Circular economy and Oil and GAS sector: A literature review

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Abstract

In this Paper, previous research on circular economies and its possible applications in the oil and gas industry is thoroughly explored. This study seeks to identify and consolidate the extant literature on the circular economy and its potential to mitigate the environmental impacts of oil and gas production, as well as improve resource efficiency and economic performance. To attain this objective, the following techniques will be utilized: identifying the literature, synthesizing the literature, and identifying the literature. In this article, scholarly journals, novels, papers, and case studies are just some of the types of writing that are explored. According to the conclusions of the study, the circular economy offers the oil and gas industry significant opportunities to reduce its environmental impact. These are possibilities include waste minimization, a greater emphasis on recycling and reusing, and the development of closed-loop technologies. In addition, the report cites a variety of obstacles and challenges, such as technological, economic, and regulatory constraints, that prohibit the widespread deployment of circular economy strategies in the sector. These limits are problematic because they hinder the adoption of circular economy strategies. In addition, the report emphasizes the importance of stakeholder participation and collaboration for the successful adoption of circular economy ideas in the oil and gas industry. The essay provides a comprehensive introduction to the concept of a circular economy and investigates its potential applications in the oil and gas industry. The article highlights both theoretical and practical implications for policymakers and practitioners in the field.

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Introduction

Companies are being pressured to establish environmentally sustainable operations by implementing the circular economy (CE) principle and logic (A Kassem et al., 2021), with government guidance and backing, and by cooperating with firms both upstream and downstream (Ackah et al., 2020). Numerous organisations are also implementing environmental management systems (EMS) to boost quality, lower manufacturing costs, and minimize carbon footprints, therefore enhancing reputational capital amongst peer groups and gaining social credibility (Bansal, 2019; Ackah et al., 2020). CE strives to reduce solid wastes, landfills, and emissions via the initiatives of reusing, remanufacturing, and/or recycling (Murray et al., 2017). Firms try to obtain economic benefits while meeting environmental obligations via CE adherence (Chan et al., 2020). To ensure profitability and competitive advantage, Companies have the tendency to change their business strategies, product designs, supply chain and logistic systems, and utilize environmentally-friendly ingredients sparingly (Gardas et al., 2019). Circularity has recently garnered the attention of politicians, organizational executives, and academic experts from all around the world such as India (Gardas et al., 2019). It serves as a viable solution for present urgent issues like waste creation, resource shortages, and long-term economic profits (Ghazinoori & Nozari, 2021). Firms strive to be responsible in the economic and environmental sense by adhering to CE standards in their operations. Due to the current emphasis on resolving environmental issues by requiring businesses to follow regulations promulgated by authorities such as the pollution control authority, deterring single-use plastics, and enforcing greater regulatory scrutiny, the study
is timely and relevant for India at present time. While dealing with these institutional challenges, they must achieve economic and environmental results.

In this sense, the oil and gas (O&G) industry encounters a rare difficulty because it taps into subsurface petroleum resources and securely extracts the said resources from the ground. The crude is then transported vast distances in pressurized pipes or ocean-going tankers once it has been extracted. It is then refined or changed at high temperatures and pressures using a variety of complicated chemical processes, leading to massive carbon emissions. The refined goods are then transferred via rails, highways, and pipelines to various industries such as aviation, transportation, and power plants for consumption.

Even with the availability of other energy sources, oil and gas remains the primary source of energy, although with substantial carbon emissions along their production chain (Hawash et al., 2020). If the oil and gas production process is not effectively managed, it can have a negative influence on the environment such as causing air pollution, oil spills, and needless accidents and injuries, which then result in a variety of societal disputes and trauma (Hosseinnia Davatgaret et al., 2021). As a result, organisations in this sector are constantly scrutinized by a variety of stakeholders like governments, civil society, and the elites. The government attempts to mitigate potential environmental concerns by propagating numerous regulations and regulatory guidelines (Kapsalis et al., 2019).

Because the oil and gas sector produces the raw materials for the majority of products, it is under examination from a variety of stakeholders, including regulators, for long-term business solutions. There are numerous regulations that the Indian O&G sector must adhere to including the Central Pollution Control Board Rules 2010; the Petroleum & Natural Gas (Safety in Offshore Operations) Rules 2008; the Environment (Protection) Act 1986; the Chemical Accidents (Emergency Planning, Preparedness, and Response) Rules 1996; the Oil Industry Safety Directorate (OISD) Standards; the American Petroleum Institute (API) Standards, and many others (Ministry of Petroleum and Natural Gas, 2019). Organizations in this sector must get approvals from the federal and state governments, including environmental and forest clearances, and permission to operate (Ministry of Petroleum and Natural Gas). Overall, the oil and gas business is an extremely regulated and restricted industry.

Under regulatory pressure, the oil industry is being compelled to explore for ways to decommission and repurpose its existing assets in order to render more environmentally-friendly operations. For instance, modern refineries have installed petroleum-coke-based captive power plants, which use refinery by-products to generate electricity, thereby completing the ‘reusing’ loop (Keksin & Filipenko, 2019). The oil industry is spending extensively in technology in order to enable longer usage of resources and to get the maximum value, with the goal of lowering carbon emissions (Laing et al., 2020). Furthermore, oil corporations are subject to stakeholder demands, such as competition to reduce pollution (Llorente-González & Vence, 2019). As a result, from an institutional theory perspective, it is worthwhile to investigate the effectiveness of institutional forces on CE performance of enterprises in the O&G sector. Furthermore, findings from previous studies (Min et al., 2021; Llorente-González & Vence, 2019; Kassem et al., 2019) are inconclusive, making it difficult to make any conclusions. Institutional pressures have no substantial impact on environmental performance, according to Nascimento et al. (2020). In order to gain social legitimacy, organisations adhere to institutional demands to separate themselves from the linear economic model and move towards the circular variety, according to several institutional theorists (Paiho et al., 2020).

Because of the nature of their activities, organisations in the oil and gas industry rely on a variety of scientific methodologies and technical procedures to effectively reduce environmental risks. Environmental impact assessments (EIAs), sustainable waste management (SWM), environmental auditing (EA), and disaster management (DM) are examples of organizational tools that mitigate environmental threats. Organizations that have an emergency management system (EMS) are strategically positioned to render CE-compliant operations. EMS enables enterprises to achieve CE performance by providing a systematic and robust approach to migrating to environmentally-
sustainable operations. Such enterprises become trend-setters, inspiring other businesses to implement CE-compliant organisational methods, such as EMS. As a result, the study investigates the role of EMS in mediating the link between institutional demands and CE performance. A flexible organisation responds well to external environmental challenges by allotting resources in a quick and efficient manner (Peronard & Ballantyne, 2019). The ability of an organisation to foresee and respond to unpredictability is what gives it flexibility. As a result, the moderating influence of organisational flexibility (OF) on the direct institutional pressures – CE performance link as well as the indirect institutional pressures – CE performance link via EMS is investigated in this study.

The concepts of circularity require organisations to balance both environmental and economic aims in order to achieve long-term economic success (A Kassem et al., 2021). Organizations that use the CE strategy recycle and reuse natural resources in an attempt to fulfill economic goals in an ecologically responsible manner minus any environmental damage (Ackah et al., 2020). Environmentally-oriented supply chain collaboration (ESCC), for instance, has benefited companies both environmentally and productivity-wise. Previous research have used institutional theory to conduct firm-level analysis with an emphasis on EMS adoption, as shown in Table 1. Only a few studies have looked into how well companies do in terms of CE.

As a result of rapid economic growth, rapid urbanization, and rising population in recent years, emerging nations have been confronted with growing resource constraint and depletion as well as environmental degradation (Bansal, 2019). As a result, organisations in these countries have been under a variety of burdens to adhere to CE requirements and to boost CE performance. No corporation in the oil and gas sector would jeopardise the environment for the sake of profit due to their strategic role. A trade-off between economic and environmental performance is the CE-targeted performance.

Lesser air emissions, reduction of wastewater, minimization of solid wastes, lowering of dangerous and toxic product usage, lowering of the prevalence of accidents, and overall environmental improvement are all examples of environmental performance (Gardas et al., 2019). Meanwhile, economic outcomes entail savings derived from lower material purchase costs, lower energy consumption costs, waste treatment fees, waste disposal fees, and fines for environmental incidents.

References:


