
22. Roth, J., (2003), 'Enabling Knowledge Creation: Learning from an R&D Organization', *Journal of Knowledge Management*, 7(1), 32-48.
23. Sigma Guidelines (2003), 'Putting Sustainable Development into Practice – A Guide for Organisations', *Sigma Project*.