INVESTIGATING OPERATIONAL EXCELLENCE IN OIL AND GAS UPSTREAM ACTIVITIES

HASAN MOHAMMED ZAKARIA

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HASAN MOHAMMED ZAKARIA

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Nama Penyelia/Penyelia-penyelia
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ABSTRACT

The upstream oil and gas industry operates in a highly complex and volatile environment, facing challenges such as fluctuating oil prices, stringent regulations, and rising environmental and operational risks. These challenges necessitate strategic management of operational performance to ensure long-term sustainability and competitiveness. This study examines a key player company in the industry, focusing on critical performance determinants, including resource optimization, efficiency, and competitiveness. Guided by four research questions, this study explores performance management practices, the role of human resource strategies, the impact of health, safety, and environmental (HSE) protocols, and the effect of technology adoption. A qualitative research approach was employed, using semi-structured interviews with 10 key respondents, thematic analysis, framed within the Resource-Based View, Human Capital Theory, Risk Management Theory, and Socio-Technical Systems Theory. Findings highlight that cost, quality, delivery, and flexibility are key dimensions of operational performance. Effective human resource strategies enhance employee engagement and adaptability, while HSE protocols mitigate risks and improve workforce morale. Furthermore, technological advancements such as automation, the Internet of Things (IoT), and artificial intelligence (AI) significantly enhance efficiency and resilience. The primary contribution of this study is the development of a tailored operational performance management framework, integrating strategic insights with practical recommendations. This framework provides the company with a roadmap to enhance efficiency and sustain a competitive edge. Broader industry implications emphasize the importance of aligning operational strategies with performance metrics to navigate industry complexities effectively. This research offers valuable insights for oil and gas firms striving to enhance operational effectiveness in an evolving market landscape.

Keywords: Operational performance; Upstream oil and gas industry; Technology adoption

ABSTRAK

Industri huluan minyak dan gas beroperasi dalam persekitaran yang sangat kompleks dan tidak menentu, berdepan cabaran seperti turun naik harga minyak, peraturan yang ketat, serta peningkatan risiko alam sekitar dan operasi. Faktor ini memerlukan pengurusan strategik terhadap prestasi operasi. Kajian ini memberi tumpuan kepada sebuah syarikat pemain utama dalam sektor ini, dengan mengkaji faktor utama yang mempengaruhi prestasinya, seperti pengoptimuman sumber, kecekapan, dan daya saing. Dengan berpandukan empat soalan penyelidikan, kajian ini mengkaji amalan pengurusan prestasi, peranan strategi sumber manusia, kesan protokol kesihatan, keselamatan, dan alam sekitar (HSE), serta kesan penggunaan teknologi. Menggunakan pendekatan kualitatif, kajian ini melibatkan temu bual separa berstruktur dengan 10 pihak berkepentingan utama dan menggunakan analisis tematik, yang dirangka dalam Pandangan Berasaskan Sumber, Teori Modal Insan, Teori Pengurusan Risiko, dan Teori Sistem Sosio-Teknikal. Penemuan kajian mendedahkan bahawa kos, kualiti, penghantaran, dan fleksibiliti adalah penting untuk prestasi operasi. Amalan sumber manusia yang berkesan meningkatkan penglibatan dan kemampuan menyesuaikan diri pekerja, manakala protokol HSE mengurangkan risiko dan meningkatkan semangat. Selain itu, teknologi seperti automasi, IoT, dan AI memacu kecekapan dan mengukuhkan daya tahan. Sumbangan utama kajian ini adalah rangka kerja yang disesuaikan untuk pengurusan prestasi operasi yang menggabungkan wawasan strategik dengan cadangan praktikal, memberikan syarikat ini panduan untuk meningkatkan kecekapan dan memperoleh kelebihan daya saing. Implikasi yang lebih luas untuk industri minyak dan gas menekankan kepentingan menyelaraskan strategi operasi dengan metrik prestasi untuk mengharungi kerumitan sektor ini dengan berkesan. Kajian ini menawarkan pandangan berharga kepada firma minyak dan gas yang berusaha meningkatkan keberkesanan operasi dalam landskap pasaran yang sentiasa berkembang.

Kata kunci: Prestasi operasi; Industri huluan minyak dan gas; Penggunaan teknologi

DECLARATION

I certify that except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis is the result of work which has been carried out since the official commencement date of the approved research program; and any editorial work, paid or unpaid, carried out by a third party is acknowledged.

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CHAPTER 1

INTRODUCTION

1. Background of the Study

Thanks to the expanding usage of fuel in industrial and home applications, the oil and gas industry has seen tremendous expansion in recent decades (Johnston, Blakemore, & Bell, 2020; Morgunova & Shaton, 2022; Morgunova & Shaton, 2022). Oil and gas are widely used in automobiles, engines, and other industrial equipment and appliances, demonstrating that their practical application is unavoidable in all fields of modern science (Yuksel, 2021). Almost every academic subject has some connection to the oil and gas business, including international relations, engineering, operations, project management, finance, law, politics, sociology, and economics. In this context, the oil and gas business, as one of the world's major sectors must remain sustainable (IBISWorld, 2021; Mcclay, 2021).

Oil and gas firms work in an industry that is subject to a variety of global and national restraints, ranging from price volatility to regulatory oversight. They must constantly adjust to the industry's ups and downs in order to prosper. This includes demonstrating superior performance in their key activities, such as exploration, processing, and crude oil supply. Performance management, on the other hand, is a support role that can have a direct influence on operations and potentially cripple the entire firm if it is not well managed. As a result, the primary goal of this research is to examine the operational performance of Company X, one of the largest oil and gas companies in the United Arab Emirates (UAE).

The hydrocarbon (oil and gas) industry is currently undergoing a crisis that poses a threat to even the most solid organizations (Gould, Atkinson, McGlade, Bosoni, &

Couse, 2020). An extended period of high pricing has been derailed by increasing supply and slowing demand growth, and the sector now appears to be facing an extended period of low oil prices (Jefferson, 2020). To make matters even more complicated, the new price reality follows reduced yields despite rising prices (OECD, 2020). Upstream operators have observed a gradual reduction in efficiency and asset reliability over the last five years, as well as rises in finding and lifting costs (Kleinberg, Paltsev, Ebinger, Hobbs, & Boersma, 2018; Jenaibi, et al., 2019; United Nations Environment Programme, 2015). Since then, many oil and gas businesses have opted to cut back their manpower to prevent high operational costs and also reduce capital expenditure (Capex) which adhere to the winning formula of the firm's sustainability by keeping the production cost low (Beckford, 2020). Hence, the study will examine the practice in Company X's operational performance in addressing the prevalent issues in the oil and gas industry.

1.1 Introduction to the Oil and Gas Industry

Since the mid-1950s, oil and gas have been the world's principal energy sources (Ahmad & Zhang, 2020). According to Overholt (2016) and Bogdanov et al. (2021), oil and gas together account for more than half of worldwide energy use. According to the United Nations Development Programme (UNDP), about 57 percent of global fuel use comes from the oil and gas sector. Petroleum products or their by-products have modernized global operations (Devold, 2013; Adeola, et al., 2021). The sector provides energy to industrial sectors and provides fuels for transportation purposes such as transporting people and goods for the well-being of humans and also the nation (Owusu & Asumadu-Sarkodie, 2016; Sher, Curnick, & Azizan, 2021). Asad et al. (2019) said the hydrocarbon industry plays a key role in accelerating the global

economy. Although “renewable” and “sustainable” energy are being introduced in conjunction with the technology advancement, none of it could contribute the same amount of energy as what can be provided by the oil and gas energy (Stevens, 2016; Hartmann, Inkpen, & Ramaswamy, 2021). Job creation is another important contribution the oil and gas industry make to the global market (Addison & Roe, 2018).

Reported by International Labour Organization (ILO), nearly 6 million people are directly working in the hydrocarbon sector and over 60 million others are indirectly hired regarding these economic activities (ILO Library, 2020). Oil and gas industry also known as the hydrocarbon industry, petroleum industry, or the oil patch, involves three main activities regarding petroleum products namely upstream (exploration, extraction, production), midstream (refining, processing, transportation) and downstream (distribution, marketing, sale to end users or businesses) (Darko, 2014; Library of Congress, 2021). Report by Mojarad, Atashbari and Tantau (2018), further explained that the upstream sector is known as “E & P” which stands for Exploration & Production, midstream sectors main activities relates to logistics which involved the movement of goods from well to processing facilities such as refineries and downstream sectors that involves the processing of crude oil and natural gas to produce gasoline, petrol, diesel, asphalt, LNG, LPG and petrochemicals. Distribution to end-users as well as to enterprises is also included in the downstream sectors.

The largest volume of products for petroleum industry comes from the downstream activities in the forms of fuel oil and gasoline (petrol) or also known as petroleum (Muspratt, 2019). According to Fernandes, Relva, Alem and P. Barbosa-Póvoab (2016) and Achaw and Danso-Boateng (2021), petroleum is the principal material of many other industries such as pharmaceuticals, fertilizers, solvents and plastics.

IPIECA, the global oil and gas industry association (2021) shows the oil and gas activities presented in Figure 1-1.

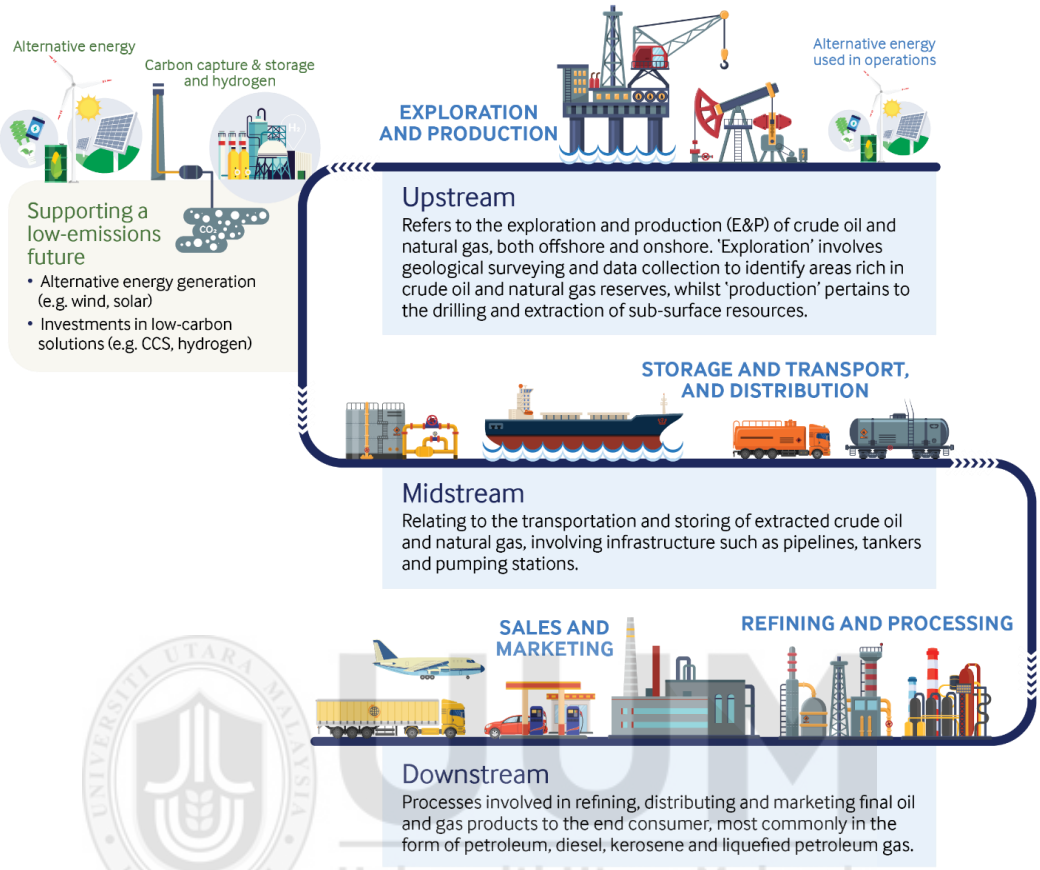

Figure 1-1:
Oil and Gas Main Activities. Source: Scope of the Roadmap by https://www.ipieca.org/ (2021)

This study focused on the upstream activities of Company X. In general, the main activities of upstream operations can be categorized to a few sectors such as 1) Offshore drilling; 2) Oil sands mining; 3) Supply and service; 4) Manufacturing; 5) Seismic surveys; 6) Geological surveys; and 7) Reclamation (Afework, Hanania, Stenhouse, & Donev, 2018). Upstream activities also can be divided based on greenfield or brownfield investment as detailed in the Figure 1-2

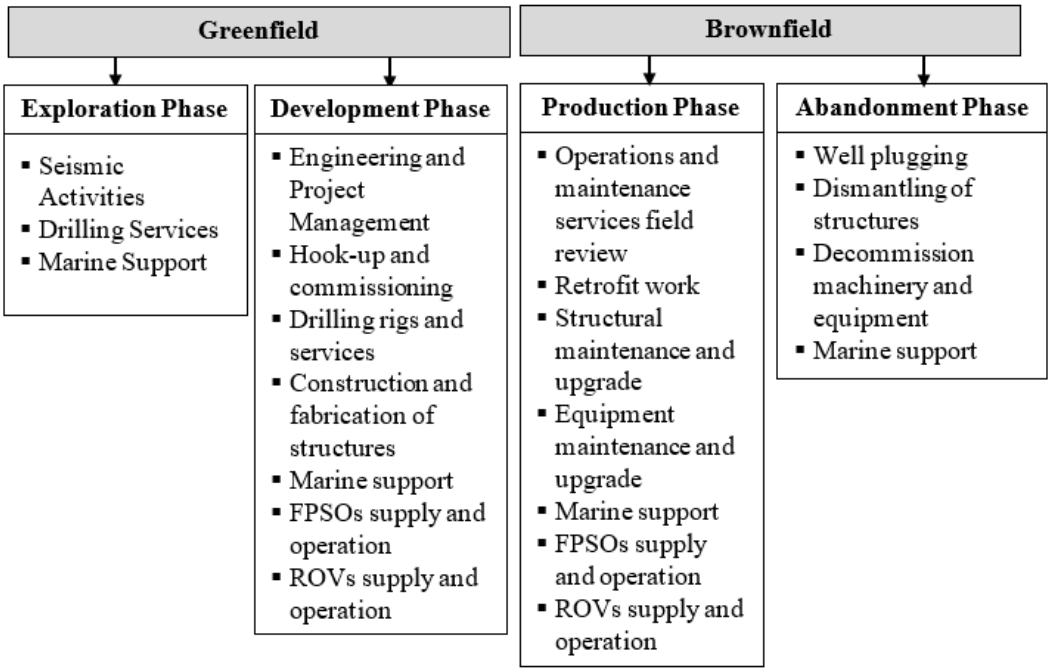

Figure 1-2:
Upstream Activities. Source: Challenges in Supply Chain Management in Upstream Sector of Oil and Gas Industry by Mandira Agarwal, Rahul Sharma and Lixin Mathew Alex (2016)

The major player in this industry can be classified into two major types which are the National Oil Companies (NPCs), namely: Saudi Aramco (Saudi Arabia), Petro-Canada (Canada), ADNOC (United Arab Emirates) and Petronas (Malaysia) (Manley, Mihalyi, & Heller, 2019) and international oil companies (IOC), for example BP, Shell, ExxonMobil and Total (Al-Fattah, 2013; Mojarad A. A., 2021). The modern landscape of the petroleum sector is made up of these NOCs and IOCs that operate in an integrated way, covering both upstream and downstream functions (Whitson, 2009; Mojarad, Atashbari, & Tantau, Challenges for sustainable development strategies in oil and gas industries, 2018). Another type of company that also involved in oil business is Oilfield Services Companies (OFSCs) such as Canary, LLC, Transocean Ltd., along with Diamond Offshore Drilling (KPMG, 2016; Khan, Yu, Golpira, Sharif, & Mardani, 2021).

IG International Limited website reported that the top oil producer for 2020 is the United States of America (USA) with 19.51 bpd (barrels per day), followed by Saudi Arabia (11.81 bpd) and Russia (11.49 bpd). Figure 1-3 shows the ten largest oil producers in the world. These top 10 producers account for over 71% of global oil demand, or over 100 million barrels a day (Killian, 2020).

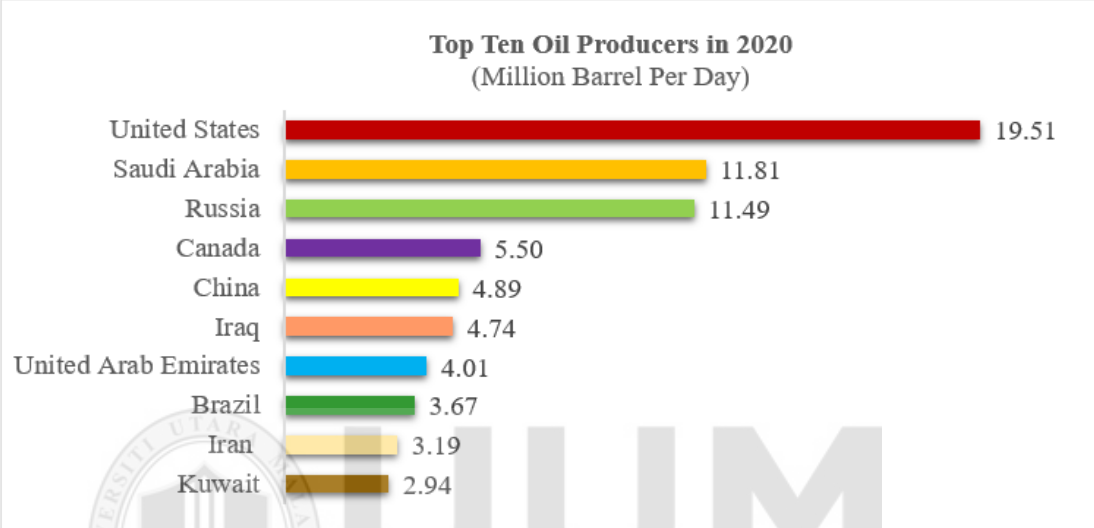

Figure 1-3:
Top Ten Oil Producers in 2020 Source: IG International Limited website https://www.ig.com/en/trading-strategies/world-s-biggest-oil-producers-200722

The oil and gas industry is often regarded as the most valuable contributor to global trade, creating millions of job opportunities and producing hundreds of billions of dollars internationally. It is the backbone of human and national well-being. From 2012 to 2016, oil and gas businesses spent a total of US$27 billion on operations. This industry is highly capital demanding, as evidenced by the large numbers. E&P businesses spent USD 546 billion (drilling and well completion) in 2019 (Oil & Gas Journal, 2020). On that basis, all procedures and policies implemented by oil and gas businesses' operations must be capable of mitigating any potential risk to the company's survival. One of the crucial issues that requires very careful consideration

is the operational performance of the organization operating in this sector, particularly in upstream operations.

1.2 The Overview of Oil and Gas in United Arab Emirates

The United Arab Emirates is a country on the Arabian Peninsula's southeast coast, with coastlines in the Persian Gulf (Arab Gulf) and the Gulf of Oman (nationsonline.org, 2021). Abu Dhabi, Ajman, Dubai, Fujairah, Ras Al-Khaimah, Sharjah, and Umm Al-Quwain (U.ae, 2021) are the seven emirates that make up the UAE (see Figure 1-4). The country has a population of over 10 million people and occupies an area of around 84 thousand square kilometres, with more than one million people living in Abu Dhabi, the capital (Organization of the Petroleum Exporting Countries, 2021). The United Arab Emirates' official language is Arabic. The country's gross domestic product (GDP) is primarily derived from extractive industries notably oil and natural gas, which account for 30% of GDP (Puri-Mirza, 2021). The UAE has evolved into a modern state with a high standard of living since the discovery of hydrocarbons (United Arab Emirates, 2021).

UAE is a member of the Organization of Petroleum Exporting Countries (OPEC) and the Gas Exporting Countries Forum (GECF) and is one of the world's top ten oil producers (U.S. Energy Information Administration, 2020). Since its independence from the United Kingdom and unity in 1971, the UAE has relied on its vast oil and gas resources to fund its economy (BBC, 2020).

Figure 1-4:
Political Map of United Arab Emirates. Source: Map of United Arab Emirates, Middle East, https://www.nationsonline.org/oneworld/map/united_arab_emirates_map.htm

The UAE is currently the world's seventh largest oil producer, with hydrocarbons accounting for roughly 20% of all export revenues (export.gov, 2019). In 2019, the UAE produced 4.0 million barrels per day (b/d) of petroleum and other liquids, with crude oil accounting for around 3.1 million b/d and non-crude oil liquids accounting for the rest (condensate, natural gas plant liquids, and refinery processing gain). After Saudi Arabia and Iraq, the United Arab Emirates was OPEC's third largest oil output in 2019 (Fawthrop, 2020). The country imports and exports liquefied natural gas (LNG) and shares international natural gas pipelines with Qatar and Oman. UAE is also a world leader in the use of natural gas in enhanced oil recovery (EOR) processes (U.S. Energy Information Administration, 2020). The country plans to expand

domestic natural gas production by using EOR techniques on gas wells as demand for natural gas rises.

The UAE has become one of the world's most important financial centres and a key commercial centre in the Middle East, in addition to its massive hydrocarbon economy (BBC, 2020). Non-energy investments, such as infrastructure and technology, have continued to provide long-term protection for UAE against low oil prices and global economic stagnation (Foo, 2015; Foo, Lean, & Salim, 2021). As a result, UAE is making significant strides in diversifying its economy through tourism, trade, and manufacturing. However, oil, natural gas, and related industries will continue to account for the majority of economic activity in the seven emirates in the near future (Schilirò, 2013; Alzubair, 2021).

1.3 Introduction of Company X

Company X, which has been entrusted with Abu Dhabi's oil and gas resources for more than 45 years and is one of the world's largest energy firms in terms of reserves and production, and is be the subject of this research. At least 90% of the United Arab Emirates' 100 billion barrels of oil reserves are held by Company X. Upstream, midstream, and downstream activities are all handled by Company X's 16 sister companies. Amongst these subsidiary companies, Company X overlooks the drilling and production of 5 major companies, 7 refineries and 3 logistics and distribution companies.

Being the National Oil Company, Company X operates directly under the Supreme Petroleum Council headed by the leader of the nation. Under the guidance of the council, Company X updated its future strategy and goals for make the upstream sector more sustainable and downstream sector to be more profitable. The mandate also

added key strategies for sustainable gas supply and a more proactive and adaptive marketing strategy (International Trade Administration, 2020).

In 2018, Company X launched the In-Country Value (ICV) program, which is increasing the company's contribution to the continued development of the nation's economy and strengthen its relations with the private sector. All commercial partnerships with the company now include a built-in ICV evaluation in the bid evaluation and award process. In relation to the role played by Company X to the nation, it advocates a closer look of how the company conduct their business to ensure the operation be sustainable in this turbulent era.

Both onshore and offshore oil and gas fields are developed by Company X. Company X produces 4 million barrels of oil per day, with 22 billion stock tank barrels (STB) of recoverable unconventional onshore oil resources and 109 billion STB of recoverable conventional oil reserves (Saadi, 2020). According to Craft.co (2021), Company X reported revenue of $653.4 million in 2020 (Arab News, 2021), and the total number of workers working for the company was over 22,000 as of July 2021 (Arab News, 2021). Due to the very significant figures contributed by Company X, the researcher intended to evaluate the company's operational performance in order to uncover any issues that could put the company at risk, while also making appropriate recommendations for the company's benefit. For this study, the focus was on the upstream activities of Company X's offshore business.

1.4 Problem Statement

The importance of the oil and gas sector to society and the nation has highlighted the necessity to ensure that it is handled in the most profitable manner possible. In this respect, oil and gas companies must operate at their optimum levels. For Company X, understanding its operational performance is crucial for ensuring the company's continued success and achieving significant outcomes.

The first and foremost issue facing Company X is the quality of its products and services (Tayab et al., 2023). As a company operating in the upstream segment, encompassing exploration and production activities (Library of Congress, 2021), ensuring the consistent quality of its outputs is crucial to meeting customer expectations in an efficient and reliable manner (PlanetTogether, 2020). Tayab et al. (2023) specifically highlight quality-related issues in Company X's process safety management, where deficiencies in risk identification have significantly hampered operational quality. Similar concerns about safety and security impacting quality are echoed by Sadikoglu and Olcay (2014) and Fonseca, Amaral, and Oliveira (2021). Furthermore, customer expectations for high-quality products remain a critical benchmark for success (Cruz, 2015; Rashad, 2020). Failure to understand and adhere to client quality requirements poses a significant challenge, as it directly defines the success or failure of Company X's operations.

The second issue of operational performance is pertaining to the cost. Company X faces significant cost-related challenges driven by volatile market dynamics and the global energy transition. The primary issue lies in maintaining financial efficiency while ensuring the delivery of critical projects and operations, requiring a balance between cost reduction and performance optimization. As highlighted by Company X (2020), the company has implemented strategies such as improving operational

efficiency, leveraging technology, and fostering strategic partnerships to manage costs effectively. However, these efforts underscore the broader issue of sustaining profitability and competitiveness amidst fluctuating oil prices and increasing demand for cost-effective energy solutions. The cost of producing a barrel of oil globally has increased by 60% in real terms over the past decade, driven by the transition from "easy oil" to exploration and development in more remote, challenging, and complex basins (Kindleman & Shimbo, 2019; Tidey, 2015). Additionally, the cost of running upstream operations is heavily influenced by fluctuating oil prices (Naumov & Toews, 2016). Company X's ability to operate efficiently has resulted in $2 billion (AED 7.36 billion) in savings over the past five years (Pipeline Oil and Gas Magazine, 2020). However, the COVID-19 pandemic has amplified financial pressures, with oil prices plunging below $30 a barrel, significantly impacting energy producers like Company X (Organisation for Economic Co-operation and Development, 2020; MEED, 2020). In response, Company X has proactively engaged with suppliers, leveraged technology, and identified unnecessary expenditures to optimize costs further (Company X, 2020). These cost challenges reflect the ongoing difficulty of balancing cost reduction with maintaining competitiveness and delivering value in a highly volatile energy market.

Delivery remains a critical challenge for Company X (ADNOC, 2020), as its ability to reliably meet production targets and expectations is central to its operational performance. This challenge stems from the transition between capital-intensive projects and operational production, requiring the company to streamline workflows, improve day-to-day operations, and minimize disruptions such as unexpected outages (Ernst & Young, 2015; Shrestha, Choi, Kwak, & Shane, 2021). With a wide range of diverse operations, including processing, refining, and producing oil and gas products

for the international market, Company X must ensure its systems and processes are optimized to deliver consistently. To support this, the company has implemented the EnMS (Energy Management System Software), which consolidates, analyses, monitors, and reports energy usage. This software has been critical in managing daily operations, achieving weekly objectives, and identifying redundancies, leading to significant energy savings that enhance the company's sustainability (Murray, 2019; Marimon & Casadesús, 2017; Tuyishime, Nzanywayingoma, & Gatera, 2021). However, the scale and complexity of Company X's upstream and downstream operations exacerbate delivery challenges. The company's recent large-scale investments aim to streamline production and supply chain operations, but these transitions are fraught with risks such as production delays and unexpected outages (JPT, 2023). Meeting delivery expectations requires not only technological solutions like EnMS but also robust project execution strategies to ensure seamless transitions from capital projects to asset production (ADNOC, 2020). Failure to address these delivery challenges could undermine Company X's ability to fulfil its production commitments and maintain competitiveness in global markets.

The final problem in operational performance is flexibility. Flexibility, defined as an organization's ability to adapt to environmental changes and respond effectively to uncertainties, is critical for sustaining competitiveness and improving performance (Dreyer & Grønhaug, 2012; Das, 1995; Gupta & Goyal, 1989; Nyu, Nilssen, & Kandemir, 2021). In the hydrocarbon industry, where environmental uncertainties are prevalent, flexibility enables companies to adjust to changing supply and demand dynamics, offering a competitive advantage and enhancing profitability and long-term survival (Reeves & Deimler, 2011; Capurro et al., 2021; Aranda, 2003; Dreyer & Grønhaug, 2004; Magzoub, 2021). For Company X, flexibility is a pressing challenge,

particularly in adapting to fluctuating oil prices and evolving energy demands. The company has made significant investments in enhancing agility across its operations, including framework agreements aimed at optimizing project delivery and streamlining workflows (ADNOC, 2020). However, the scale and complexity of its operations amplify the difficulty of maintaining adaptability. Framework agreements worth billions have been implemented to ensure a responsive approach to engineering services and reduce bottlenecks during large-scale transitions. Despite these efforts, achieving the flexibility required to navigate a volatile energy market remains a significant challenge for Company X (ADNOC, 2020; JPT, 2023).

While the challenges of quality, cost, delivery, and flexibility define the overarching operational performance concerns in Company X, addressing these challenges requires a deeper understanding of the underlying factors that influence performance outcomes. Specifically, human resource practices, health, safety, and environmental (HSE) measures, and technology adoption play pivotal roles in shaping operational efficiency and effectiveness. These factors not only drive organizational resilience and adaptability but also serve as critical levers for overcoming industry-specific challenges in highly complex and dynamic environments. Examining how these elements interact with operational performance provides a focused lens through which the broader issues outlined in the problem statement can be understood and addressed comprehensively.

Effective human resource practices are a cornerstone of operational performance in the oil and gas industry, particularly in upstream operations where efficiency and adaptability are critical. Organizations that invest in training, skill development, and employee engagement often see improved productivity, reduced turnover, and enhanced alignment with organizational goals (Hong et al., 2012; Magableh et al.,

2021). Robust HR practices foster collaboration and innovation, which are essential in navigating the complex and dynamic nature of upstream operations (Jayathilake et al., 2021). For Company X, ensuring that HR strategies are not only aligned with business objectives but also responsive to industry-specific challenges is key to achieving and sustaining high levels of operational performance.

Health, safety, and environmental (HSE) measures have a profound influence on operational performance, particularly in industries like oil and gas where safety risks are high. Comprehensive HSE programs mitigate risks, reduce operational downtime, and enhance workforce morale, which in turn leads to greater productivity and efficiency (Sadikoglu & Olcay, 2014; Fonseca et al., 2021). In upstream operations, where even minor safety lapses can lead to significant financial and reputational losses, the role of HSE is even more pronounced. For Company X, establishing a culture of safety and integrating HSE considerations into every aspect of operations are not only regulatory requirements but also critical drivers of performance and sustainability (Okenyi et al., 2021; ADNOC, 2020).

Technology adoption represents another crucial factor influencing operational performance in the upstream oil and gas sector. Advanced technologies enable organizations to optimize processes, reduce costs, and improve decision-making through real-time data and predictive analytics (Ghobakhloo et al., 2012; Altadonna, 2020). For Company X, leveraging technologies such as automation, machine learning, and energy management systems could lead to significant efficiency gains and competitive advantages. However, successful technology adoption requires overcoming challenges such as integration with legacy systems and resistance to change (Kerl, 2020; Roberts et al., 2021). By addressing these hurdles, Company X

can enhance its operational resilience and readiness to adapt to the evolving demands of the energy sector.

1.5 Research Gaps

Substantial gaps were identified in the literature, underscoring the need for this research. While a sufficient knowledge gap existed to justify studying operational performance in the upstream oil and gas sector, it was the contextual and methodological gaps that proved more significant in driving the need for further investigation. The contextual gap highlighted the lack of research applying operational performance frameworks to the unique environment of upstream oil and gas operations, where factors such as cost, quality, delivery, and flexibility play a critical role. Meanwhile, the methodological gap pointed to limitations in the approaches used in previous studies, which often relied on generalized frameworks that failed to address the complexities and specific challenges of the sector and Company X. Together, these gaps reinforced the importance of conducting targeted research to bridge the existing voids and contribute valuable insights to the domain.

1.5.1 Knowledge gap

In this study, the researcher identified some gaps in previous research related to operational performance in the oil and gas industry, especially in upstream activities. While studies such as Kalleparambil et al. (2024) have focused on operational performance and project material management in downstream oil and gas operations, there is still a significant gap in research addressing upstream operations, particularly concerning Company X. Prior research in the oil and gas industry appeared to have a knowledge gap, as many of these studies concentrated on supply chain management (Aslam, Saleem, Khan, & Kim, 2021; Adam, Yusuf, Abubakar, Ali, & Hassan, 2021); maintenance management (Shou, Wang, Wu, & Wang, 2020); and organizational resilience (Bento, Garotti, & Mercado, 2021). As such, it is a significant and noteworthy study in the context of operational performance for upstream oil and gas operations (Miles, 2017).

1.5.2 Contextual gap

The researcher identified a significant contextual gap in the existing body of research related to operational performance in the oil and gas industry, particularly in upstream activities. Prior studies have largely overlooked this sector, despite exploring operational performance in industries such as manufacturing (Buer, Semini, Strandhagen, & Sgarbossa, 2021), information technology (Verma et al., 2021), small and medium enterprises (Inan, Gungor, Bititci, & Halim-Lim, 2021), healthcare (Ilangakoon, Weerabahu, Samaranayake, & Wickramarachchi, 2021), and banking (Preeti & Roy, 2021). These industries have examined dimensions of operational performance, including efficiency, technology adoption, and resource optimization, which remain underexplored in upstream oil and gas. Additionally, operational

performance in upstream oil and gas is highly influenced by cost, quality, delivery, and flexibility—factors that are widely recognized as key performance indicators in operational performance management (Henshall, 2018; Dreyer & Grønhaug, 2012). However, these metrics have not been sufficiently studied in the context of upstream oil and gas operations, creating a clear contextual gap. This gap is particularly critical given the current industry dynamics.

The timing of this research is crucial, as price volatility in the global oil market continues to impose significant challenges on operational efficiency and profitability (Oil-Price.net, 2019). Upstream oil and gas operations, characterized by capital-intensive projects and environmental volatility, require a tailored approach to operational performance management to navigate these challenges effectively. Research addressing operational performance in this sector could provide valuable insights into optimizing cost, maintaining quality, ensuring reliable delivery, and improving flexibility—factors that directly influence the sector's sustainability and competitiveness.

The context of the UAE and Company X adds another layer of significance to this study. As a major player in the global energy market, the UAE and Company X has a critical influence on upstream oil and gas operations, with its companies often serving as benchmarks for the region (ADNOC, 2020). However, despite its global prominence, operational performance management within UAE-based companies, particularly in the upstream sector, remains underexplored. This study is especially significant because it examines a company where such research has not been conducted before, making it a pioneering effort to address the contextual and operational challenges specific to the upstream oil and gas industry in the UAE.

1.5.3 Methodological Gap

A review of the existing literature demonstrates significant attention to operational performance in the upstream oil and gas sector, yet much of this work is centred on quantitative analyses. Studies such as those by Nechully and Pokhriyal (2019) have focused on the adoption of innovative drilling technologies through structured quantitative methods. Similarly, Alhammadi et al. (2024) examined supplier strategies in the UAE's oil and gas sector using numerical data to derive insights. While valuable, these studies often fail to capture the contextual and experiential depth necessary for addressing the complexities inherent in upstream oil and gas operations. In contrast, qualitative studies, though insightful, remain underrepresented. A limited number of these works, including Almansoori and Rahman (2020), who explored performance factors, and Mohamed (2023), who examined supply chain processes, provide a qualitative perspective but are not specifically focused on Company X or the UAE context. These studies underline the potential of qualitative approaches in uncovering deeper insights into organizational and operational strategies but have yet to comprehensively address the unique dynamics of Company X's operations within the UAE.

Furthermore, existing research specific to Company X often relies on quantitative methodologies. For example, Al Dhanhani (2020) explored leadership and culture within Company X using structured surveys, while Khalid and Abdallah (2020) assessed health and safety practices quantitatively. Although these studies contribute to understanding various operational dimensions, they overlook the critical role of qualitative data in capturing nuanced managerial insights and operational decision-making processes.

To address this gap, this study adopts a qualitative approach, engaging with senior-level managers within Company X through semi-structured interviews. This approach will allow the capture of rich, detailed narratives regarding operational performance management in upstream oil and gas operations. Previous research, such as that by Alshehhi et al. (2023), underscores the importance of leadership in operational performance, and Marzooqi and Samsudin (2022) highlight the role of human capital. However, neither study delves deeply into the managerial perspectives specific to Company X's operational frameworks.

By conducting qualitative research within Company X, this study aims to provide an in-depth understanding of operational performance management strategies, contributing to a broader discourse on the subject within the upstream oil and gas sector, particularly in the UAE context. This unique focus on engaging senior managers offers an unprecedented opportunity to capture insights that could inform both academic literature and industry practices.

The gaps highlighted in the existing literature and the challenges faced in the upstream oil and gas sector pointed to the need for a comprehensive exploration of operational performance management in Company X. This study addressed the contextual and methodological gaps by focusing on the unique dynamics of upstream operations within the UAE oil and gas industry. Using a qualitative approach, the research explored the perspectives of senior managers to gain a deeper understanding of human resource practices, health, safety, and environmental (HSE) measures, and technology adoption. These components formed the basis for developing strategies to enhance operational performance. The research questions and objectives in the following sections were designed to examine these critical themes systematically, providing a

framework to address the complexities of operational performance management in this context.

1.6 Research Questions

This study employed the following research questions that addressed prevalent issues relating to operational performance for Company X.

1) How is operational performance management of upstream activities being practiced in Company X?
2) How does human resource practices influence operational performance in Company X?
3) How HSE practices influence Company X's operational performance?
4) How technology adoption influence operational performance in Company X?

1.7 Research Objectives

The objective of this study was to examine the operational performance best practices by Company X. In addition, the study also looked at related issues such as human resource, safety and health environment, and technology adoption approach.

Specific Objectives

The objective of this study was to:

1) Understand operational performance management best practices in Company X
2) Investigate how human resource practices' influence operational performance.
3) Explore how HSE practices influence operational performance.
4) Understand how technology adoption influence operational performance.

1.8 Significance of the Study

This study served as a starting point for finding flaws in Company X's operational performance implementation. The main objective was to provide opportunities to establish a new perspective in the review of operating performance. This study gave a clear picture of operational performance in the UAE oil and gas industry, its influence on national and human well-being, and suggested recommendations for improving operational performance to cut down on unnecessary spending by government agencies and oil and gas companies, as well as to prevent work-related incidents for oil and gas operators. Furthermore, the proposal for safety and health operational performance will assist and facilitate safety professionals and production crews in preventing injuries in hazardous work environments for the oil and gas industries, both onshore and offshore, in accordance with international safety standards.

The implication of this study in theoretical terms was to explore theories that include prioritization that reflect the desired performance to be pursued by an organization that involved organizational initiative (Bravo & Hernández, 2021; Roman, Osinski, & Erdmann, 2017); personnel motivation (Nkrumah, Liu, Fiergbor, & Akoto, 2021; Naji, et al., 2021); and technology adoption determinants (Salazar, Rauniar, & Blodgett, 2021; Junior, et al., 2021) and the means by which it will achieve them (Pietro, Renzi, & Edvardsson, 2021). Various approaches introduced to assist the organization to achieve the objective such as business process redesign (BPR), six sigma, lean manufacturing and reconfigurable manufacturing systems (Mcclay, 2021); Total Quality Management (TQM) (Muazu & Gwangwazo, 2021); and analytic which related to the recent industrial internet of things (Petrosyan, 2021). These decisions, in part, involve the resources that will be employed to achieve the desired performance (Barletta, Despeisse, Hoffenson, & Johansson, 2021). Operational performance is

therefore crucial for all operations. Decisions made reflect the goals of an organization and determine how operations will meet those needs, turning operations into a competitive weapon (Ribeiro & Filho, 2021). Generally, such decisions are related to quality, costs, flexibility, and delivery (Alyatama, 2021; Basile, Capobianco, & Vona, 2021). This is very crucial for the sustainability of companies operating in oil and gas industry such as Company X.

The scope of the current investigation was also evaluated from a methodological perspective. The originality of the proposed thesis is also supported by its methodology. The methodology is based on exploiting the informational value of individual classification acts for the identification of relevant participant in an area of interest (Benabdelkrim, Levallois, Savinien, & Robardet, 2020). When field studies are used, methodological contributions may entail changes in the design of previous studies which; 1) Reduce potential variance problems in the shared method through the judicious use of several measurement methods; 2) Enhance the generalization of research through more appropriate sampling methods; 3) Enable the study of the plausibility of the "explanations of the third variable" for the results of past studies; and 4) Improve the conceptual validity of key metrics by using more specific multi-element metrics and/or measurement approaches that are not based on self-declarations (Asgari, 2015; Ågerfalk & Karlsson, 2020). The current study utilized semi-structure interview session with relevant personnel attached to Company X to uncover issues pertaining operational performance practices in their company which will be the first research in this kind conducted for the company. In addition, the observation approach was also conducted to enhance the understanding of the researcher relating to matter under study. These approaches was in addition to the

review of Company X's documents to justify and explain certain practices regarding operational performance.

The study correspondingly will influence the managerial contribution in terms of developing a profile of top management contributions to understand; 1) the way management work influences work processes and organizational outcomes; 2) factors that undermine management's contribution to performance; and 3) the way a "enabling environment" for management work can be assembled and maintained (Buchanan, et al., 2013; Sorce & Issa, 2021). Regardless of the topic of study, management functions are classified as Planning, Organization, Leading, and Controlling (POLC) (Harris, McCaffe, Baldwin, & Edum-Fotwe, 2020). Planning allows for safer, more cost-effective, and more efficient work in upstream operations than unstructured activity. Poor planning costs money since it results in overstaffing, overtime, missed deadlines, and expensive urgent orders. Larger, more rapid operations and activities can put people in danger. The removal of inefficiencies and wasted operating time helps to ensure that operations are safe, dependable, and cost-effective (McCreery & Phillips, 2013; Sircar, Yadav, Rayavarapu, Bist, & Oza, 2021).

In terms of organization, today's upstream oil and gas companies must understand the adage of resource scarcity. Consequently, businesses build large, complex organizations with strong centralized functions. This model enables them to address formidable technical challenges, manage major political and operational risks, and deploy rare talent around the world, as required (Handscomb, Sharabura, & Woxholth, 2016; Baro-Tijerina & Piña-Monarrez, 2021). Leading function for upstream oil and gas operators is to determine how the company can remain ahead of the competition. In doing so, the company have to be dynamic in addressing the issues such as increased competition, new technologies that enables unconventional plays, increase in NOCs,

large Independents and service companies (Shuen, Feiler, & Teece, 2014; Adeleke, Ajibike, Muuka, Darun, & Moshood, 2021). The last managerial function to be discussed is controlling. Companies are responsible for ensuring that all practices related to E&P activities are monitored and controlled to ensure proper functioning operations. Companies prioritize health, safety, and the environment (HSE), as well as assets, production, and local and public image at the forefront of their operations (Yakoot, Elgibaly, Ragab, & Mahmoud, 2021). Based on this understanding the upstream oil and gas operators such as Company X, need to be on top of thing in ensuring all facets of operation been run in the most effective and efficient manner.

1.9 Scope of Study

This study focuses on the operational performance of upstream activities within Company X, a prominent oil and gas company responsible for managing the UAE's significant oil and gas resources. The research is specifically concerned with exploring the critical factors influencing operational performance, namely human resource practices, health, safety, and environmental (HSE) measures, and technology adoption. These factors are examined within the unique operational environment of Company X's upstream activities, where challenges such as cost efficiency, delivery reliability, flexibility, and quality are critical for sustaining competitive advantage and national economic contributions.

The scope encompasses addressing a significant knowledge gap in operational performance management as it pertains to Company X. While extensive literature exists on downstream operations and global oil and gas frameworks, Company X's upstream activities remain underexplored. By focusing on factors such as HR practices, HSE, and technology adoption, this study provides new insights into how

these elements drive operational performance within one of the UAE's most vital industries.

From a contextual perspective, the study highlights the underrepresentation of research specific to Company X's upstream operations. While previous studies have explored operational performance in industries such as manufacturing, healthcare, and IT, limited attention has been paid to the unique operational challenges faced by Company X. This research seeks to fill that gap by focusing on a critical sector that plays a vital role in the UAE's energy security and global oil and gas supply chains.

From a methodological standpoint, this research adopts a qualitative approach tailored to the operations of Company X. Engaging with senior-level managers allows the study to uncover nuanced perspectives on the company's strategic and operational practices, perspectives that have been overlooked in quantitatively dominated studies. The timing of this research is particularly relevant, given the volatility of oil prices and the evolving dynamics of the global energy market. By conducting this study during a period of significant industry transformation, it captures the strategic and operational adjustments being made by Company X to navigate these uncertainties. The study combines semi-structured interviews, document reviews, and observations to provide a comprehensive analysis aligned with Company X's unique operational characteristics.

Overall, this research contributes to advancing the understanding of operational performance management within Company X's upstream activities, providing valuable insights for the company's leadership, industry practitioners, and policymakers.

1.10 Operational Definitions of Term

1.10.1 Operational Performance

For the purpose of this study, Operational performance definition referred to as the level at which all business units within an organization work together to achieve key business objectives (Tucci & Roy, 2020). Operational performance in turn influenced company's performance measures such as market share and customer satisfaction (Kumar, Batista, & Maull, 2011; Kato, 2021). Operational performance is used in the oil and gas industry to improve the reliability of assets and prevent catastrophic failures, compliance with safety and environment regulations and support long-term strategic success. It is also viewed as a strategy that allows oil and gas companies to remain competitive over the coming decades of energy challenges (Singh A. , 2010; Hamdi, Rokhim, Hartijasti, & Zubaedah, 2021). On that note, the operational performance of Company X came under purview of the current research to understand the practice applied and recommended ways to assist the organization to become more profitable and sustainable.

1.10.2 Human Resource Practices

Human resource practices primarily involve operational or organizational activities in human resource management aimed at achieving corporate targets or objectives (Khan M. Y., 2018). Researchers have stated that effective human resource management may be the main success factor for a business (Hong, Hao, Kumar, Ramendran, & Kadiresan, 2012; Jayathilake, Daud, Eaw, & Annuar, 2021). Human Resource Management (HRM) is a management process that develops and manages an organization's human resources, taking into account their overall knowledge, skills, creative abilities, talents, abilities, and potential to effectively contribute to

organizational goals (Boxall, Purcell, & Wright, 2008; Magableh, Omar, & Al-Tarawneh, 2021). The organization needs to understand that the most significant asset is its employees, so management's primary responsibility is to manage human resources effectively.

1.10.3 Technology Adoption

Technology adoption is defined as the successful integration of new technologies into businesses (Ghobakhloo, Hong, Sabouri, & Zulkifli, 2012; Abeh, Talib, & Amoako, 2021). Yet, adoption is not limited to the use of technology. Once an organization adopt a new technology, they fully utilize it and see the benefits of using the new system in term of operational performance or more generally into the profitability of the firm (Altadonna, 2020). Despite the pressing need to accept new technologies, many people still consider that advancement is too sluggish. Poor training, the inability of new technologies to address existing systems, and plain dissatisfied or habit-oriented personnel are also challenges (Kerl, 2020). According to Roberts, et al., (2021), the upstream oil and gas (O&G) industry has been characterized as having a low propensity to adopt new technologies. Consequently, the study will reveal this aspect in terms of influence on the operational performance of the Company X.

1.10.4 Financial Constraint

When internal funding is insufficient, financial limitations are typically described as an inelastic supply of external funding, implying a constraint on corporate decisions (Cherchye, Rock, Ferrando, Mulier, & Verschelde, 2020). These constraints are known to have considerable repercussions. Ergün and Doruk (2020) suggest that financial constraints significantly hinder enterprises seeking external funding for

investments in intangible or fixed capital, as well as for their research and development (R&D) activities, which are essential for achieving their growth and profit objectives. Thus, access to external financing plays an important role in the firm growth particularly in investment intensive industry such as oil and gas.

1.10.5 Manpower Constraint

Labor constraints or shortages are another challenge faced by oil and gas players. According to the Cambridge Business English Dictionary (2021), the concept refers to the insufficient number of people who can work or who are needed to do specific work. Technology advancement, innovation in business operation model, exodus of retirees, and loss of interest in young talents for the "out-of-favour" industry were cited as reasons why the industry is in this situation (Dickson, Tilghman, Bonny, Hardin, & Mittal, 2020). Offshore Technology (2020) emphasized that operating oil and gas equipment or related devices demands years of training and field experience, which can result in a shortage of a skilled workforce.

1.11 Summary of the chapter

Effective cost control practices are a key element of business excellence in the oil and gas industry (Deloitte, 2021). The current oil and gas landscape have created an industry-wide incentive to reassess its operations (Fattouh, Poudineh, & West, 2019). While significant and timely, sustainability is achieved through long-term strategies to manage costs (Ahmad, Brito, Rezaei, & Tavasszy, 2016; Aslam, Saleem, Khan, & Kim, 2021). Therefore, in oil and gas context, players in this industry need to embrace the concept of operational performance due to the nature of its operations that is full of risks, i.e. political risk, geological risk, price risk, supply and demand risk and cost

risk (Beattie, 2020) coupled with many other issues for instance health and safety, environmental performance and technology advancement that contribute to the cost of production (Tasmin, Muazu, Nor Aziati, & Zohadi, 2020). Therefore, the study attempted to address the issue of Company X 's operational performance. Finally, the findings of this study contributes to the improvements in the oil and gas production for Company X. The researcher also looks forward to the research recommendations being implemented and becoming beneficial not only for the operators involved and companies operating in the oil and gas industry but also for the nation.

1.12 Organization of the Study

The research was be divided into five sections. The Introduction Chapter is the first chapter. This comprises a background study on the topic, a problem statement, a research purpose, research questions, and a brief overview of all key terms and topics that will be discussed, as well as the importance of this study.

The second chapter is the Literature Review which includes discussions on the key concepts, theories, paradigm, issues that have emerged in the oil and gas sector and that will focus on operational performance. A theoretical framework is introduced as the basis for discussions which provides possible answers to the research questions.

The chapter on research methodology is the third chapter. Discussions regarding research methodologies, study design, and research goals are included here. This chapter also covers the data gathering method and data analysis procedures. There is an ethics review as well as a brief summary of the discussions about how the study was be carried out.

The Findings and Analysis are discussed in the fourth chapter. This involves describing the numerous findings that were made during this study as well as the

study's analysis. The research objectives is also stated, as well as the solution to the research question.

Lastly, the fifth chapter comprises of Conclusion and the Recommendations. This involves the linking of the study with objectives and supporting evidence to the research findings, limitations of the study, recommendation for further research works and finally a brief summarization.

CHAPTER 2

LITERATURE REVIEW

2. Introduction

This chapter addresses the concept of operational performance in global oil and gas company as well as in middle east countries. The study was conducted to examine the concept from the perspective of Senior Management to provide a comprehensive review and understanding of current research. The key point is that the information gathered should guide an appropriate approach, which is currently lacking in the methods used to assess Company X's performance. Considering the scope of this research area, the literature review for this study was selective and focused on the operational performance of oil and gas companies engaged in upstream activities. The review examined textbooks, conference proceedings, websites, trade journals, reports and journals, print and online versions of a university library that subscribes to a full range of journals and journal databases.

The chapter discusses the evolution and definitions of operational performance in the hydrocarbon industry, its implementation, and its contribution to the company's overall performance. Most of the articles in that section were published in recent academic journals. The study was able to propose a general operational performance structure consisting of four main steps which are, respectively, problem definition, evaluation of the current operational performance practices of the mainstream oil and gas operators and methods of operational performance decision.

2.1 Operational Performance Management in Upstream Oil and Gas Activities

The oil and gas industry has been a cornerstone of global energy supply and industrial development since the mid-19th century. The discovery of crude oil and its refinement into petroleum products revolutionized key sectors such as transportation, manufacturing, and electricity generation, laying the foundation for modern economies (Craig et al., 2018). Over time, the industry has evolved into one of the most capital-intensive and strategically significant sectors globally, driving industrialization and economic growth. Despite advancements in renewable energy technologies and increasing environmental concerns, hydrocarbons remain the dominant energy source, accounting for over half of global consumption (Bogdanov et al., 2021). Their energy density, transportability, and scalability make them indispensable to both developed and emerging economies, particularly in energy-intensive industries (Stevens, 2016).

Within this global context, the upstream segment of the oil and gas industry—encompassing exploration, extraction, and production—holds critical importance. These operations form the foundation of the hydrocarbon supply chain, supplying raw materials for downstream processing and distribution. However, upstream activities face unique challenges, including fluctuating oil prices, regulatory pressures, and technological constraints. Market volatility exacerbates these challenges, often disrupting production strategies, operational budgets, and investment plans. Moreover, the resource-intensive and risk-prone nature of upstream operations heightens the need for efficiency and resilience, as inefficiencies can result in significant financial losses and reputational damage. Addressing these challenges necessitates a strategic focus on optimizing operational performance.

Operational performance serves as a pivotal mechanism for tackling these complexities, enabling organizations to improve efficiency, reduce costs, and enhance adaptability. Regardless of oil price swings, operating costs have consistently climbed over the last decade and are expected to continue rising (BBC, 2021). The requirement for operational performance is not driven solely by recent price reductions, but such pressures demand swift and effective action (McFarlane, 2021). To achieve this, the industry requires a measured approach, unlike past practices that fostered cycles of expansion and recession (United Nations, 2020). According to Abdou, Hassan, and Dief (2020), the industry's expansion and contraction model creates substantial instability, which can only be mitigated by integrating perpetual stability and sustainability into operational strategies. This approach enables companies to reap calculated and cost-effective benefits from performance improvements (Johnston, Blakemore, & Bell, 2020).

The measurable components of operational performance—such as dependability, production cycle time, and inventory management—are crucial for achieving long-term success (EY, 2015; Azim & Ahmed, 2015). These features of organizational processes directly influence firm performance indicators, including market share and customer satisfaction (Alkalha, Al-Zu'bi, & Zighan, 2021). In the oil and gas sector, pressures from asset incidents, environmental concerns, declining performance, and escalating costs highlight the need for action that is both immediate and sustainable. Companies must take steps to enhance health, safety, environment, and quality (HSEQ), streamline operations, and drive business performance.

Operational performance programs that prioritize continuous improvement are the most effective strategy for achieving this level of endurance and adaptability. Such programs enable organizations to address recurring operational challenges

systematically, ensuring resilience and sustainability in volatile conditions (CEMEX, 2020). At its core, operational performance involves aligning processes, resources, and technologies to meet critical business objectives, such as cost reduction, quality improvement, and operational flexibility (Neely, 2011; Hansen, 2021). Across industries, frameworks for operational performance have been instrumental in maintaining competitiveness. Manufacturing and information technology sectors, for example, have implemented strategies leveraging automation, advanced analytics, and resource planning to achieve significant gains in efficiency and responsiveness (Buer et al., 2021; Verma et al., 2021).

In the oil and gas industry, the stakes for operational performance are particularly high due to the sector's interdependencies with global supply chains and energy markets. Operational inefficiencies can trigger cascading effects, disrupting production timelines, increasing costs, and impacting downstream operations. Key performance measures such as cost, quality, delivery reliability, and flexibility are therefore essential for sustaining operational success. Cost management remains a critical concern due to the capital-intensive nature of upstream activities, while ensuring quality and reliability is vital for meeting industry standards and stakeholder expectations (Sadikoglu & Olcay, 2014; Fonseca et al., 2021). Flexibility, meanwhile, allows companies to respond swiftly to market volatility, geopolitical disruptions, and technological advancements (Reeves & Deimler, 2011).

The UAE oil and gas sector, represented by companies like Company X, exemplifies the importance of operational performance. In this context, upstream operators face challenges amplified by resource constraints, environmental pressures, and the need to align with international standards. Addressing these issues requires a holistic framework that integrates key drivers of operational performance, such as business

events, processes, decision-making, and data management. Together, these components provide the foundation for creating adaptive, resilient, and efficient operations capable of sustaining competitiveness in a volatile energy market (Aghina et al., 2020; Viter, 2021).

2.1.1 Business Events

Planned and unplanned events that guide an organization's internal responses and processes are referred to as business events (Greene, 2021). According to DiLallo (2019), the oil and gas business globally pumps, transports, and processes more than 100 million barrels of crude oil and 355 billion cubic feet of natural gas per day. The upstream sector of the hydrocarbon industry is responsible for the first heavy lifting, since it is responsible for the exploration and production of hydrocarbons such as oil, natural gas, and natural gas liquids (NGLs). It then moves this output to the midstream sector, which focuses on hydrocarbon transportation, processing, and storage. Hydrocarbons then move downstream from here, where they are refined into finished petroleum products like gasoline and diesel and then distributed to end customers.

The upstream segment of the oil and gas industry encompasses exploration activities, such as creating geological surveys and securing land tenure, as well as production activities, including onshore and offshore drilling (Library of Congress, 2021). Given these activities, numerous challenges are bound to arise throughout the processes. Therefore, it is understandable that oil and gas companies, particularly upstream operators, would be equipped with adequate mechanisms to mitigate any negative events.

2.1.2 Business Activities

A business process is a collection of business activities that represents the processes required to attain a specific company goal (Greene, 2021). Each phase of a business process, according to Kissflow Inc (2021), specifies a task allocated to a participant. Many related concepts, such as business process management and process automation, are built around it. The importance and benefits of a business process are evident in major corporations. Any company's lifeline is a procedure, which helps to streamline individual actions and ensure that resources are used efficiently (McKinsey & Company, 2020). Key rationale for having well-defined business processes according to Kiss Inc (2021) are; i) Determine tasks that are important to major business goals; ii) Improve efficiency; iii) Facilitate communication between individuals, functions and departments; iv) Establish approvals for accountability and best use of resources; v) Keep chaos out of day-to-day operations; and vi) Standardize a set of procedures to accomplish tasks that are truly important to companies. In a way, operational performance can be enhanced by having an appropriate business process integrated into the business operation.

2.1.3 Business Decisions

Business decisions encompass all decisions that influence future business activities, objectives and activities (Indeed.com, 2021). Spacey (2021) defined business decision as “a commitment by an organization, team or individual to a plan of action”. Understanding the importance of business decisions and different types of decisions makes it possible to apply the right decision-making skills to different situations. High-performing businesses invest in decision-making methodologies and

technologies to increase the operational performance of their strategic decision-making responsibilities (Greene, 2021). The level of uncertainty and anxiety on the part of upstream producers and the supply chain has rarely been higher. In the coming years, the decision-making process will be more heavily influenced by the sentiment surrounding the energy transition, political turmoil and trade disputes than in previous years. This adds to the ongoing risks of unexpected supply and demand imbalances, niche cost inflation, or a slowdown in the global economy (McKay, 2020). The ability of the upstream O&G operator to make a suitable business decision will ensure the sustainability of the business.

2.1.4 Data Management

Corporate data is defined as information that describes corporate assets such as resources, products, customers and events (Greene, 2021). Data management is a discipline aimed at improving the management, governance, quality and utilization of business data (Nguyen, Gosine, & Warrian, 2020). Trustworthiness data may be the company's most important asset. Patel, Prajapati, Mahida and Shah (2020) claimed that sufficient data assists companies in detecting and correlating events, optimizing business processes and making better decisions. In today's unpredictable petroleum industry, having access to high-quality, fast, and coordinated data is critical. Data management removes the ambiguity that might stymie a company's growth and guarantees that it can embrace opportunities with confidence and understanding (Barbosa, Bresciani, Graham, Nyquist, & Yanosek, 2020). For an effective improvement strategy, the three prior processes in unlocking operational performance are critical topics of focus. Given the importance of all three, the data are likely the most significant. The quality of an event, process, or choice, according to Greene

(2021), is only as good as the evidence that supports it. Correlation and contextual data are required for events. Incorrect event data correlation for fraud, or even the linkage of two events for production shortages, can be caused by bad data (Foreman, 2021). Data is needed to guide and make decisions in processes. Insufficient data could stymie procedures, while inappropriate routing to corporate functions could leave a customer issue unresolved. Decisions necessitate precise and consistent data. Poor data may have an influence on clients' risk assessments or the involuntary denial of a claim. To avoid the risks associated with poor data quality, high-performing firms invest in data management. Businesses can improve their operational performance by guaranteeing data reliability, access, quality, and timeliness in order to better respond to market changes and opportunities.

2.2 Performance Measures

The literature on performance measures identifies many elements, such as i) speed of delivery; ii) reliability of delivery; iii) flexibility; iv) quality; and v) accuracy of forecasts (Siagian, Tarigan, & Jie, 2021; Salehzadeh, Tabaeeian, & Esteki, 2020).. It also deals with financial measures, compliance with processes and security measures (Azim & Ahmed, 2015; Menhat M. N., 2017; Menhat & Yusuf, 2018). Moreover, other sustainable metrics that have recently garnered a lot of attention from scholars and practitioners are innovations, social responsibility, and environmental measures, all of which are discussed in this discussion.

2.2.1 Speed of delivery

Speed of delivery is a measure used to measure an organization's capacity to deliver services or goods within the agreed upon timeframe (Tarigan & Siagian, 2021). Speed of delivery is considered to be one of the competitiveness priorities of organizations (Esmizadeh & Parast, 2021). For activities with a variety of operational functions, a delay in an area could have an influence on resulting events. This will ultimately influence client satisfaction and increase the cost of inventory. Vehicle speed, driver reliability, delivery frequency, and depot locations all have an influence on this performance (Al-Mekhlafi, et al., 2021). Another aspect of timeliness relates to the flow of information relevant to improved decision-making.

The potential value of improved connectivity in exploration and production has never been more essential than it is now, thanks to pressures from oil and gas prices and demand. Technology is rapidly growing, and it has the potential to improve operations and add value. Devices that enable and improve connectivity, as well as those that connect the main network (the global Internet) to small sub-networks, are all examples of these technologies (Grijpink, Katsap, Verre, & Ward, 2020).

Through optimization and automation, technology may improve the efficiency of the upstream oil and gas value chain. Optimization entails using all relevant data on a regular basis in order to make better selections. Pushing the limits of optimization involves collecting more data and processing it faster, which necessitates the use of more sensors, more bandwidth, and more computing capability (Gold & Shaw, 2021).

2.2.2 Reliability of delivery

Reliable delivery is a measure concerning the performance of a firm/contractor in the delivery of goods/services ordered at a precise location, at a decided time, in the correct quantity and appropriate quality required (Abdirad & Krishnan, 2021). Jenkins (2021) stated that delivery reliability metrics are the amalgamation of delivery performance, load ratio, and perfect fulfilment of orders. This was the second-highest priority for competitiveness after quality in the petroleum industry (Barbosa, Bresciani, Graham, Nyquist, & Yanosek, 2020). Moreover, the reliability of the delivery service is essential to evaluate the performance of members of the supply chain (Sánchez-Flores, Cruz-Sotelo, Ojeda-Benitez, & Ramírez-Barreto, 2020). Integrated supply chain ensures reliable delivery (Bauer, Bauernhansl, & Sauer, 2021). Reliability is the capacity of the service provider to deliver the service in a safe and efficient manner (Ademe & Adewuyi, 2021).

Delivery is a continuous, non-conformance-free performance that can be trusted by the customer. The service provider should deliver the promised service/goods without having to re-design. Restuputri, Indriani, Masudin and Tan (2021) claimed that reliability is the capability to i) Provide the expected standard at all times; ii) How the organization manages the client service issue; iii) Delivering the right services for the first time; iv) Provide services in a timely manner; and v) keep a record free of errors. One of the important criteria that describe the performance of a logistics system, according to Ademe and Adewuyi (2021), is its reliability. The number of products delivered at the confirmed delivery date divided by the number of products purchased is the definition of reliable delivery (Cano, Gómez and Cortés, 2021). Dhamodharan (2019) argues that time-based measurements are the most significant aspect of the delivery process, which is reliability.

2.2.3 Flexibility

Flexibility in managing the supply chain is very important because it contributes to a company's responsiveness to uncertainty in current business environment especially oil and gas sector. Fletcher, Mahindroo, Santhanam and Sawaya (2020) claimed that a flexible supply chain may be considered to have the ability to meet fluctuating customer demands. Sima, Gheorghe, Subi and Nancu (2020) defined flexibility as "the ability of a manufacturing system or facility to efficiently respond to uncertainty from a broad range of sources and at the same time, continue to effectively produce a variety of products or volumes of products of acceptable quality, cost and schedule". Flexibility can be improved by providing measures such as performance measurement, visual display, and data gathering and analysis (Dickson, Bonny, Tilghman, Hardin, & Mittal, 2020).

Flexibility is also regarded as a meta-process that involves orchestrating and leading a group of activities. Resources, processes and best practices need to be managed holistically and systematically, which is of crucial strategic importance (He, Wu, Croasdell, & Zhao, 2022). Akenroye, Owens, Elbaz and Durowoju (2020) stated that flexibility enables accurate policy decisions, aligns stakeholders, Drive change readiness and increase agility to capture value and mitigate risks

As such, high flexibilities are unlikely to translate into a competitive advantage (Davidescu, Apostu, Paul, & Casuneanu, 2020). Chen, et al., (2021) stated that the strategy should be tailored to capabilities to anticipate when and how flexibility capabilities will affect business performance. Strong flexibility and strategy have combined to maintain the competitive edge of firms that have resisted for decades, even though they have changed the focus of their operations (Islami, Mustafa, & Latkovikj, 2020). Only business processes and business models that improve

differentiation and value are known to provide genuine flexibility capabilities (Harland, Uddin, & Laudien, 2020).

2.2.4 Quality

In modern-day competitive business landscape, the key to the success and sustainability of an organization is quality. Businesses embrace a variety of quality measures as a basic element of their strategic business plans in order to remain competitive in a global environment (Srinivasaiah, Swamy, & Nanjundeswaraswamy, 2020). Quality has become more important as a result of globalization and privatization, and many organizations are implementing a variety of quality tools and procedures to stay competitive (Abimbola, Ekpudu, & Kuye, 2021). According to Antunes, Mucharreira, Justino, and Texeira-Quirós (2021), quality procedures will improve the quality of products and services, resulting in increased earnings. Furthermore, companies can learn from other companies' successes and follow quality best practices to implement and maintain high levels of quality (Patel, 2021). As well, upstream activities in the oil and gas sector will also focus on quality in terms of supplier contribution to organizational performance.

Supplier quality management is directly linked to the high level of overall quality, reducing variations in quality performance and reducing costs (Menhat & Yusuf, Factors influencing the choice of performance measures for the oil and gas supply chain – exploratory study, 2018; Hanafiah, Menhat, Jeevan, Salleh, & Ngah, 2021). Mehta, Tanwar, Bodkhe, Shukla, and Kumar (2021) emphasized the need of emphasizing supplier quality because it might affect the overall cost of products and services. Furthermore, poor quality performance may have an influence on revenue and customer and stakeholder confidence (Goedhart & Koller, 2020). Information

technology, according to research, can increase quality standards by providing reliable data, fast reporting, and data integration (Menhat & Yusuf, Factors influencing the choice of performance measures for the oil and gas supply chain – exploratory study, 2018). In short, quality procedures are critical for long-term business growth in any type of corporate environment. Organizations are under pressure to improve quality in a shifting global landscape.

2.2.5 Accuracy of forecasts

Accurate forecasts provide an accurate estimate of certain unknown future events (Norouzi & Fani, 2020). Baker (2020) claimed that this is important to reduce inventory levels and ultimately improve the cost savings of organizations. Oil and gas associations such as Organization of the Petroleum Exporting Countries (OPEC) and International Energy Agency (IEA) insist on accurate forecasts to ensure their production is capable of meeting market demand (International Energy Agency, 2021). Long-term forecasting is an important part of strategic planning. In the case of the energy market, such decisions are typically made when energy producers need to know the demand for a certain geographic area in order to organize their supply chain and develop infrastructure. The minimum period for this type of decision is estimated to be five years (Gaweł & Palinski, 2021).

Predicting energy use has been a major study topic for decades. Its importance has grown in lockstep with the global increase in energy consumption. The quality of projections over various time horizons and for various durations remains a major research topic. Additionally, researchers also forecast the country's natural resources' potential to predict the country's long-term energy future (Gaweł & Palinski, 2021). Enhancing the accuracy of long-term projections, which are falling behind the

increasing volatility of the long-term economic environment, is a major research challenge. Accurate forecasts allow companies to adapt their output based on forecasts rather than on orders that accelerate the process. In addition, they argue that certain products exhibit seasonal demand patterns. Therefore, inventory levels, commodity quantities, working time, costs and potential revenues must be planned in advance using forecasts (Sima, Gheorghe, Subi, & Nancu, 2020).

2.2.6 Financial measures

Financial measures are designed to achieve the financial objectives of an organization. Financial measures can involve cost savings, a return on assets and a return on investment (Barauskaite & Streimikiene, 2021). These measures were recognized as the most important component of performance measurement well in advance of the introduction of non-financial measures such as operational measures (Ahmed, Muthuraman, & Al-Hadabi, 2021). While financial measures on their own are not enough for simple supply chain management applications (Blanchard, 2021), it is still necessary for measuring organizations' financial situation and particularly important for providing information to stakeholders and potential investors (Farhoomand, Markus, Gable, & Khan, 2021). Therefore, financial measures play an important role in the performance of the supply chain for oil and gas industry, particularly in terms of decision-making (Yusuf, et al., 2018).

While the hydrocarbon business is used to highs and lows in the economic cycles and price fluctuations, the present slump looks to be extraordinary. In fact, the operations and distribution industry is seeing a "major downsizing." The next decade might be significantly different for the whole O&G value chain, with many companies' viability at stake and long-term declines in oil demand. The next year will be either a leap

forward or an endurance test for many. According to Tattersall (2021), five oil and gas trends will emerge in 2021 that will challenge traditional hydrocarbon production methods, identify the industry's direction and begin to separate the pioneers from the followers. These trends would include i) the position and commitment of a new jurisdiction with respect to clean energy; ii) changes in end-use demand models and supply composition; iii) increasing environmental, socially responsible and impactful investments; iv) adoption of new talent strategies for success in the future of work; and v) consolidation within a low-cost environment.

2.2.7 Compliance with processes

Process compliance is focused on the capacity of operational functions to work in accordance with standard process requirements established by the organization (Biswas, 2019). Staff compliance to the business process is important in terms of organizational policy and management effectiveness (Paoletta, 2020). Antonsen and Madsen (2021) indicated that four process compliance management cycles exist. This includes the definition of compliance measures, the development of compliance policies, the implementation of compliance policies, and the control of compliance policies. Additionally, compliance controls are divided into two categories: passive and active controls. When business operations check process compliance, active compliance is verified, whereas passive compliance is verified when process compliance monitors their operations (Sihag & Rijsdijk, 2019). Compliance affects every aspect of business life; even organizations that are not regulated by their own sector will have to comply with government rules or other industry-wide rules (Nyhuis, 2020). Therefore, compliance with processes is essential to ensure an organization's well-being.

2.2.8 Security measure

Security measure brings a great number of organizational and financial advantages for the organization (Ahmed R. K., 2016; Ibnugraha, Nugroho, & Santosa, 2021). In the event of a breach in security defences, the organization will be exposed to numerous risks such as loss of reputation, assets and business discontinuities. Today, the explosion of technology is forcing organizations to change their operations and structures. Technology becomes the major driver of productivity growth and organizational competitiveness and allows for efficient cost reductions. The use of technology, its role and importance are becoming increasingly important. It is no longer necessary to ignore the current phenomena of globalization and delocalization. A typical sector that is very susceptible to such risks is, for example, the service sector. As such, security issues within an organization need to be addressed as a priority at the top management level.

2.2.9 Innovation measure

The hydrocarbon industry used to be driven by innovation, like reflective seismology, which revolutionized oil exploration in the 1920s, led to worldwide discoveries and filled billions of barrels of oil (IBM, 2020). Due to overcapitalization, budget overruns, and an excess supply of goods, industry is constantly under pressure to streamline processes and save costs. As a result, innovation is critical to the long-term viability of oil and gas enterprises. In addition, one of the primary drivers of service and product innovation is rising client expectations (Toor, 2020). Initial studies on innovation focus on advancing technological information. That orientation then extended to the creation of value-added innovations (Akbar, Bon, Alshaikh, & Wadood, 2021). Newcomers to the petroleum industry must go through the full value

chain, from upstream to midstream, as well as distribution and consumption to retail (IBM, 2020).

OECD (2021) highlighted that innovation as been coerced due to :

i) Stricter pollution restrictions and political uncertainties heighten industrial restraints, as the next energy transition necessitates a delicate balance between existing companies' portfolios and investments in sectors such as renewables, electricity, hydrogen, and biofuels

ii) As a result of the young workforce's perception of oil and gas as a "disadvantaged" industry, employment in extraction (exploration and production) and support (oil services) declined dramatically

iii) Market dynamics resulting from the industry's rapid technological advancements, growing client demand, and the emergence of a diverse start-up ecosystem.Social responsibility measure.

2.2.10 Social responsibility measure

The capacity of an organization to invest in voluntary initiatives to enhance social conditions is referred to as social responsibility (Maldonado-Erazo, Álvarez-García, Río-Ramap, & Correa-Quezada, 2020). External pressure on Corporate Social Responsibility (CSR) issues leads organizations to take an interest in integrating CSR values into their business operations (Koolwal & Khandelwal, 2020). Furthermore, Gyane, Nunoo, Suleman, and Essandoh-Yeddu (2021) suggested that the possibility for competitive advantages drives the expansion of socially responsible operations. Organizations that practice CSR pay attention not only to achieving benefits, but also to how their decisions influence stakeholders and the general public. (Zhang & Yang, 2021).

A number of organizations have incorporated social responsibility measures into their performance frameworks such as BP-Amoco, ChevronTexaco, Shell, ENI, Occidental, Exxon-Mobil, Tullow and Total-Fina-Elf (Gyane, Nunoo, Suleman, & Essandoh-Yeddu, 2021; GRI, 2021). Koolwal and Khandelwal (2020) further added that “CSR must be actualized and completed for an organization to accomplish financial advantages”. In addition, many other benefits associated with CSR initiative for the companies such as i) attract and retain employees; ii) improve customers' perception of company’s brand; iii) shows a sign of accountability to investors; iv) saves money; and v) better engagement with customers (Heyward, 2020). In this regard, CSR has been identified as one of the key elements in reviewing a company's performance.

2.2.11 Environmental measures

Most organizations' environmental consciousness has grown in recent years including Company X, as indicated by their environmental management throughout their activities (El-Mallah, Aref, & Sherif, 2019). Environmental awareness factors, according to Ritchie and Roser (2021), include scarcity of resources, changes in environmental policy, and natural disasters. Companies in the industry reported their sustainability initiatives, often known as "corporate citizenship" or "environmental, social, and governance (ESG) reporting." (Hadi & Baskaran, 2021). ESG, according to Stepler, Stewart, and Waring (2021), is a strategy for analyzing and reporting on how a company serves all stakeholders, such as employees, communities, consumers, vendors, shareholders, and the environment.

ESG investment has increased dramatically, with global sustainable investment now reaching $30 trillion (Henisz, Kolle, & Nuttall, 2019). Effective ESG planning can

help with reputation management, attracting new types of investors, promoting long-term financial performance, and mitigating growing regulatory requirements, as well as other benefits. This has had a favourable influence on performance, such as lowering operational costs by reducing energy and water use, recruiting and retaining talent, strengthening community and investor ties, and boosting the likelihood of receiving government assistance and subsidies (Stepler, Stewart, & Waring, 2021). Oil and gas operations are multi-faceted and because of the high-risk nature of these activities, companies continually strive to reduce the significance of their adverse effects on the environment and people. Assessment of sustainable production in this industry is therefore critical.

Based on the discussion of performance measures, this study focused on the most relevant elements of measures associated with operational performance for upstream oil and gas operations - quality, cost, flexibility and delivery (Liu, Wu, Zhong, & Liu, 2020; Fuad & Musa, 2021; Emmanuel & Adiele, 2021; Basile, Capobianco, & Vona, The usefulness of sustainable business models: Analysis from oil and gas industry, 2021; Lima, McMahon, & Costa, 2021). This is explained by the fact that the basic objective of operational performance is to identify the areas that a company is trying to improve, with the aim of achieving its business strategy. Once a corporation has set its business strategy, it will identify the operational performance targets that must be measured and configured in order to fulfil the goals.

In addition to performance measures, oil and gas producers constantly strive to optimize business processes, re-organize human resource roles, and enable the use of new technologies to achieve production objectives. These efforts are supported by well-thought-out operational efficiency improvement strategies that consider geographic location, regulatory compliance, resource availability, and technological

restrictions. Key activities include innovative methods for effectively deploying field sensors to acquire data and smart monitoring of producing wells. With many field workers operating autonomously in remote locations, centralized monitoring and transformation methods are crucial. The current study outlined some of these transformative initiatives that can contribute to the operational improvement of oil and gas production.

2.3 Operational Performance of Upstream Activities

E&P is a complex process that starts with a prognosis and includes a series of activities. Such as geological survey, magnetic survey, gravitational survey, seismic survey, laboratory studies, geochemical study, as well as exploratory drilling. encompassing coring, casing, cementing, mud engineering, and drill stem test (DST) followed by well testing (Chowdhury, 2016; Bonnet & Westerman, 2021). According to the well test results, the well is declared "dry" or "hydrocarbon bearing" if there is no oil or gas, it is then abandoned. If found, another set of activities follows, namely the drilling of the assessment well, the delineation of the field and the assessment of the commercial viability of the reserves (Abigaba, Bengtsson, & Rosendahl, 2021).

The upstream hydrocarbon industry is very unique in that inputs are deterministic while outputs (results from exploration activities) are stochastic (Bonnet & Westerman, 2021). The investment made does not guarantee an outcome or realization. As a result, the industry is linked to uncertainty and high risk (Forradellas & Gallastegui, 2021). Although oil and gas are discovered, its commercial viability must be evaluated before the next course of action is decided. The development of the field takes a great deal of time before the start of production. All of this makes E&P's business high risk and high cost (Chowdhury, 2016).

E&P activities are also technologically intensive and require expertise in a variety of areas. E&P activities are essentially the application of "various streams of science and engineering, such as science (geology, geophysics, geochemistry, palynology, mathematics, and statistics); engineering (petroleum, chemical, reservoir, mechanical, electrical, civil, marine and ocean, electronics, instrumentation, telecommunication, and computer science); and many others" (Bonnet & Westerman, 2021). Chowdhury (2016) expressed the same concern about E&P activities with the requirement of a technology-intensive method. Currently, oil and gas exploration is conducted on challenging terrain - geographically and geologically. These include deepwater exploration (Cholteeva, 2020), the Arctic region (Ainger, 2021), hostile snow fields (Bussewitz, 2021), mountains (Cast, 2021), the high-pressure, high-temperature horizon (Ma, et al., 2020), and other challenging areas.

In the upstream sector, a typical oil and gas cycle involves several different phases that have different goals using specialized technologies. The Figure 2-1 below presents a schematic representation of the field cycle and the activities generally conducted in each phase:

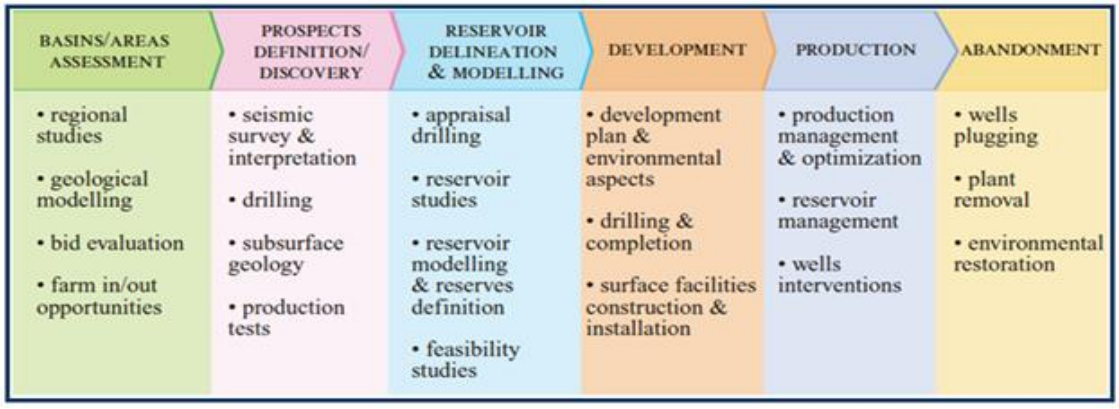

Figure 2-1:
The oil and gas operating cycle and activities. Source: http://www.oil-gasportal.com/upstream/basic-concept/

“Exploration is a set of coordinated activities involving different integrated disciplines, sciences and technologies —not only geology/geophysics— aiming at discovering new oil and gas volumes that could be exploited in a “reasonable” future with an economic return” (Craig & Quagliaroli, 2020). In the execution of the exploration task, a thorough understanding and mapping of the current subsurface structure of an area is essential (Mohammadpoor & Torabi, 2020). The charge of understanding the evolution of hydrocarbons over time, locating the areas where hydrocarbons may be generated, estimating their volumes and assessing whether explorers' predictions are accurate require appropriate processes and knowledge. To reach these goals in the most effective way, high-level skills and know-how must be used. The use of a powerful, integrated digital approach with the support of a dedicated R&D project team is also a must-have (Craig & Quagliaroli, 2020).

2.3.1 Basin/Area Assessment

Areas of Earth characterized by long-term subsidence which allows development for accommodation space for sediment filling are called sedimentary basins. This is were generally the exploration activities for hydrocarbon are carried out. Deep sedimentary basins typically more than 2500m depth is required for oil exploration. To produce and accumulate oil, these basins must have the five key components: mature source rock, reservoir rock, migration pathway, trap and seal or also known as “petroleum system” (Dar, 2013).

- Source rock: Organic rick sediments that are capable to produce hydrocarbon in the presence of heat. These sediments are usually shales, carbonates, marls, coals and sandstones.

- Reservoir rock: Simply put, these are rocks with enough porosity and permeability to host and flow hydrocarbons.
- Migration pathway: High permeable features that allow hydrocarbons to migrate from source rock to reservoir rock.
- Seals: Impermeable rocks, generally sedimentary in nature, able to create a barrier over and around the reservoir.
- Trap: Structural setting of reservoir and seal which allows accumulation of hydrocarbons.

2.3.2 Hydrocarbon exploration methods

Once an area has been chosen for exploration, the conventional sequence of events begins with defining a basin. Oil exploration and production, particularly offshore, necessitates geophysical interpretation of structural data. Petroleum exploration employs three basic geophysical methods: magnetic, gravitational, and seismic (PetroSkills, 2020).

- Geological Terrain Survey and Remote Sensing: The majority of exploration geophysics activities rely on highly advanced technologies to discover and determine the amount of these deposits. The procedure of surface geological mapping and rock outcrop sampling was typically used in the first step of any reconnaissance project to establish the geological and structural properties of the zone (lithology, sequential thickness, structural configuration). The rock samples are subsequently tested in laboratories, yielding useful information including age and petrophysical properties (i.e., porosity and permeability), as well as total carbon content, organic material quality, and thermal maturity for possible origin rocks (Craig & Quagliaroli, 2020).

- Geophysical Analysis (non-seismic): Anomalies in the Earth's gravity and magnetic field can be detected using gravimeters and magnetometers respectively. Basically, these anomalies could be linked to changes in the rocks' unique physical features (density or magnetic susceptibility). Following data processing, interpretations may inform the explorer of the basin's shape and extent, structural trends, fault locations (basically gravimetry), subsurface depth, subsoil lineation, and the existence of igneous bodies (essentially magnetic) (Balossino, 2020).
- Geophysical analysis (seismic): Seismic surveys are used to investigate geological structures of interest based on gravity and magnetic studies in greater detail. By examining the propagation pattern of sound waves through the subsurface, seismic surveys provide 2D and 3D images of the Earth. These images provide us a look at what's going on in the subsurface. The approach involves sending sound waves into the earth, where they travel through the rock mass, undergoing reflection and refraction at geological discontinuities. According to the type or density of the rock layers they pass through, seismic waves travel at varying velocities. A seismic survey may reveal the presence of potential hydrocarbon traps that could be the subject of drilling (Craig & Quagliaroli, 2020).
- Geology and Geophysics (G&G) analysis: Integrated multi-disciplinary studies are carried out to determine the potential of a geological interest prior to drilling and exploration well. It is a necessary step in order to improve chances of successful exploration and avoid dry-holes (Bempong, Ehinola, Apesegah, Hotor, & Botwe, 2021).
- Prospect generation: The final processed seismic data is displayed as maps or sections. This enables the Geoscientists to exactly map subsurface sedimentary and structural features. Mapping and G&G investigations allow for the

identification of the most prospective places for hydrocarbons to exist. An identifiable structural or stratigraphic closure (trap) or seismic amplitude anomaly that interpreters may recommend for drilling a well is referred to as a "prospect." (Balossino, 2020).

- Well drilling: Finally, an exploratory well (wildcat well) is drilled to conclusively determine the presence or absence of hydrocarbon (Bempong, Ehinola, Apesegah, Hotor, & Botwe, 2021).

Following a successful wildcat well, multiple delineation wells are drilled to determine the extent of the discovery. All newly acquired data is further developed with additional G&G studies that provide a detailed understanding of the subsoil geology and hydrocarbon reservoir volumes (Craig & Quagliaroli, 2020; Bempong, Ehinola, Apesegah, Hotor, & Botwe, 2021).

The E&P scenario for the oil and gas sector is becoming more expensive, risky and technologically demanding as operations move from easy to difficult and challenging frontiers. There is a need to optimize strategies, resources and costs and improve business performance in all spheres of the E&P business. This is about surviving and sustaining businesses. All of this requires innovative ideas, mindsets, new perspectives and business approaches. Therefore, this study would like to review the operational performance practice of Company X in order to identify ways to ensure the sustainability of the company.

2.4 Human Resource Practices and Their Influence on Operational Performance

Human Resource Management (HRM) is a fundamental component of organizational success, especially in industries where operational efficiency is critical. Effective HRM practices enable organizations to address challenges by fostering a motivated and competent workforce capable of meeting strategic goals (Singh, Gupta, Busso, & Kamboj, 2021). In industries like oil and gas, where operational complexities are significant, human resources are not merely functional but are regarded as strategic assets essential for achieving sustainability and cost-effectiveness. Amoah and Marimon (2021) highlighted that HRM practices, such as nurturing knowledge, competencies, and interpersonal relationships, help organizations cultivate unique advantages that are difficult for competitors to replicate.

In the upstream oil and gas sector, the role of human resources is particularly significant, given the industry's reliance on skilled personnel to navigate resource-intensive operations, market volatility, and regulatory demands. HR managers are increasingly integral to strategic decision-making, ensuring that HR practices align with organizational objectives (Vrontis et al., 2021). HR practices are tailored to reflect organizational priorities and are instrumental in enhancing both individual and collective performance (Ahtisham-ul-Haq, Rehman, & Rehman, 2021).

HRM practices shape operational performance by influencing engagement, satisfaction, and commitment, all of which contribute to sustained high performance. These elements are especially critical in upstream oil and gas, where human resources play a central role in addressing challenges and driving efficiency. Below, five critical factors are discussed, highlighting their influence on operational performance.

2.4.1 Employee Engagement

Employee engagement is widely recognized as a critical driver of operational success, reflecting the level of enthusiasm, dedication, and ownership employees bring to their roles. Engaged employees actively contribute to organizational goals, demonstrating a strong alignment with the organization's vision (Ayanaba et al., 2023). HR practices that foster communication, provide recognition, and involve employees in decision-making create a sense of value and belonging, enhancing productivity and morale (Obiekwe, Mobolade, & Akinade, 2021).

Engagement is reflected in behaviors such as proactive problem-solving, identifying opportunities for improvement, and taking initiative to enhance processes. These attributes are particularly valuable in upstream oil and gas operations, where the complexity of tasks demands high levels of commitment and collaboration. Moreover, fostering a culture of recognition and shared responsibility strengthens resilience among employees, enabling them to adapt to operational and market challenges effectively (Komm, Pollner, Schaninger, & Sikka, 2021).

2.4.2 Work Environment

The work environment significantly impacts operational performance by influencing employee satisfaction and stability. Modern HR practices emphasize creating inclusive, safe, and supportive workplaces that foster trust and collaboration (Paulus, 2023). A positive environment encourages employees to focus on their roles, reducing absenteeism and minimizing disruptions.

Workplaces that prioritize diversity, equity, and well-being contribute to stronger loyalty and reduced turnover. These characteristics are particularly valuable in industries like oil and gas, where retaining skilled employees is crucial (Mahmood et

al., 2019). Organizations that implement safety policies, mental health support, and open communication pathways are better positioned to maintain operational consistency. Furthermore, a supportive environment enhances teamwork and efficiency, ensuring that organizational goals are met effectively (Mahfouz et al., 2020).

2.4.3 Employee Motivation (Job Satisfaction and Compensation)

Employee motivation is central to maintaining operational performance. HR practices addressing fair compensation, career development, and meaningful recognition foster job satisfaction, ensuring employees remain committed to their roles (Quader, 2024). Motivated employees are more likely to perform consistently and maintain high-quality standards, even under challenging conditions.

Fair and competitive compensation attracts and retains skilled talent, which is essential for operational consistency in industries like upstream oil and gas (Alshehri et al., 2024). Additionally, intrinsic motivators, such as alignment with organizational values and opportunities for growth, deepen employees' sense of purpose. These factors collectively drive operational performance by promoting consistent performance and reducing turnover (Najam et al., 2020).

2.4.4 Training and Development

Training and development programs are critical for equipping employees to meet operational demands effectively. Investing in employee growth enhances skills, reduces errors, and improves productivity (Rasool et al., 2019). Training programs also enable employees to adapt to new technologies and processes, fostering innovation and operational efficiency.

Organizations that prioritize continuous learning demonstrate a commitment to employee growth, which improves morale and retention (Alshehri et al., 2024). For upstream oil and gas operations, where industry regulations and technological advancements evolve rapidly, training ensures that employees remain competent and prepared to handle operational complexities (Setiawan et al., 2020). This focus on capability building contributes to overall business continuity and success.

2.4.5 Employee Commitment

Employee commitment is a cornerstone of operational performance, reflecting employees' loyalty, resilience, and dedication to their roles. HR practices that prioritize recognition, inclusivity, and professional development foster a sense of belonging and alignment with organizational objectives (Chilufya., 2023).

Committed employees contribute to operational consistency by reducing turnover and maintaining high standards of performance. Organizations that offer clear career pathways and supportive work environments benefit from a stable and experienced workforce, which is essential for long-term operational success (Yusof et al., 2023). In the oil and gas sector, where expertise and stability are critical, fostering employee commitment enhances both efficiency and resilience (Najam et al., 2020).

HR practices play a central role in shaping operational performance through their influence on engagement, motivation, work environment, training, and commitment. By understanding how these factors interact within an organization, companies can develop strategies to enhance productivity, reduce turnover, and build resilience within their workforce. For companies like Company X, aligning HR initiatives with

operational goals ensures competitiveness and sustainability in the dynamic upstream oil and gas sector.

2.5 Health, Safety and Environmental Practices Influence on Operational Performance

In many businesses, there has long been a belief that productivity must be compromised for the sake of health and safety (HSE). The idea that HSE is a roadblock to quick operational management is harmful and incorrect (Flockett, 2019). In fact, according to Muazu, Tasmin and Javaid, a high level of health and safety is essential to operational effectiveness, regardless of the sector especially upstream O&G industry (2021).

2.5.1 Safety Hazards

Drilling and servicing wells necessitates a wide range of tools and materials. Preventing injuries and fatalities requires identifying and controlling dangers. A number of such safety hazards according to Flockett (2019) are:

- **Vehicle Collisions** - Transporting workers and equipment to and from wells frequently located in remote regions requires long driving hours. Accidents with motor vehicles are the greatest cause of death among oil and gas workers. Approximately four out of every ten workers who died in this sector are killed in a road vehicle accident.
- **Struck-By/ Caught-In/ Caught-Between** - This hazard accounts for three of the five on-site fatalities amongst oil and gas production professionals (OSHA IMIS database).
- **Explosions and Fires –** The ignition of combustible vapours or gases exposes workers in the oil and gas industry to fire and explosion threats. Wells, trucks,

production equipment, and surface equipment like tanks and shale shakers can all discharge flammable gases. Potential ignition sources for these explosions could be static electricity, energy sources, cigarettes, open flames, lightning, cutting and welding instruments, hot surfaces, and frictional heat.

- **Falls** - Workers may be required to work at heights to access rigs and equipment. Fall protection harnesses are basic requirements by the HSE to prevent falls from the mast, drilling platform, and other elevated equipment.
- **Confined Spaces** - Workers are frequently required to access confined spaces near wellheads, petroleum and other storage tanks, mud pits, reserve pits, sand storage containers, and other confined spaces. Here, inflammable vapours or gases can ignite causing injuries. Thus, Asphyxia and exposure to hazardous substances are two top health risks.
- **Ergonomic Hazards** - Workers in the oil and gas sector could be at risk of ergonomic injuries. Ergonomic risks are caused by tasks such as carrying heavy goods, bending over, reaching the roof, pushing and pulling big loads, working in awkward positions, and doing repetitive tasks.
- **High Pressure Lines and Equipment** - Compressed gases or high-pressure lines may pose a threat to workers. Internal pipe erosion can lead to pipe leaks or ruptures, putting workers at risk of being exposed to high-pressure gases or pipes. At the same time, collision hazards may arise if the joints that sustain the high-pressure lines break.
- **Electrical and other hazardous energy** - If equipment are not properly built, installed, and maintained, workers may be exposed to uncontrolled sources of electrical, mechanical, hydraulic, and other energy.

- **Machine Hazards** – Hydrocarbon production workers are usually surrounded by various rotating wellhead equipment, including “top drives and Kelly drives, draw works, pumps, compressors, catheads, hoist blocks, belt wheels, and conveyors”, and high chances of injury are presents if they are struck by or caught between these machines.

2.5.2 Health Hazards

In addition to safety hazards, oil and gas, especially in upstream O&G activities, also posed a variety of health hazards. Drilling and maintenance activities on oil and gas wells include the use and generation of potentially hazardous materials such as.

- **Diesel particulates** - A drilling site's diesel engines power a variety of machinery, trucks, and equipment. While these engines are running, workers may be exposed to dangerous levels of diesel particulate matter.
- **Hazardous chemicals** - Hazardous byproducts from drilling may be exposed to workers who handle hazardous chemicals in the workplace, particularly during hydraulic fracturing. Chemical burns from caustic compounds and inhalation of toxic fumes are both potential risks, depending on the chemical characteristics and toxicity of the substance.
- **Hydrogen Sulphide** – H2S is also known as ‘silent killer’ in the oil and gas industry. At certain concentrations this gas is odourless and exposure to it can cause eminent death.
- **Naturally Occurring Radioactive Material (NORM)** - NORM are materials released by subsurface formations. Workers who operate with pipes and equipment that may have been polluted with NORM are at risk of exposure. High quantities of NORM can be found in sludge, drilling mud, and pipe scales, for

example, and the radioactive materials can be transferred from site to site as equipment and materials are reused. Workers may be exposed to NORM when it is disposed of, reused, or recycled.

- **Hydrocarbon Gases and Vapours (HGVs) and Low Oxygen Environments** - Workers at oil and gas extraction sites could be exposed to hydrocarbon gases and vapours, oxygen-deficient atmospheres.
- **Silica** - In sand-related activities, such as hydraulic fracturing, workers may be exposed to breathing crystalline silica.
- **Noise** - While working equipment in field, workers may be subjected to hazardous noise levels.

The right to a safe and healthy working environment is a universal right for everyone. Occupational health and safety is an organizational responsibility to ensure knowledge, prevention, and protection of workers' and others' well-being from dangerous chemicals, exposure to an unhealthy work environment, contaminated areas, and other hazards. The death rate from a lack of or improper application of HSE measures continues to climb, resulting in the death of workers in the majority of cases. According to the United States Department of Labor, there were 5,333 fatal workplace injuries in 2019, up 2% from 5,250 in 2018. This is the highest mortality rate since 2007. (2020). According to these figures, 642 workers died in 2019 as a result of exposure to hazardous substances or conditions, the greatest number since the series began in 2011. Addressing these health hazards through advanced monitoring systems and health screenings ensures worker well-being and reduces absenteeism, which is directly linked to operational performance (Smith & Lee, 2022). As a result, health, safety, and the environment must be among an organization's top objectives.

The influence of HSE practices on operational performance is not limited to ensuring compliance and safety. They directly shape the financial stability, productivity, and workforce morale of an organization. Key dimensions such as the cost of accidents, operational downtime, and employee morale illustrate the interconnectedness of HSE measures with the broader goals of operational efficiency and resilience.

2.5.3 The Cost of Accident

Accidents in the oil and gas sector not only pose significant safety risks but also lead to substantial financial burdens and operational disruptions. Employers are often required to manage several direct and indirect costs following an accident, including workers' compensation, medical expenses, noncompliance fines, litigation fees, and property losses (Flockett, 2019). In addition, indirect costs such as decreased productivity, reputational damage, and operational delays can significantly influence an organization's bottom line.

Tayab et al. (2024) emphasized the critical need for robust safety protocols, highlighting how proactive measures in upstream and downstream oil and gas segments mitigate such costs. Their research demonstrated that integrating operational performance management with process safety enhanced efficiency and reduced incident-related expenditures by as much as 15%. Similarly, Muazu and Tasmin (2019) noted that effective safety measures not only prevent accidents but also safeguard operational time, reducing the economic influence of workplace incidents.

Health and Safety England reported that 38.8 million workdays were lost in 2019-20 due to occupational illness or injury. This stark statistic underscores the operational

benefits of comprehensive HSE programs, which not only save lives but also minimize downtime and protect financial resources.

2.5.4 Operational Downtime

Operational downtime caused by machinery failure, inadequate maintenance, or safety-related incidents is a critical issue in industrial settings, particularly in the upstream oil and gas sector. Machine downtime has profound implications for productivity, financial stability, and health, safety, and environment (HSE) standards. Poor maintenance practices and untrained personnel are primary contributors to this problem, often resulting in unexpected breakdowns, operational halts, and costly repairs.

Smith (2020) emphasized the importance of regular maintenance schedules in preventing such occurrences, ensuring that machinery operates at peak efficiency and minimizing disruptions. Improperly maintained machinery not only increases the likelihood of downtime but also creates significant safety risks for personnel. Johnson and Lee (2018) noted that personnel who are inadequately trained in operating heavy machinery pose additional risks to HSE standards, underscoring the importance of ongoing training and certification programs. These programs equip workers with the necessary skills and confidence to handle equipment safely and efficiently, reducing the likelihood of accidents and downtime.

Advanced maintenance practices and predictive analytics are particularly critical in the oil and gas sector, where operations involve complex machinery and high-stakes environments. Ramadan et al. (2024) highlighted how real-time monitoring systems can detect anomalies in machinery performance, allowing for timely interventions that prevent extensive disruptions. Such systems leverage IoT-based sensors and

predictive maintenance technologies to anticipate potential failures, ensuring operational reliability and cost efficiency.

Poor HSE practices can lead to indirect but severe consequences, such as project delays, loss of skilled workers, and termination of business contracts. Williams (2017) emphasized the economic influence of inadequate safety measures, noting that companies often face significant financial losses and reputational damage when operational disruptions occur. These disruptions can erode stakeholder trust and complicate project timelines, further exacerbating operational inefficiencies.

For the upstream oil and gas industry, minimizing downtime through a combination of predictive maintenance, comprehensive training, and robust HSE measures is essential. By investing in these areas, organizations can ensure operational continuity, protect their workforce, and sustain productivity in a highly competitive and resource-intensive sector.

2.5.5 Employee Morale

High standards of HSE practices play a critical role in fostering a positive and supportive work environment, which directly influence s employee morale. Employees are more likely to feel motivated and engaged when they perceive their workplace as safe and their well-being as a priority. Feeling valued and protected can inspire employees to put in their best effort, contributing to a culture of shared responsibility and commitment.

Ahtisham-ul-Haq, Rehman, and Rehman (2021) emphasized that creating a safe and inclusive environment strengthens the emotional and psychological connection employees have with their organization. When workers feel secure in their roles, they exhibit greater satisfaction, which naturally translates into enhanced morale and

improved collaboration across teams. High employee morale often leads to increased productivity as individuals become more invested in the organization's success.

Research has also highlighted the relationship between HSE practices and employee engagement. Garcia-Herrero et al. (2020) noted that comprehensive HSE programs cultivate a sense of belonging among employees, fostering higher engagement and loyalty. Engaged employees tend to take greater ownership of their tasks, display creative problem-solving skills, and contribute positively to the organizational culture. These outcomes are especially critical in high-risk industries, where the psychological well-being of employees is essential to ensuring operational consistency and safety.

Additionally, a safe and supportive work environment reinforces trust and collaboration within teams. Smith and Lee (2022) emphasized that workplaces prioritizing health and safety foster loyalty, which reduces turnover and creates a stable, cohesive workforce. This stability is crucial for organizations aiming to maintain operational performance in complex and dynamic industries.

Prioritizing employee morale through robust HSE practices is not merely a regulatory requirement but also a strategic approach that strengthens organizational resilience. By fostering a culture of care and inclusivity, organizations can build a workforce that is not only productive but also deeply aligned with the company's vision and values.

Health and safety are indispensable factors influencing operational performance in the oil and gas industry. From mitigating the financial and operational impacts of accidents to reducing downtime and fostering employee morale, HSE practices are essential to achieving sustainable operational performance. The industry's complex and high-risk environment necessitates an unwavering commitment to robust safety protocols, predictive maintenance, and employee-focused policies. For companies like Company X, prioritizing HSE practices not only ensures compliance with global

standards but also enhances workforce stability, operational efficiency, and long-term competitiveness. By embedding HSE as a core organizational value, the sector can build resilient, efficient, and sustainable operations.

2.6 Technology Adoption Influence on Operational Performance

In the petroleum industry, technological innovation offers numerous potential solutions for enhancing operational performance. However, the industry has historically been cautious, often referred to as "fast followers" due to its slow adoption of new technologies. This hesitation stems from the high-risk nature of the sector, where operational disruptions can lead to significant financial and environmental consequences. Companies often prioritize reliability and proven solutions, resulting in slower adoption of emerging technologies (Roberts, Flin, & Corradi, 2021).

Despite these tendencies, the gradual increase in innovative activity within the oil and gas sector underscores its potential to integrate advanced technologies that optimize operations, reduce costs, and enhance efficiency. This transformation is fuelled by increasing global energy demand, evolving market conditions, and mounting regulatory pressures to meet sustainability targets. Improved connectivity, for instance, has been identified as a key enabler for optimizing drilling and production flows, streamlining field maintenance, and enhancing overall operations. These advancements not only improve operational efficiency but also create opportunities for competitive differentiation.

McKinsey (2020) estimates that leveraging connectivity to deploy digital tools and analytics could add up to $250 billion in value to upstream activities by 2030. This value encompasses investments in existing infrastructure, low-orbit satellites, and 5G

technology, all of which hold promise for transforming operations. Low-orbit satellites and advanced connectivity solutions such as 5G provide real-time data collection and analysis, enabling better decision-making at every stage of the production lifecycle. Offshore operators, in particular, stand to benefit significantly, with potential reductions in operating and capital costs by 20-25% per barrel when these advancements are fully leveraged (Grijpink, Katsap, Verre, & Ward, 2020).

However, while many of these technologies are currently available, their adoption remains uneven across the industry. Factors such as high initial investment costs, integration challenges with legacy systems, and the need for workforce upskilling contribute to this variability. Furthermore, cultural resistance within organizations often hinders the adoption of disruptive innovations. Many companies remain risk-averse, choosing incremental improvements over transformative changes. This cautious approach limits the industry's ability to fully exploit the potential of digital enablers such as IoT and AI.

Abhishek Paul Choudhury, a Disruptive Tech Analyst at GlobalData, observed that companies are increasingly adopting digital enablers such as IoT and AI to handle vast amounts of data, optimize subsurface modelling, and improve drilling performance (World Oil, 2021). IoT technologies provide seamless interconnectivity between devices, enabling the collection of real-time operational data. When combined with AI, these technologies can process and analyse large datasets to generate actionable insights, improving operational efficiency and predictive capabilities. For example, AI algorithms can identify patterns and trends in drilling performance data, enabling proactive adjustments to minimize inefficiencies and enhance productivity.

Despite these developments, the industry must overcome systemic barriers to fully capitalize on the opportunities presented by technological advancements. Investments in Industry 4.0 technologies—such as autonomous drilling, predictive maintenance, and real-time monitoring—are critical for achieving efficiency and sustainability in a highly competitive and resource-intensive environment. Autonomous drilling technologies, for instance, reduce human error and enhance operational precision, while predictive maintenance minimizes equipment downtime by addressing issues before they escalate into major failures.

The successful adoption of these technologies also requires strategic alignment across organizational levels. Leadership must foster a culture of innovation, encouraging collaboration between operational teams and technology providers. Moreover, workforce training programs are essential to equip employees with the skills needed to navigate and leverage these advanced systems effectively. By addressing these barriers, the industry can accelerate its transition to a more agile and resilient operational model, positioning itself for long-term success in a rapidly evolving energy landscape.

The integration of advanced technologies in the upstream oil and gas sector plays a transformative role in reshaping operational performance. Among the myriad technological advancements available, three core dimensions—automation and robotics, system integration facilitated by the Internet of Things (IoT), and artificial intelligence (AI)—emerge as key enablers. These technologies address the industry's persistent challenges by improving precision, fostering interoperability, and generating actionable insights. By exploring these dimensions, it becomes evident

how each contributes uniquely to optimizing processes, enhancing efficiency, and achieving sustainability in a highly competitive landscape

2.6.1 Automation and Robotic

Automation and robotics have begun transforming the upstream oil and gas sector by streamlining repetitive and hazardous tasks. Historically, the industry's use of robotics was limited to specific areas such as drilling technology and equipment monitoring (Jones, 2019). However, advancements in automation have introduced robotic systems capable of handling complex operations with increased precision and efficiency. For instance, robotic drilling pipe installation systems have replaced manual processes, significantly enhanced operational accuracy while reduced risks to personnel (Al-AbdulJabbar et al., 2020).

Despite these benefits, the transition to automation has raised workforce concerns regarding job security. Workers who previously engaged in manual operations, such as placing and installing drilling pipes, fear displacement as automated systems become more prevalent. Such concerns underscore the importance of balancing technological adoption with measures that address workforce adaptation and skill development. By prioritizing training and inclusion, organizations can ensure that automation complements rather than replaces human capital.

2.6.2 System Integration (Internet of Things)

As hydrocarbon companies adopt technological change and innovation, they will begin to invest in diverse technology packages offered by various research and development companies (Abeh, Talib, & Amoako, 2021). At times, however, these

industrial software and equipment packages are not compatible with one another or with the rest of the company's existing equipment and software applications. As a result, the company's systems exist in autonomous "silos" that are completely separate from the rest of the company's systems (Borodin et al., 2021).

These changes will end up creating other types of inefficiencies. Given that some or most of the company's systems and equipment lack direct or fluid coordination and interoperability, workflows and processes are hampered (Christos et al., 2021). For instance, data generated in one aspect of operations may not be easily or conveniently transferred to another department if their work systems are incompatible. This will take them the extra effort and task of transforming the files into formats that their systems can comprehend.

2.6.3 Artificial Intelligent (AI)

Another technological innovation that petroleum companies can deploy to further enhance their operational efficiency is the use of artificial intelligence (AI) (Vrontis et al, (2021). Tuyishime, Nzanywayingoma, & Gatera, (2021). Sircar et al, (2021)). The potential applications of artificial intelligence in the oil and gas sector are huge (Magableh, Omar, & Al-Tarawneh, (2021). Forradellas, & Gallastegui, (2021). Burton, (2021)). With the constant need for precision and efficiency in oil rig operations, AI can certainly be used to significantly improve management. handling and analysis of data from oil rig operations. This data can be very useful in identifying problematic areas in oil rig operations, as well as potential areas for improvement.

The use of AI will allow companies to discover old patterns and trends not seen in their operations. This will assist oil companies in identifying and even predicting causes and trends of inefficiency in their operations.

For example, AI may collect workflow data from oil platforms, as well as refineries, storage depots and distribution centres. Based on the data collected, AI can then identify bottlenecks and other causes of inefficiencies and provide recommendations on how to improve existing workflows and systems.

With artificial intelligence, companies can improve the operational performance and efficiency of the level of field workers, including management and executives. AI would be a great way to automate processes, streamline operations and interconnect devices in an Internet of Things (IoT) network (Hawash et al., 2021). Oil companies would certainly benefit from the commercial intelligence that AI and IoT can generate. This results in an improvement in operational performance and significantly higher efficiency.

The adoption of advanced technologies is critical for achieving optimal operational performance in the oil and gas industry. Automation, system integration, and AI are key enablers that enhance efficiency, reduce costs, and ensure sustainability in a competitive and resource-intensive sector. However, successful implementation requires addressing barriers such as workforce concerns, compatibility challenges, and organizational resistance. For companies like Company X, integrating technology adoption with strategic goals is essential to maintaining competitiveness and operational resilience. By prioritizing investments in automation, system interoperability, and AI-driven insights, organizations can unlock new efficiencies while fostering a culture of innovation and adaptability. This approach not only aligns

with industry trends but also ensures long-term sustainability and growth in a rapidly evolving energy landscape.

2.7 Conclusion of Literature Review

Operational performance holds paramount importance in the oil and gas industry, particularly for companies such as Company X, where achieving efficiency and resilience is crucial to maintaining competitiveness and supporting national economic stability. As a cornerstone of operational success, the measures of cost, quality, delivery, and flexibility stand out as the most critical indicators for evaluating and optimizing performance. These metrics not only reflect an organization's ability to meet market demands and maintain profitability but also underscore its capacity to adapt to volatile market conditions, stringent regulatory requirements, and technological advancements.

The literature highlights three pivotal factors influencing operational performance: human resource practices, health, safety, and environmental (HSE) measures, and technology adoption. Effective HR practices are instrumental in cultivating a skilled, motivated, and engaged workforce, which is vital for ensuring productivity and adaptability in the complex upstream sector. HSE measures contribute significantly to operational stability, risk mitigation, and employee well-being, demonstrating their indispensability in high-stakes environments. Technology adoption, particularly through Industry 4.0 innovations such as IoT, AI, and automation, emerges as a transformative driver, enabling organizations to streamline processes, reduce costs, and enhance precision in operations. Together, these factors create a synergistic foundation for achieving optimal operational performance.

This study is significant as it seeks to address critical gaps in the literature by exploring how these factors collectively shape operational performance in the unique context of Company X. By adopting a qualitative approach, the research bridges theoretical frameworks with practical insights, offering a nuanced understanding of operational practices in the upstream oil and gas industry. The findings from this study have the potential to inform both academic discourse and industry strategies, providing actionable recommendations for enhancing efficiency, resilience, and long-term sustainability in this dynamic and resource-intensive sector.

The next section addresses the methodology used in a logical and systematic to find new and useful information in relation to the study. The upcoming chapter on research methodology elaborates the specific procedures and techniques used to identify, select, process, and analyse data on operational performance in Company X.

CHAPTER 3

METHODOLOGY

3. Introduction

The purpose of the study was to review the operational performance of upstream oil and gas operations in the UAE. This chapter explains the methodology as the study's guideline, which includes the research design, data collection, participant selection and data management practices, reliability and validity issues, primary rationale, and data analysis strategies.

The methodology was defined as the method used for the study (Rebelo, Marques, & Santos, 2022). Furthermore, methodology also referred to the way of studying the world (Prochner & Godin, 2022. Figure 3-1). The fundamental question of the methodology is "How can we acquire knowledge?" (Ruwhiu, et al., 2021). Additionally, methodology summarizes the research process, i.e., the focal point of the research (Cash, Isaksson, Maier, & Summers, 2022). Marutha (2022) stated that choosing the methodology begins with choosing the research paradigm that guides the study. Hence, the methodological process is guided by philosophical beliefs concerning the nature of reality, knowledge and values and the theoretical framework that informs understanding, interpretation, literature selection and research practice on a research topic (Böhma, Halevy, & Kugler, 2022).

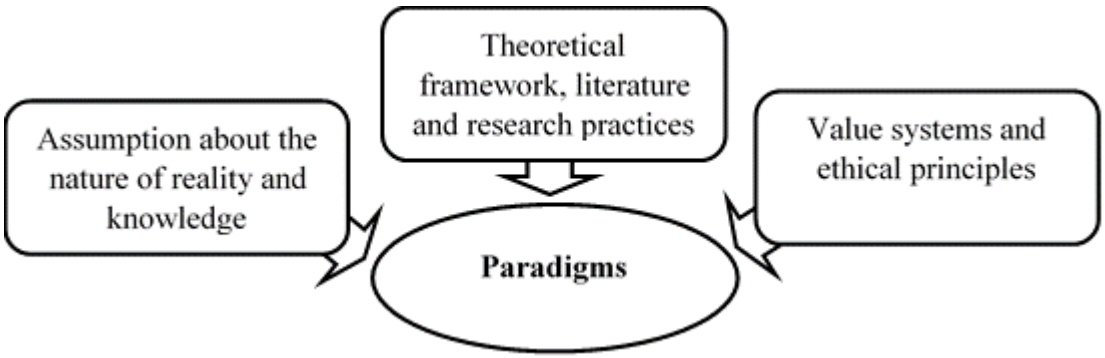

Figure 3-1:
Factors influencing the choice of paradigm. Source: Quality in research through design projects: Recommendations for evaluation and enhancement by Isabel Prochner and Danny Godin, 2022

Qualitative approach was used for this study due to the need to understand the phenomenon in the oil and gas industry as it relates to operational performance. Data was gathered and analysed from high-level Company X employees and company documentations on operational performance. Qualitative research explored important questions and disclosed key research allegations concerning operational performance practice (Alkaraana, Albitar, Hussainey, & Venkatesh, 2022).

For this study, qualitative research methodology was chosen as the most suitable to deeply delve into the study. In qualitative research, the objective of sampling is to understand the phenomenon rather than empirically generalize a sample to a population (USC Libraries, 2022). This approach is considered a priceless expression of the phenomenon of interest and provides insight into features of the academic tradition. Qualitative methods are widely used in significant fields like psychology, sociology, anthropology, and history, creating words rather than numbers as analytical data (Goldschmidt & Matthews, 2022). The basis for using qualitative research is linked to its objective as "an iterative process in which improved understanding to the scientific community is achieved by making new significant distinctions resulting from getting closer to the phenomenon studied" (Aspers & Corte, 2021). In summary, qualitative research has been employed in the social sciences for centuries to

investigate people's experiences, perspectives, and perceptions (Aurini, Heath, & Howells, 2021).

3.1 Qualitative Research

When psychoanalysis' impact began to pervade the business world around the turn of the twentieth century, qualitative research was born (Conner, 2018). Paul Felix Lazersfield, the father of qualitative research, established in 1945 how psychology may give a framework for the analysis of human behavior (Fleck, 2021). Lazersfield pioneered unstructured interviews and group conversations, emphasizing the significance of answering the crucial "why?" question (Haide, 2021).

The study of social phenomena may be used to generate a theory (inductive method) rather than just testing or refining the theory (deductive method) (Casula, Rangarajan, & Shields, 2021). The conception of the qualitative study is based on three elements. The first is naturalistic- study of real-life circumstances as they unfold in their natural course; it is non-manipulative and uncontrolled. The researcher is open to whatever comes up. (i.e., there are no predefined constraints on findings). The term "'naturalistic" describes “a paradigm for inquiry, not a method” (Guba, 1981; Kayid, Jin, Priporas, & Ramakrishnan, 2022). Secondly, emergent - acceptance of research adaptability as knowledge grows and/or circumstances change; the researcher avoids inflexible concepts that preclude the pursuit of new paths of discovery as they emerge (Halkias, Neubert, Thurman, & Harkiolakis, 2022). Lastly the third element of qualitative study is purposeful - cases for study (e.g., individuals, organizations, communities, cultures, events, critical impacts) are selected because they are "informative" and illuminating (Touloumakos, 2022).

In other words, qualitative investigation is a priceless expression of the phenomenon of interest. The objective of sampling is to understand the phenomenon, not to empirically generalize a sample and apply it to a population (USC Libraries, 2022). This stud provided an explanation on how naturalistic inquiry can be successfully utilized to understand the issue pertaining to operational performance in upstream oil and gas operators in UAE.

The qualitative paradigm used in the study is to understand the experiences, views and reflections of the study participants. Denzin and Lincoln (1994) defined qualitative research.

Qualitative research is based on several methods and includes an interpretative and naturalistic approach to the subject. This means that qualitative researchers study things in their natural surroundings, trying to understand or interpret phenomena in terms of what people mean to them. Qualitative research involves the studied use and collection of a variety of empirical materials case study, personal experience, introspective, life story interview, observational, historical, interactional, and visual texts-that describes routine and problematic moments and meaning in individuals' lives."

According to Chen (2022), there are a number of important features of the qualitative study methodology. Firstly, the study focused on understanding people's experiences. Secondly, the instrument for collecting and analysing data was mainly the researcher. Third, the study data were analysed inductively. In other words, from the data, the researcher produced explanations in terms of concepts, hypotheses, or theories based on the evidence. Finally, a detailed description was generated from multiple lines of evidence, such as documentation, field notes and interviews. At the same time, the population sample for this research was limited to one company and its management

level employees. This led to a low number of high confidence samples which could not be analysed in a quantitative manner. Hence, qualitative approach from management standpoint was deployed for this study.

The qualitative paradigm for the study was initiated by the researcher to conduct interviews with selected oil and gas staff who have been identified by upstream oil and gas operator as well as the direct observation of operational performance activities and reporting mechanism. Individual interview session was conducted with senior management professionals, such as Senior Vice Presidents, Vice President and Managers, who are in charge of operational performance of an oil and gas producing reservoirs. The triangulation of the study will be achieved through the reassessment of important documents on the subject and general documents relating to the description of operational performance.

The research was exploratory in nature given that the study on operational performance in oil and gas upstream activities is a comparatively new phenomenon (Fu, Liao, Tang, Jiang, & Huang, 2020). The study was also in line with the ontological research model because "reality is subjective and multiple according to the study participants" (Stokes, 2021). Engaging with personnel from the oil and gas industry provided a clear understanding of how different roles within upstream activities perceived and practiced operational performance.

3.2 Research Philosophy

The research philosophy is concerned with the selection of a research strategy, formulation of a problem statement, data collection tools, data processing and analysis techniques, and so on. – “a researcher's thinking system, which provides reliable new knowledge on the research subject” (Khanzode, P.R.S.Sarma, Mangla, & Yuan, 2021). Chege and Otieno (2020) argued that the philosophy of research can be defined

as a set of beliefs about the nature of the reality under investigation and the philosophy chosen. This also depends on the field of study and the knowledge being studied. In the context of business studies in particular, there are four major research philosophies: 1) pragmatism; 2) positivism; 3) realism; and 4) interpretivism (Prochner & Godin, 2022).

Based on the work of philosophers Charles Pierce, William James, and John Dewey, pragmatism was brought to the United States around the close of the nineteenth century (Muhaise, Ejiri, Muwanga-Zake, & Kareyo, 2020). The concept of pragmatism was referred to “Reality is the practical consequences of ideas” and “Flux of processes, experiences and practices”. (Saunders, Lewis, & Thornhill, 2019). As a result, theories, concepts and ideas only serve to support action (Tsvuura, 2022). Pragmatists appreciate reality as the practical effects of ideas, and knowledge is valued to allow actions to be carried through (Muhaise, Ejiri, Muwanga-Zake, & Kareyo, 2020). In addition, the central conception of pragmatism dates from its Greek origin the word "pragma" which means "action" (Brown C. , 2022) or “works or deeds (Tsvuura, 2022). Pragmatism has therefore been regarded as the philosophical basis of mixed methods research (Pasipamire & Masuku, 2022).

The philosophy of positivism has emphasized the creation of knowledge through research within the context of the natural sciences, collection of data from a variety of samples with a wider perspective and generally using more structured research instruments such as questionnaires with closed-ended questions (Burton, 2021). Its objective is to generate data that can be analysed statistically and whose results can be expressed digitally (Arshad, Abdul-Talib, & Manzoor, 2022), Hence, the results of the philosophy of positivity are generally objective and reliable because they are based on large representative samples (Arocha, 2020). In other words, a positivist approach

focuses on experimentation, observation, monitoring, measurement, reliability and validity of research processes which denote a quantitative research methodology (Phaladi, 2022).

The philosophy of realism study is based on the premise that reality is separate from the human mind. Thus, the concept of realism can be defined as the assumption that reality exists independent of the mind that perceives it (Park, 2021). "Reality" in realism refers to what it is in the universe like structures, forces, entities, objects, etc. (Thaher & Jaaron, 2022). The idea that entities exist independently of how they are perceived or their associated theories. Realism is most often associated with everything and any philosophical position where philosophers believe the truth about something (Martens, 2022). This causal situation or also known as "causal tendencies" had an attribute that differed from the philosophy of realism that was appropriate for the problem of finding "cause and effect" (Heijden, Kuhlmann, Lindquist, & Wellstead, 2021)

Interpretivism philosophy tends to take a very different view of the world, requiring a different response from researchers. (Muhaise, Ejiri, Muwanga-Zake, & Kareyo, 2020). Interpretivist seeks to explore the subtleties of social phenomena by gaining an understanding of how study subjects perceive the world. (Ramsberg, 2018; Saunders, Lewis, & Thornhill, 2019; Crossman, 2021) based on findings from a relatively small sample size (Collis & Hussey, 2014; Letonja, Duh, & Ženko, 2021). Interpretative research allows researchers to carefully select study participants (Moser & Korstjens, 2018; Matiwane & Iyamu, 2022) and employ an open-ended interview methodology to investigate complex and delicate phenomena such as opinions, feelings, and experiences, as well as complex issues that necessitate a detailed understanding of

how things work based on one's experience or position (Ramsberg, 2018; Gauthier & Wallace, 2022).

The characteristics of the interpretive philosophy are therefore the most suitable approach to achieve the objectives of this research. Interpretivism aligns well with the study's aim to understand the subjective experiences, perspectives, and interpretations of operational performance within the unique context of upstream oil and gas operations. By focusing on senior management professionals in Company X, this philosophy allows for a deeper exploration of the human and organizational factors that influence performance outcomes. Furthermore, interpretivism supports the use of qualitative methods such as interviews and document analysis, enabling the researcher to uncover nuanced insights that are critical for understanding complex organizational dynamics. This approach is particularly valuable in industries like oil and gas, where diverse roles, perspectives, and situational contexts significantly shape operational practices and performance.

3.3 Research Design

The research design's goal was to create a reasonable framework for a study that explores operational performance in upstream oil and gas operations. The research approach chosen is a critical decision in the research design process as it determines how relevant data will be acquired (Kumar, Leone, Aaker, & Day, 2018; Kumar & Vannan, 2021). This study adopted an exploratory research design to address the research problem, particularly given the limited prior studies available for reference (Streb, 2010; Schoepf & Klimow, 2022).

The exploratory design enabled the researcher to delve into the intricate factors affecting operational performance by generating insights such as:

- understanding background details, contexts, and concerns.
- painting an accurate picture of the situation.
- generating new ideas and assumptions.
- formulating provisional theories.
- determining feasibility for future research
- refining questions for more systematic investigations (Walia & Kumar, 2022)

Additionally, exploratory research often utilizes small sample sizes, making it a suitable approach for studies focusing on high-level organizational perspectives, where generalization to the entire population is not the primary goal (Schoepf & Klimow, 2022).

This exploratory design provided the flexibility and depth required to uncover meaningful insights into the factors influencing operational performance in the oil and gas sector, offering a strong foundation for addressing the unique challenges of upstream activities.

3.3.1 Population

The credibility of qualitative research relies significantly on selecting an appropriate population. According to Cash et al. (2022), there are no fixed sample size rules in qualitative research; instead, the focus lies on selecting respondents who can provide rich, meaningful insights. In this study, the population comprised high-ranking professionals—managers, vice-presidents, and senior vice-presidents—directly involved in operational performance activities in upstream oil and gas operations.

These individuals were identified as "gatekeepers" or "custodians" of critical knowledge due to their extensive experience, reflections, and understanding of operational challenges (Mack, Woodsong, MacQueen, Guest, & Namey, 2005; Bazen,

Frances, & Takeshita, 2021). Creswell and Poth (2016) emphasized that selecting qualified respondents enhances the reliability of data in qualitative studies. This approach allowed the research to access detailed perspectives and strategies employed by Company X to improve operational performance.

Targeting this specific population ensured access to highly relevant insights, fostering a deeper understanding of operational performance within a complex and dynamic industry like upstream oil and gas.

3.3.2 Sampling Procedures

The sampling strategy for this research followed a purposeful sampling approach, as it is effective in producing "information-rich" cases (Staller, 2021). Purposeful sampling focuses on identifying and selecting individuals who are not only knowledgeable about the research topic but also willing to share their experiences and insights in a reflective and articulate manner (Creswell & Creswell, 2018). This method is particularly valuable for exploring complex phenomena, such as operational performance, where generalized sampling might not capture the nuances of the subject matter (Farooqi, Ryan, & Cobb, 2022).

In this study, participants were selected based on their professional roles and direct involvement in upstream oil and gas activities. These individuals were expected to provide comprehensive saturation of the necessary data, ensuring the research captured diverse yet interconnected perspectives. Sampling continued until no significant new information emerged, fulfilling the principle of data saturation.

Purposeful sampling was instrumental in achieving a comprehensive understanding of operational performance by leveraging the expertise and insights of key stakeholders.

This approach ensured that the study captured the depth and complexity of the phenomenon under investigation.

3.3.3 Data Collection Strategies

In qualitative research, data and information are collected through various methods such as interviews, case studies, and observations to explore multiple perspectives on a topic of interest (Marutha, 2022). Compared to quantitative models, qualitative approaches are particularly effective for measuring complex functions like performance (Creswell & Creswell, 2018). The types of questions asked in qualitative research are highly critical, often focusing on "what," "why," or "how" to investigate the nuances of the subject matter (Merriam & Tisdell, 2016). Marshall and Rossman (2014) and Smith (2020) emphasized that qualitative research aims to:

1. Understand the processes within the study's context.
2. Illustrate troubling phenomena.
3. Explore differences in policies and theoretical frameworks.
4. Identify contextual variables not previously specified.

Such questions enable a deeper and more comprehensive understanding of the topic (Cash et al., 2022). Creswell and Poth (2016) further argued that qualitative research is undertaken to address complex and multifaceted issues requiring detailed exploration.

For this study, qualitative approaches included:

1- Semi-structured interviews: Conducted with high-level professionals experienced in upstream oil and gas operations, using open-ended questions to elicit detailed responses.

2- Operational performance records review: Systematically examined to gather in-depth and contextual information relevant to the research.
3- Field observations: Employed to observe operational performance practices in their real-world setting.

Lanka, Rostron, Singh, and Lanka (2022) emphasized that the quality of qualitative research depends on its validity and reliability. As highlighted by Cabedo-Peris et al. (2022), Marutha (2022), and Prochner and Godin (2022), qualitative research must focus on trustworthiness, rigor, and dependability rather than traditional notions of validity and reliability. To achieve this, the study incorporated triangulation, which strengthens research by combining multiple methods and data sources (Lauri, 2011; Crowther, 2021; González-Díaz, 2022).

Triangulation is categorized into two conditions (Yin, 2013; Guenther & Falk, 2021):

- Convergence of evidence: Where evidence from different sources aligns to support the study's conclusions.
- Non-convergence of evidence: Where differing data points highlight unique perspectives or findings.

Both conditioned as define in Figure 3-2:

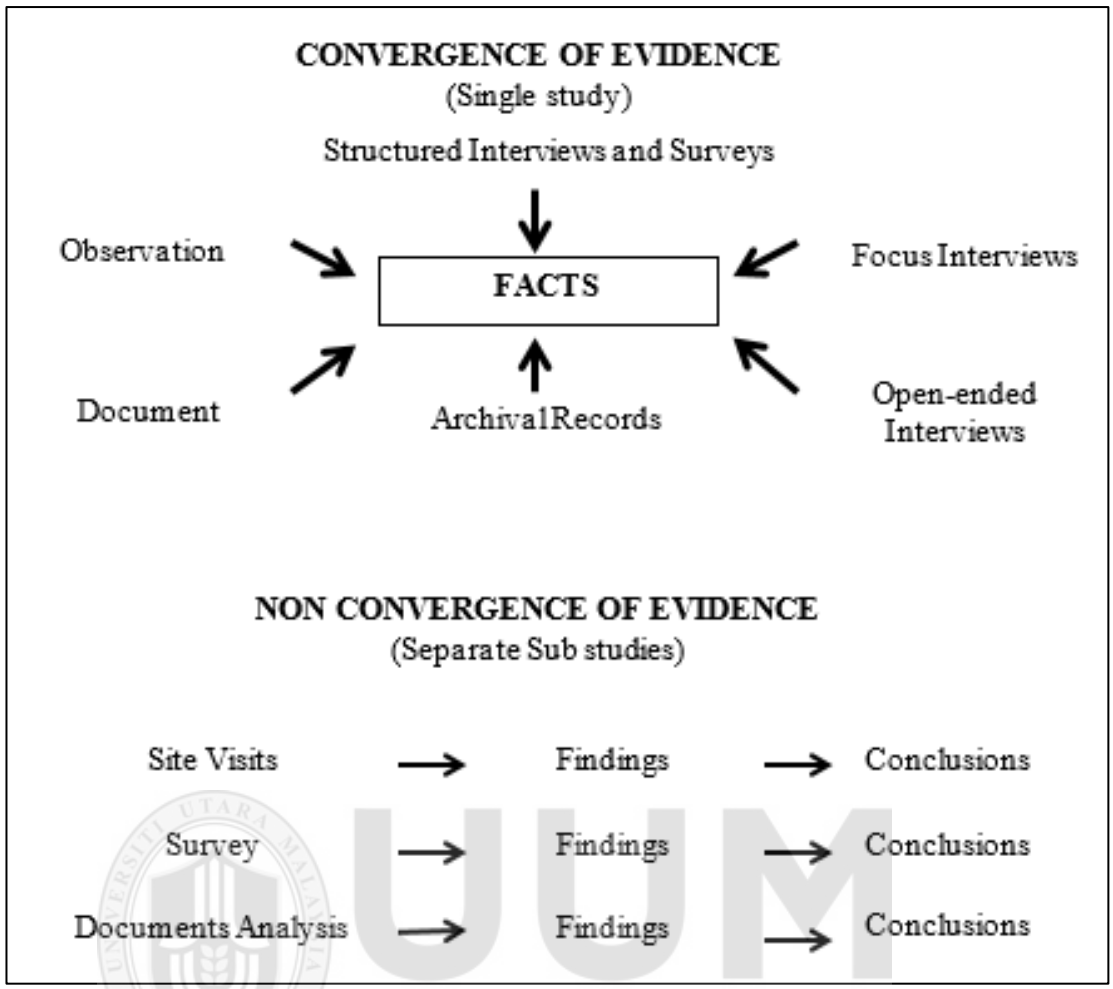

Figure 3-2:
Convergence and Non-convergence of Multiple Sources of Evidence. Source: Adapted from Validity And Generalization In Future Case Study Evaluations by Robert K. Yin, 2013. Sage Publications.

Information gathered from multiple sources was carefully assessed to ensure validity and reliability (Skaggs, 2022). Converging evidence reinforced the study's credibility, while divergent findings provided additional insights into operational performance nuances (Yin, 2013). This robust approach ensured the research met high standards of trustworthiness, quality, and thoroughness, offering confidence in its conclusions (Farooqi, Ryan, & Cobb, 2022).

Data collection for this study combined semi-structured interviews, operational performance records review, and field observations. Semi-structured interviews

provided in-depth insights into participants' perspectives and experiences, while document reviews enriched the contextual understanding of operational practices. Field observations further validated findings by capturing real-world practices.

This triangulated methodology ensured comprehensive data collection, enhancing the study's depth and reliability. By integrating these diverse methods, the research offered a holistic view of operational performance in upstream oil and gas operations, making it well-suited to address the study's objectives.

3.4 Interview Design

To learn more about the people who work in oil and gas upstream activities and its operational performance, an interview method was used. According to Islam and Aldaihani (2022), qualitative interviews can be classified as unstructured, semi-structured, or structured. Because structured interviews typically provide quantitative data, this study concentrated on unstructured and semi-structured data (Haide, 2021). Because the researcher did not know all of the study's challenges ahead of time, unstructured interviews allowed respondents to feel at ease and not judged while also establishing the terms and circumstances for the remainder of the interview sessions (Hannabuss, 1996; Qu & Dumay, 2011; Ferreira, Martins, Pimenta, & Gonçalves, 2022). This method was also considered as a technique for the interviewer to connect with the interviewees in order to gain access to the interviewee's point of view (Fontana & Frey, 1994; Hannabuss, 1996; Qu & Dumay, 2011; Ferreira, Martins, Pimenta, & Gonçalves, 2022).

This study also used semi-structured interview focusing on the core issues of the study, prepared prior to the interview itself (Knox & Burkard, 2009; Qu & Dumay, 2011; Ferretti, Ienca, Velarde, Hurst, & Vayena, 2022). However, the researcher needed to

keep an open and flexible mind to be able to deepen the respondent's responses (DiCicco-Bloom & Crabtree, 2006; Ferreira, Martins, Pimenta, & Gonçalves, 2022). According to Ferretti, Ienca, Velarde, Hurst, and Vayena (2022), it is critical to pay great attention to how questions are posed and interpreted before, during, and after the interview session. The essential feature of human communication, which allows the researcher to manage the pace and style of the question, gets the optimal response from the respondents (Hannabuss, 1996; Haider, 2021).

The study's questions were developed based on an understanding of the operational performance work process and the job descriptions of upstream oil and gas professionals. Furthermore, the questions' wordings were adjusted, explanations were given, and some questions were omitted or added to the interview for specific interviews, as required. Having this flexibility allowed for deeper connection with the interviewees. This study utilized interviewing process stated in “Qualitative Research Methods: A Data Collector’s Field Guide” book by Natasha Mack, Cynthia Woodsong, Kathleen M. MacQueen, Greg Guest and Emily Namey, that was published in 2005 and “Research Techniques Made Simple: An Introduction to Qualitative Research” article by Alexus Bazen, Frances K.Barg and Junko Takeshita, published in 2021.

Participants in the interviewes were contacted via email to set up an appointment. The researchers gave a brief explanation of the study's aim, procedures, and what was expected of study participants, including the duration necessary. Interviewees were guaranteed that their involvement in this study was completely voluntary, and they had the option to withdraw at any moment. Interviewees were also ensured that their privacy would be respected and that they will be informed about the study's potential hazards and benefits.

This is consistent with research ethics, which is a very significant element of qualitative research. The well-being of research participants were the top priority, because research itself is always a secondary issue (Mack, Woodsong, MacQueen, Guest, & Namey, 2005; Bazen, Frances, & Takeshita, 2021). In other words, if there was a choice between harming a participant and harming research, then research would be sacrificed. Figure 3-3 shows the interview process executed for this study.

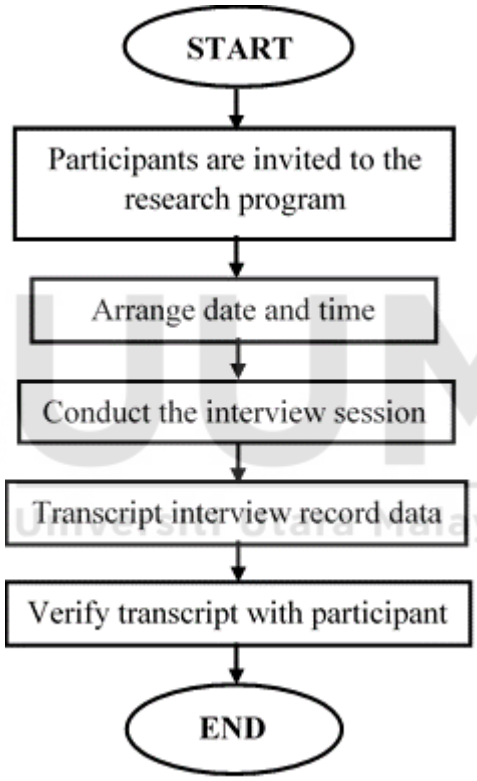

Figure 3-3:
Procedure for interview session. Source: Adapted from Qualitative Research Methods: A Data Collector's Field Guide by Natasha Mack, Cynthiawoodsong, Kathleen M.Macqueen, Greg Guest, Emily Namey, 2005. Family Health International

The structure and format of the interview questions for this study were derived from the works of Dodge (2011) and Ragan et al. (2019). However, the specific questions themselves were developed after a thorough review of operational performance documents and detailed field observations. This approach ensured that the questions were tailored to address the study's objectives while reflecting the real-world practices

and challenges observed in the upstream oil and gas industry. The questions were categorized into six parts, with each question serving as a key prompt during the interview sessions. These questions were used as a guide to conducting the interview to deep dive into the experience of the respondent, rather than a structed question answer session.

Introduction and Demographic Information.

This section contains the study's description and goal. The researcher maintained contact with the participant while being near to the subject. To put participants' responses into context, basic factual or demographic questions were collected at first. These may vary based on the topic of the interview, but they typically contain the interviewer's name, age, work experience, and job title or function.

1. Can you tell me about yourself?
2. How long have you worked at this organization?
3. How experienced are you with operational performance?
4. What technical training did you receive?
5. What role do you play in operational performance of this company?

RQ 1: How is Operational Performance Management of upstream activities being practiced in this company?

Objective 1- Understand Operational Performance managed in this company.

1) How important is operational performance in this company and how is it measured?
2) What is the need to manage operating cost?
3) How does it affect operational performance?

4) Who is responsible for operating cost?

5) What is the importance of Quality in this company?

6) How does it affect operational performance?

7) Who is responsible for quality?

8) What is the importance of delivery in this company?

9) How does it affect operational performance?

10) Who is responsible for delivery?

11) What is the importance of flexibility in this company?

12) How does it affect operational performance?

13) Who is responsible for flexibility?

RQ 2 - How does Human Resource Practices influence operational performance in this Company?

Objective 2 - Investigate the Human Resource Practices' influence on operational performance.

1) What affect does Human Resource Practices' have on?

    a. Employee engagement

    b. Work environment.

    c. Employee motivation (job satisfaction and money)

    d. Employee commitment

    e. Training and development

2) How does Employee engagement affect operational performance?

3) How does Work environment affect operational performance?

4) How does Employee motivation (job satisfaction and money) affect operational performance?

5) How does Employee commitment affect operational performance?

6) How does Training and development affect operational performance?

RQ 3 - How HSE influence the Company's operational performance?

Objective 3 - Explore the HSE influence on operational performance.

1) How are safety hazards and health hazards classified and managed in this company?
2) How do you characterize HSE in this company?
3) How is HSE evaluated in this company?
4) Do you have any procedures to evaluate the HSE practices?
5) What are the biggest challenges in managing HSE?
6) How do you manage all problems related to HSE in this company?
7) How does Cost of Accident influence operational performance?
8) How does Operational Down Time influence operational performance?
9) How does Employee Morale influence operational performance?

RQ 4 - How Technology Adoption influence operational performance in this Company?

Objective 4 - Understand the Technology Adoption influence on operational performance.

1) How do you define technology adoption in this company?
2) How does technology adoption affect operational performance in this company?
3) O&G industries are known to be slow in technology adoption, how do you overcome psychological factor that acts as barrier to technology adoption in this company?
4) How does Automation and Robotic implementation affect operational performance?
5) How does IoT affect operational performance?

6) How does Artificial Intelligent (AI) affect operational performance?

Closing of the interview session

1. Would you like to add or propose anything that I do not know about?

It was critical to collect accurate information during the interview sessions and have participants answer questions honestly to produce meaningful and reliable study findings. The interview questions were designed as open-ended inquiries within a semi-structured interview setup, ensuring that participants were allowed the freedom to express their thoughts, experiences, and perspectives in detail without undue restrictions. This approach enabled the researcher to elicit candid opinions and insights about improving or changing specific aspects of the existing situation and procedures, which proved valuable in generating actionable recommendations.

The semi-structured format served as a necessary framework to guide the discussion while avoiding deviations from the research objectives. Although the questions were well-defined, they primarily functioned as a guide rather than a strict script, allowing flexibility for the researcher to adapt to the flow of the conversation and explore emerging themes. This structure balanced maintaining focus and ensuring participants felt comfortable sharing their insights openly.

During the interview sessions, all responses were carefully recorded and documented, then transcribed to produce a comprehensive document. This document was subsequently shared with the respective interview participants for approval. This validation exercise was critical to ensure the accuracy of the responses and information gathered, enhancing the study's credibility and trustworthiness.

3.5 Operational Performance Records Review

Document review is a systematic technique for assessing or analysing documents, whether printed or electronic. The literature review, like other qualitative research analytical methodologies, necessitates data assessment and interpretation in order to achieve empirical meaning, understanding, and knowledge. (Corbin & Strauss, 2008; Rokonuzzaman, Kim, Dugar, & JennineFox, 2022). Documents include text (words) and images that have been saved without the intervention of a researcher (Bowen, 2009; Prøitz, 2022). Identifying, choosing, assessing (comprehending), and summarizing the data included in the documents are all part of the analytical procedure. Content analysis is used to arrange data from document evaluations (excerpts, quotations, or entire passages) into general topics, categories, and case examples (Labuschagne, 2003; Majumdar, 2022).

This study examined the operational performance records and collected information on operational performance activities. The record included the identification of the operational performance factor, the issues it raised, mitigation plan and result. The validity of the comparison between the written material and the actual process is demonstrated here. The precision of triangular data analysis was improved as a result of this. According to Bowen (2009) and Prøitz (2022), the literature review incorporates coding content into themes similar to the way interview transcripts are analysed. A grid or rubric may also be used to record and score the document. Organizations can use textual analysis to turn enormous amounts of human-generated material into useful summaries that help them make evidence-based decisions (Gandomi & Haider, 2015; Angel, Ravindran, Vincent, Srinivasan, & Hu, 2022).

The document review serves many functions to help the researcher obtain more comprehensive information on the research question. Bowen (2009) Prøitz (2022) stated the following roles of document investigation:

1- Documents can reveal details about the environment in which research participants function. Documents and evidence of previous events provide context and historical information. This information and knowledge can assist researchers in understanding the historical roots of particular problems and may indicate conditions that influence current problems/conditions.

2- The information contained in the materials may suggest questions to be asked during the interview phase and situations to be observed during the research observation activities. Goldstein and Reiboldt (2004) and Söderlund and Pemsel (2021) stated participant observation activities were targeted using interview data, document analysis was used to produce new interview questions, and participant observation was used to collect documents.

3- The document review provides additional research information. Document-generated data and insights can be extremely valuable additions to one's knowledge base. Document analysis is regarded as a medium for knowledge development because it can, generate new ideas and research directions for any field or discipline, create policy and practice guidelines, and provide evidence of an effect (Snyder, 2019).

4- Documentation allows you to keep track of changes and progress. When different drafts of a document are accessible, the researcher might compare them to see whether there are any differences. Even minor modifications in a draft can signal significant changes in a proposal.

5- Documents may be analyzed to confirm or substantiate evidence obtained from other sources. The investigator is expected to explore further if the documentary evidence is conflicting rather than corroborative. Readers of research reports are often more confident in the reliability (credibility) of the conclusions when information from several sources converges (Angrosino & Mays de Pérez, 2000; Haider, 2021).

A basic process workflow was utilized in this study to collect all associated text files, examine them one by one, and summarize all of the data in a folder. The software Atlas.ti later assisted in the process of dissecting all of the information that has been acquired in a file, as illustrated in Figure 3-4. The analytical approach is based on information gathered from the following three sources: operational performance report, work request (Operational Performance issue that has to be resolved), Procedures (mitigation strategy, and outcome). These details are crucial in confirming the study's findings.

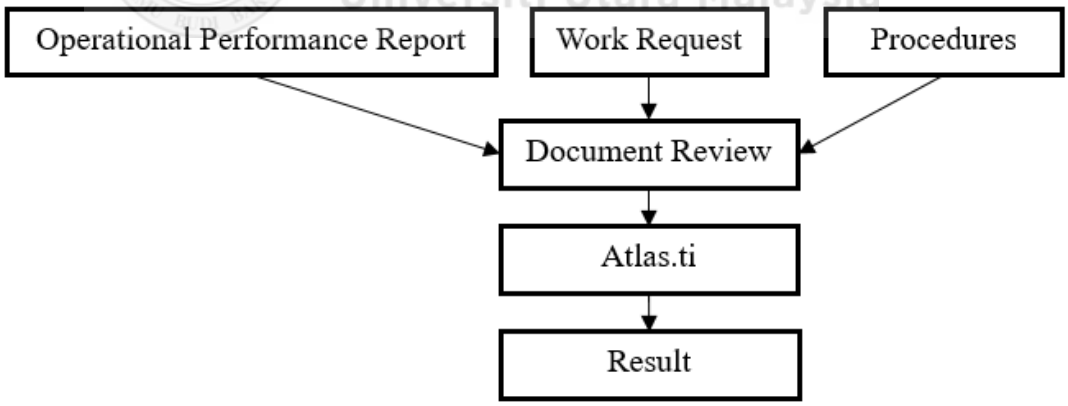

Figure 3-4:
Document review process flow.

3.6 Qualitative Research Data analysis

A six-step data analysis developed from Cresswell (2009) study guided the examination of study data for the qualitative method of this study. As seen in Figure 3-5, the analysis was carried out in a linear and hierarchical order rather than in a static order.

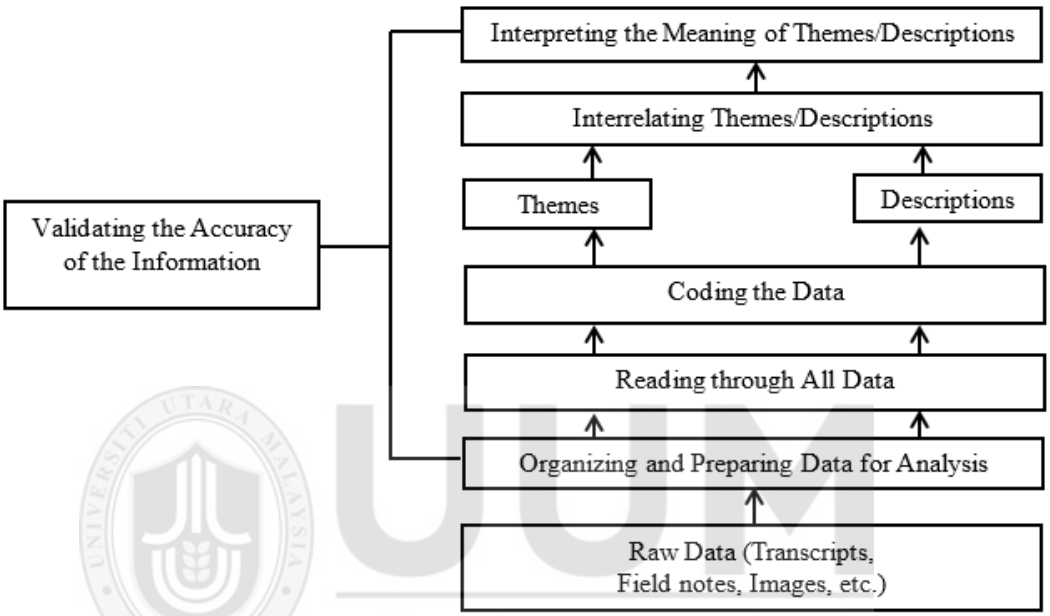

Figure 3-5:
Six steps for data analysis in qualitative research based on the research design: qualitative, quantitative and mixed methods. 3rd Edition by John W. Cresswell, 2009. Sage Publication Inc.

Step 1: Data preparation for analysis. All information gathered from the audio recordings and interview document was transferred into a single transcript for each respondent.

Step 2: Reading through all data. Break out common themes/topics in the data in Step 1 to create the manifestation of the thoughts and information provided by the participants.

Step 3: Coding the data. To initiate the data analysis process, researcher classified acquired data categorically and label all of the data provided according to the information provided during the interview session.

Step 4: Themes / Descriptions. The coding process was used to generate a common theme or description or thematic area of the field or participant, as well as categories for analysis. The researcher then generated codes for all data and analyses all categories in a general description.

Step 5: Interrelating themes/descriptions. Thematic descriptions were used to offer qualitative narration. This step brought together all of the discoveries that rose logically from the interview answers and integrated them into a narrative style.

Step 6: Interpreting the Meaning of Themes/Descriptions. This phase was considered the "essence" of the Lincoln and Guba (1985) study in terms of the researcher's lesson learned. The researcher who observes and analyses the activities of operational performance processes, as well as knowing the participants' stories during the interviewing process, contributes to a thorough understanding of all data obtained throughout the sessions.

However, the researcher kept in mind that not all of the data may fit neatly into a single group, theme, or description, therefore the findings may overlap different categories for understanding and interpretation (Cassell, Symon, Buehring, & Johnson, 2006). The Atlas.ti application was employed to demonstrate the connection between factors of operational performance practices and the efficiency of the oil and gas upstream operational performance system in terms of data analysis technique.

3.7 Conclusion of methodology

The present study used the triangulation method to explain the similarities of phenomena from the various study methods, namely interview, observation and document review (Golafshani, 2003). Denzin (1978) defines triangulation as "the combination of methods for studying the same phenomenon". Hence, qualitative approach was employed in this study because the researcher wanted to understand the phenomena that occurred in oil and gas operational performance practices of UAE oil and gas businesses. The chosen research method was responsible for describing and comprehending the significance of the study participants' focal themes (Kvale & Brinkmann, 2009; Blown & Bryce, 2022). Atlas.ti software was used to illustrate the relationship between operational performance practices and the success of the oil and gas operational performance system for data analysis.

CHAPTER 4

DATA ANALYSIS AND RESULT

4. Introduction

This chapter shows and evaluates the research findings as well as marking the end of the study activities. A summary of the key findings and their implications is provided in the conclusion, which also includes an analysis and discussion of the data. Using the questions and objectives of the study as a guide, the researcher presents the data that was collected in this chapter. The findings are shown using tables, and figure representations. Along with drawing conclusions for potential future study directions based on the findings, it also required drawing linkages between the findings and the research framework established in earlier chapters.

Specifically, the format reporting consisted of interviews, observations, and lastly a study of the company's documentation. This approach to discuss and interpreting the results and analysis was structurally dependent on the methods being used. Finding the answers to the study question was the goal of the data gathering, according to the research design. Significantly, this is an explanatory study on the understanding of operational performance in the Company X. The RQ established earlier in the study were organized and put into a matrix to match against the subsequent findings in order to present a better flow of the rational and sequence in answering all the RQ.

4.1 Research work process

The qualitative research strategy employed in the study necessitated a methodical approach to data collection that focuses on goals and collected data from a range of sources, such as observations, interviews, and document reviews. Following that, these sources were examined so that researchers could make inferences from the

study's results. These three approaches were selected because of their relationships with one another in order to accomplish triangulation of findings. Document analysis assisted in the creation of new interview questions, and interview data assisted in focusing on specific participant observation activities.

In order to make sure that the information and data collected for the research study were legitimate and ethically obtained, the interviewees were sent transcripts of the interviews to confirm what they had said and to make sure that the written words in the transcript matched the interviewees' actual words. The interviewees signed the transcript once it accurately captured their meaning.

4.2 Analysis Using Atlas.ti

This section would be discussing the findings derived from the interview data using Atlas.ti. The process using the software would be further clarified in terms of examples of interview data collected, discussions on the themes generated from the software and relating the results to the key construct of the research. Atlas.ti allows researchers to easily import, organize, and store large amounts of qualitative data such as interviews, observation field notes, and documents. It provides a centralized platform for managing and accessing the data throughout the research process. The application also offers various tools for coding and categorizing data, allowing researchers to identify and organize themes, patterns, and concepts within their data. This helped in the systematic analysis and interpretation of qualitative data.

All data from interviews and observations were uploaded to Atlas.ti. Quotations were developed and subsequently assigned coding. Codes were grouped as according to the themes, similar to the results using the manual process. In a manual process, researcher would typically review coded data, look for recurring codes or patterns, and then

manually group similar codes together to form themes. This can be done by reviewing the codebook or coding categories and organizing codes under relevant themes based on their similarities or relationships. Similarly, in Atlas.ti, the researcher can use features such the "Grouping" or "Code" function to create thematic groups. These groups can be created by selecting and combining relevant codes that share similar themes or concepts. The software then allows researcher to visualize and explore these groupings to better understand the relationships and patterns within your data. Through the relationships of groups of networks being established and a pattern emerged. As a result of merging all of the network flows, a new code of operational performance was established.

4.2.1 Generation of Quotations

Documents, Quotations, Codes, Memos, Networks, and Links are the six main types of entities in Atlas.ti. "Operational Performance of Company X" is the name of the project. All files uploaded to Atlas.ti must be coded in order to create a link or hyperlink between the codes and quotations, after which a concept or theme must be developed. Notes from observations and interview transcripts were uploaded to Atlas.ti, where they are classified as Document entities by the software. Data formats include PDFs and files created with Microsoft Office software.

4.2.2 Generation of Codes

There are codes allocated to each quotation. Codes are short statements that indicate the significance of a collection of quotes. In qualitative research, codes creation is the process of locating and assigning meaningful labels to data units. Words, phrases, or brief sentences that encapsulate the main ideas of a specific text section can be used as codes. Generating code can be done in a variety of methods. Several typical techniques include:

- Inductive coding: This method of coding develops codes from the data itself, following a bottom-up approach. After going over the data to find themes and patterns, the researcher develops codes to represent these patterns.
- Deductive coding: This method of coding is known as top-down, and it develops codes based on the researcher's preexisting theories or expertise. After going over the data, the researcher finds passages that support the theory and generates codes to represent them.
- Mixed coding: This code combines deductive and inductive coding. As they go through the data, the researcher permits the establishment of inductive codes in addition to the initial set of deductive codes.

Depending on the data and the study question, different codes were generated. But it's crucial to use discernment and only produce codes that are pertinent to the study. This case study developed codes and related them to RQs. Based on the results, more codes were developed under the RQ1, RQ2, RQ3, and RQ4 categories to arrive at the sets of codes that explain Company X's operational performance.

4.2.3 Generation of Network

In this study, codes were grouped and analysed based on their relevance to the research questions to uncover interconnected themes related to Company X's operational performance. This process facilitated the exploration of relationships between different factors, offering a nuanced understanding of key dynamics and practices. By emphasizing thematic connections, the analysis provided rich insights into the operational performance framework, reflecting the qualitative nature of the research.

4.3 Unit of Analysis

The qualitative data was collected in less than two months with the consent of the Management, starting in October 2023. The list of workers were selected, as was previously said, based on their engagement with Company X's operational side. Email invitations were distributed to the chosen staff members explaining the purpose and background of the study. The staff members were interviewed according to their availability on the specified day, time, and location. Ten workers, all at the supervisory level and employed by a few divisions or departments, participated in the research. This amount equated to half of the appropriate department staff. There were just ten participants in total because several of them had unavoidable matters. Condensed work schedules, time restrictions, and meetings were the most often mentioned issues. Before each interview, the participants received information about the study's objectives, sample questions, and a glossary of terms.

4.3.1 Participants Demographic

The results of the researcher's interviews are discussed in this section. Staff from the Company X participated in ten sessions of the interview sessions. The results of the interviews clarified how each respondent from the unit of analysis was referred to. The unit of analysis and respondent lists interviewed to fulfil the objectives of this study are described in Table 4-1. The identification displayed in the 'Respondent' column in the table allows you to identify the respondent.

Table 4-1:
Unit of analysis and respondents

Unit of analysis	**Respondent**	**Gender**
Company X Staff (Total = 10)	Respondent 1	Male
	Respondent 2	Male
	Respondent 3	Male
	Respondent 4	Male
	Respondent 5	Male
	Respondent 6	Male
	Respondent 7	Male
	Respondent 8	Male
	Respondent 9	Male
	Respondent 10	Male

4.3.2 Profile of Participants

Table 4-2 below provides a profile of the participants using the Atlas.ti applications. Nearly all of the interviewees offered their full cooperation. They desired to make a significant contribution and have an impact on the study's conclusion. The study's participants intended it to be a way of describing what is going on in their organization. With all the data collected, the study could be broken down into the following categories: participants; years of employment; technical education level; and respondents' self-descriptions as maintenance personnel.

Table 4-2:
Profile of participants

No	Category	Description	Total
1.	Number of years with the company	More than 20 years	5
		10 to 19 years	5
		Less than 10 years	0
2.	Operational experience	More than 15 years	9
		5 to 14 years	1
		Less than 5 years	0
3.	Technical training received	Informal and Formal	10
		Formal only	0
		Informal only	0
4.	Operational performance role	Executive	10
		Non-executive	0

4.3.2.1 Number of years with the company

Throughout the interview sessions, all ten participants were seen to be completely cooperative and providing insightful responses. Given that 100% of the employees have been with the company for more than 11 years, it is evident from the data analysis results in participant profiles, as shown in Table 4.1, that this is overcrowded.

4.3.2.2 Number of years in operational performance role

A high degree of work experience is also suggested by the length of time spent in the operational performance field. Their greater degree of work experience (100% of the

respondent has more than 10 years of experience) may provide them an advantage in performing their operational responsibilities, especially in the upstream oil and gas sector. One cannot stress how crucial it is for each employee to have past experience with operational performance.

Several conclusions have been drawn from this data, including the idea that while a staff retention rate of over 11 years is impressive, some turnover is really beneficial in order to provide fresh perspectives. Furthermore, the sample's high average tenure offers valuable viewpoints; but, to prevent insular biases, they should be supplemented with a greater range of experience. Expanding the sample size will reinforce the findings of this current study.

4.3.2.3 Technical training received.

The participants' level of technical training in the field of operational performance are depicted in Table 4.1. 100% of the personnel received both formal and informal technical training in the field of operational performance. In addition, two respondents have Doctor of Philosophy (PhD) qualification indicate that the personnel in this Company X were skilled professionals, which will help ensure a high-quality, efficient operational process.

4.3.2.4 Operational performance role

Table 4.1. showcased that all the respondents were on the executive level which mean that they are in the position of making the decision for the operational matter. Hence, they typically oversee the day-to-day activities of the company's operations, which can include areas such as production, logistics, quality control, supply chain management, and resource allocation. They are responsible for ensuring that

operations are running smoothly, efficiently, and in alignment with the organization's goals and objectives.

On the other side, the finding of the current study also highlighted that operational challenges and implementation barriers perceived by middle management and frontline workers may be missed. A diversity of perspectives from different functions, locations, and seniority levels often surfaces more balanced findings and ideas. Combining the bird's eye view of executives with input from management and staff delivers a comprehensive understanding to inform decisions.

4.4 Themes and Significant Statements

The staff's input in Company X led to the coding of four primary themes and the need for more information. Upstream activities being practiced, human resource practices, HSE influence and technology adoption for Company X’s operational performance were the themes coded in the Atlas.ti program. Once codes have been generated, they were organized into a coding scheme. A coding scheme is a system for classifying codes into categories. This help to make the data more manageable and to facilitate analysis. In this study, the following procedures were used to generate themes:

1. Carefully and repeatedly go over the data. This will make it easier for the researcher to get to know the data and spot trends and themes.
2. Create inductive codes first. These are codes that have been created based on the data. To produce inductive codes, the researcher can employ a number of techniques, including underlining important words or phrases, drafting memoranda, and drawing concept maps.
3. After a collection of inductive codes has been produced, organized them into topics. A collection of codes can be summarized by using themes, which are

more general groupings. To categorize codes into themes, the researcher might employ several techniques, such as searching for frequently used terms or phrases or seeing patterns in the data.

4. Verify the topics to ensure they are clear and significant. If necessary, the researcher might have to divide or combine themes.
5. The researcher continues to refine the themes while working with the data. As the researcher learns more about the data, they may need to modify or add to their themes.

Themes are an important tool for research analysis. They can be used to make sense of the data, identify patterns and relationships, and generate new insights. By using themes, researchers gain a deeper understanding of the data and its implications. The next section, all the themes identified for this research are discussed.

4.4.1 Theme No. 1: Operational Performance Management of upstream activities being practiced in Company X

The research's Research Question 1, which asks How is Operational Performance of upstream activities being managed in this company, is directly related to Theme No. 1 as stated in Chapter 1. The research results are relevant to operational performance practices, notably in terms upstream oil and gas activities. As evidence and input for data analysis, pertinent information gleaned from interview sessions, observations, and document reviews was taken into consideration. According to the themes and their key assertions, Table 4-3 presents a separate breakdown of the interviews' responses to this study topic.

Table 4-3:
Significant Statements and Interpretative Meaning for Operational Performance Practices

Significant Statements	Interpretative Meaning
Importance of operational performance and its measurement	
<u>Key Performance Indicators</u>	
▪ COMPANY X uses Key Performance Indicators to measure its level of operational performance.... It could vaguely be a bit too much of an extreme in terms of measuring operational performance (Respondent #1)	Extremely important and being measured by KPI
▪ Operational performance is of paramount importance within our company… primarily through Key Performance Indicators (KPIs) (Respondent #3)	
▪ At Company X, we utilize Key Performance Indicators, or KPIs (Respondent #6)	
▪ In order to get the desired operational performance, all of these are mapped into our KPIs (Respondent #7)	
▪ In our company the metric use to measure operational performance is the KPI (Respondent #8)	
▪ …. our metrics are determined by our KPIs (Respondent #9)	
▪ The approach used by Company X involves creating highly detailed KPIs to guarantee accurate performance monitoring (Respondent #10)	
<u>Individual Department Requirements</u>	
▪ …… it is important in any company… record your operational performance, its different factors, especially when you are focusing about the HSE performance, about the care of your employee, like training of your employee and also technology, implement the technology and think differently than the existing practice. (Respondent #2)	Important and measurement based on the requirements of each department
Cost and quality	
▪ Extremely important …. various measures but top few are cost – cost of the operation/drilling (Respondent #4)	Extremely important and measures based on cost and quality of the operation
▪ Very important. It is how you measure how well the company is doing. It is measured by measuring the various factors that influence it such as cost, quality and etc (Respondent #5)	

The need to manage operating cost	
CAPEX and OPEX	
▪ Operating cost in COMPANY X can be divided into two; CAPEX and OPEX. When it comes to CAPEX it is an investment that amortizes over a period of time whereas for OPEX it is the cost that is required for day to day expense of the company (Respondent #1) ▪ We need to have a strong balance between these as CAPEX tend to give us tangible returns whereas OPEX is money that is spent without any tangible return (Respondent #3)	CAPEX to monitor investment and OPEX to view the expenses
OPEX	
▪ you need to try to reduce your OPEX to improve your cost per barrel (Respondent #2) ▪ As a result, managers are expected to generate cost savings… (Respondent #6) ▪ cost optimization is an ongoing effort in any kind of business. Oil and gas companies are currently using cost reduction as a primary approach to increase their profit margin (Respondent #7) ▪ Upstream industries including petroleum exploration, development, and production costs use cost management (Respondent #8) ▪ Therefore, in order to give the organization some savings, the costs must be adequately reviewed (Respondent #9) ▪ Given the current emphasis on quick fixes and "easy" procurement savings, operators' operational methods need to be reevaluated in order to establish a long-term and sustainable cost reduction regime (Respondent #10)	Need to find ways to reduce OPEX
Monitor budget	
▪ You do not want to overshoot the budget allocated for each job (Respondent #4) ▪ To make sure you don't overspend (Respondent #5)	Adhere to budget allocated
Influence of cost on operational performance	
Operating Expenses	
▪ This implies that operational performance is affected by operating costs (Respondent #1) ▪ The operational performance, it will be effect when you have high cost (Respondent #2) ▪ Obviously, we would want to spend least and have more return (Respondent #3)	Operating cost impacting operational performance

▪ …. more cost will lead to longer recovery time and thus poor operational performance (Respondent #4) ▪ So, if you do well in managing our cost and keeping it low, you will positively impact the operational performance (Respondent #5) ▪ Businesses may stabilize in the current cost-conscious market and maintain their competitiveness over time by matching cost containment strategies and procedures with important bottom-line indicators (Respondent #6) ▪ … companies should actively and continuously integrate structurally sustainable cost management practices (Respondent #7)	
Operating Expenses ▪ This makes it possible to identify cost-optimization methods using a range of strategies, including altering service and equipment purchase plans as well as equipment and operating practices (Respondent #8) ▪ Cost in oil and gas operations is not only related to activities but also to the system of operations and process (Respondent #9) ▪ In light of this, we are making sure that proper operational performance is maintained in addition to our cost-cutting initiative (Respondent #10)	Operating cost impacting operational performance
Cost custodian Management ▪ Different levels of management are assigned different spending brackets without requiring prior approval (Respondent #1) ▪ The operating cost management, each of us, each leader is responsible about his budget (Respondent #2) ▪ Different levels of management have different brackets within which they can spend (Respondent #3) ▪ I am responsible for overlooking the drilling cost, and I have a budget allocated to me (Respondent #4) ▪ Well, every team's management is responsible for managing their cost (Respondent #5) ▪ Every department in oil and gas businesses is normally in charge of overseeing its own operating expenses (Respondent #6)	Authorize personnel in each department

▪ This implies that they are responsible for monitoring and managing the costs associated with the day-to-day operations of their department (Respondent #7) ▪ The practice in Company X is each department is in charge of overseeing and regulating its running expenses (Respondent #8) ▪ In short, operating costs are generally the responsibility of the department doing the specific activity (Respondent #9) ▪ Every department in an oil and gas business, especially those involved in upstream operations, contributes in some manner to operational expenses (Respondent #10)	
The importance of quality in Company X Comply to defined standard	
▪ Quality is of paramount importance in this company … ensures that they meet the required standards (Respondent #1)	Adhere to the set standard
Professional company	
▪ Quality, today, as COMPANY X, we are working as a professional company and the quality is our main factor when we are working to satisfy our shareholders and our services to the others (Respondent #2) ▪ …. a commitment we make to all our stakeholders (Respondent #3) ▪ Quality has a direct impact on the viability and success of E&P enterprises because of the high stakes involved in the oil industry (Respondent #9)	Comply to the need of stakeholders
Efficiency	
▪ It's very simple, see, we drill a bad quality well and it will give you various issues like poor flow rate of hydrocarbon, integrity issues and may also need workover which will incur more cost (Respondent #4) ▪ …. research, projects, drilling and production, model building, almost everything (Respondent #5) ▪ Ensuring safety, reducing environmental damage, and averting accidents during the exploration, drilling, and extraction processes depend heavily on maintaining high-quality operations (Respondent #6) ▪ …. contributing to safety, efficient operations, environmental stewardship, and overall business performance (Respondent #7)	Achieve efficiency in operation

- Quality is very important to provide operational efficiency (Respondent #8)
- For our company, putting quality first has a domino effect that improves reputation and market position while also cutting costs and increasing operational efficiency (Respondent #10)

Influence of quality on operational performance

Long term effect

- The impact of quality on operational performance may be more evident in the long run (Respondent #1) — Future impact
- In our business, it will also mean poor quality of operations leading to poor future outcomes (Respondent #3)
- Quality is not just an option but a strategic imperative for exploration and production (E&P) oil and gas companies (Respondent #8)

Productivity

- It will be better performance and it will improve your productivity (Respondent #2) — Increase the productivity
- . Poor quality will mean reduced hydrocarbon extraction, may also incur further cost, so poor operational performance (Respondent #4)

Productivity

- The same way cost does. Poor quality means negative impact on operational performance, and vice versa (Respondent #5) — Increase the productivity
- …. is significantly impacted by quality in a number of ways, including production optimization, exploration accuracy, and drilling efficiency (Respondent #6)
- Quality of operational practices directly influences the efficiency, safety, cost-effectiveness, and overall success of upstream oil and gas companies (Respondent #7)
- To put it simply, quality is the cornerstone of optimal, dependable, and legal E&P performance in the oil and gas industry (Respondent #9)
- It is impossible to overstate the significance of quality in oil and gas exploration and production since it influences both process efficiency and the end product (Respondent #10)

Quality custodian

Individual

- … the responsibility rests with the individual performing the duty. (Respondent #1) — Individual responsibility

- However, in my opinion it is the responsibility of each individual (Respondent #5)
- Every employee and department in Company X is accountable for quality (Respondent #6)
- Quality is a team effort, and every person and division in the upstream oil and gas organization contributes to its assurance and upkeep (Respondent #8)
- Achieving quality in upstream oil and gas requires accountability at all levels, from top executives setting policy to frontline workers executing tasks (Respondent #9)

Quality department

- ….. we have a dedicated team for the performance company. Every time they are ensuring all the division, all the teams are as per the standard quality (Respondent #2)
- We have dedicated teams ensuring and auditing that quality standards are met (Respondent #3)
- ….. where there are team dedicated for quality control in different aspects of the business (Respondent #4)
- Particularly in charge of keeping an eye on and upholding quality across the entire organization is the Quality Control (QC) department (Respondent #7)
- Quality Control Department has direct control over ensuring that all firm stakeholders receive high-quality service (Respondent #10)

Quality department responsibility

The importance of delivery in this company

Business plan

- ….. we know it affects the Operational Performance because without meeting the deadline we are not meeting the production mandate (Respondent #1)
- This is about the business plan. It is required your objective, your goals, your budget, and what you need to deliver based on the vision of your company (Respondent #2)
- It is what we have promised to our shareholder and failure to do so means we are lacking behind (Respondent #3)
- It is necessary that we deliver what we promised to our stakeholders (Respondent #5)
- The delivery in Company X is crucial for setting strategic direction, securing investment, managing risks, enhancing operational performance (Respondent #6)

Adhere to business plan

- Here, delivery—which includes meeting schedules, budgets, and quality standards—is not just a logistical issue, but a strategic one (Respondent #7)

Productivity

- You don't deliver wells, then, you don't delivery hydrocarbon to shareholders as well as the global market (Respondent #4) — Product supply
- For this reason, upstream oil and gas businesses' total performance and competitiveness depend on the timely and effective delivery of exploration and production activities (Respondent #8)
- Businesses can guarantee long-term sustainability and successfully negotiate the changing energy landscape by placing a high priority on delivery quality (Respondent #9)
- Delivering oil and gas output in a timely and effective manner guarantees supply chain optimization, revenue growth, and contractual compliance (Respondent #10)

Influence of delivery on operational performance

Production

- Meeting deadlines and fulfilling commitments are essential for achieving production mandates (Respondent #1) — Product supply commitment
- Delays in deliveries have the potential to result in project setbacks, elevated expenditures, and a negative impact on our standing in terms of meeting the production mandate (Respondent #3)
- Again, directly proportional because of the reason mentioned previously (Respondent #4)
- Oil and gas firms can achieve optimal performance in terms of output, costs, dependability, safety, and sustainability criteria by adhering to disciplined delivery of operational targets (Respondent #10)

Business plan

- This is about the business plan. It is required your objective, your goals, your budget, and what you need to deliver based on the vision of your company (Respondent #2) — Business plan commitment
- Same way that cost and quality does (Respondent #5)
- Delivery commitments and timelines have a direct impact on operational efficiency and planning (Respondent #6)

▪ Company X's operational performance is greatly impacted by the delivery of a business plan (Respondent #7) ▪ Effective delivery ensures that operational activities are aligned with the strategic objectives outlined in the business plan (Respondent #8) ▪ Company X's operational performance is directly impacted by the delivery of a business plan (Respondent #9)	
Delivery custodian	
Stakeholder	
▪ The relevant stakeholders involved in the planning and execution of activities outlined in the business plan (Respondent #1) ▪ The responsibility for delivery in upstream oil and gas companies is typically shared among several key stakeholders (Respondent #6) ▪ the responsibility for the delivery of business plans and operational performance is distributed across various levels and functions within the organization (Respondent #7) ▪ Responsibility is shared across various individuals and departments (Respondent #9) ▪ accountability for operational performance and business plan delivery is spread among stakeholders associate with the company (Respondent #10)	Relevant stakeholder
Division	
▪ Each division, they have their business plan (Respondent #2) ▪ It is the responsibility of the division as well as the project managers (Respondent #3) ▪ each division in the company is responsible for their delivery (Respondent #4) ▪ Although executive guidance drives delivery, end-to-end plan execution and upstream operational performance depend on tactical plans and disciplined field implementation (Respondent #8)	Department responsible for delivery
Management	
▪ I think it's the management who is responsible to make sure that things are going according to the plan (Respondent #5)	Decision makers
The importance of flexibility in Company X	
Short-term and Long-term	
▪ Flexibility is very important both in short and long term as it determines the direction of the	Short-term and long-term

company's evolution and adjustment to the given conditions (Respondent #1) ▪ Therefore, you need to have a short and long term plan and be agile and flexible to response to the evolving conditions around you (Respondent #3)	
Health, Safety, Environment	
▪ Today the HSE is the priority, even if you try to do some adjustment or some mind tuning in the business plan based on the need (Respondent #2)	HSE requirement
Market condition	
▪ If you are not flexible to match the demands of the world, someone else will and you will be out (Respondent #4) ▪ In this business, flexibility is closely associated to survivability. That's how important it is (Respondent #5) ▪ Since the oil and gas sector is extremely unpredictable and prone to abrupt changes in market conditions, including shifts in commodity prices and demand, flexibility is crucial for Company X (Respondent #6) ▪ In Company X, flexibility is vital to navigate market volatility (Respondent #7) ▪ In the volatile, complicated, and uncertain capital-intensive upstream industry, flexibility is a strategic necessity (Respondent #8) ▪ Businesses that adopt a flexible strategy can successfully manage uncertainty (Respondent #9) ▪ Because we are involved in an industry that is so volatile, flexibility is essential for these companies (Respondent #10)	Adhere to market condition
Influence of flexibility on operational performance	
Short-term and long-term	
▪ Flexibility holds significant importance in the company, both in the short term and long term (Respondent #1)	Short-term and long-term impact
Business plan	
▪ Agile and flexibility, we are as a company flexible to update and to adjust the plan and the objective of the business plan (Respondent #2) ▪ Without being flexible, you won't meet the updated business plan (Respondent #4) ▪ Same as the other three (Respondent #5)	Influence based on business plan
Market condition	
▪ Ability to adjust to conditions is necessary (Respondent #3)	Ability to adapt to market situation

- ….. response to changing market conditions which is crucial for operational performance (Respondent #6)
- Flexibility allows for adaptability to market conditions (Respondent #7)
- ….. gain a competitive advantage in a dynamic and demanding industry by implementing a strategic approach to flexibility (Respondent #8)
- Being flexible helps businesses cut expenses, increase operational effectiveness, and maximize production—all critical for surviving the difficult economic climate faced by the oil and gas industry (Respondent #9)
- It enables companies to adapt to market conditions (Respondent #10)

Flexibility custodian

Management

- Responsibility for flexibility lies with higher management (Respondent #1)
- The owner by himself. Today each owner, he is responsible about his objective and his goal, how he is flexible and what is justifiable today (Respondent #2)
- Management people such as myself (Respondent #3)
- I think it will be higher management in this case (Respondent #4)
- At Company X, executive leadership, operations management, project teams, and human resources are all jointly accountable for flexibility (Respondent #7)
- Flexibility is not just about individual responsibility; it's a cultural and organizational attribute (Respondent #9)
- The management and leadership of Company X assume the duty for maintaining flexibility (Respondent #10)

Higher management responsibility

Division

- I think every division is, but this is where we come into play bit more than the others (Respondent #5)
- While executive leadership sets the tone, flexibility ultimately depends on coordination across functions (Respondent #8)

Department responsibility

Stakeholder

- Within Company X, different departments and stakeholders share responsibility for flexibility (Respondent #6)

Stakeholder responsibility

The results are discussed in detail and relevant research questions are addressed in the section that follows. The selected responses were quoted to portray the exact meaning of respondents' feedback. According to the respondent's compilation of responses, every respondent concurred that operational performance is crucial for the business. It encompasses the effectiveness and efficiency of core business activities, directly impacting productivity, cost management, customer satisfaction, and overall profitability. By concentrating on operational performance, businesses may produce superior products and services, streamline their operations, and keep a competitive advantage in the marketplace. This focus makes sure that the company functions efficiently and is in a position to meet its strategic goals. But when it comes to the performance measurement, the answers differ. Seven out of ten stated that the measurement done via the set Key Performance Indicators (KPIs),

> "Company X uses Key Performance Indicators to measure its level of operational performance. This is a quite new system that Company X has acquired in the past few years to measure its level operational performance."
>
> Respondent #1

> "Operational performance is of paramount importance within our company, as it is recognized as a fundamental pillar for achieving excellence in both quality and economic outcomes. We employ a multifaceted approach to measure our operational performance, primarily through Key Performance Indicators (KPIs). These KPIs encompass various aspects of our operations, including health, safety, and environmental (HSE) performance, employee well-being and development, and the integration of innovative technologies."
>
> Respondent #3

> "Measuring company performance entails evaluating a range of critical metrics, including financial metrics, customer satisfaction, operational efficiency, and others, to determine the success, efficacy, and efficiency of corporate operations. In order to get the desired operational performance, all of these are mapped into our KPIs."
>
> Respondent #7

> "Assessing performance and obtaining the information required for a sustainable organization is essential in today's businesses. One of the most useful management techniques that can lower expenses, assess a company's success, and compare it to organizational objectives is figuring out what is and

> is not working. Companies can use data, which is essential to maintaining their competitiveness in the market, to their advantage by reviewing performance and setting clear operational metrics. The approach used by Company X involves creating highly detailed KPIs to guarantee accurate performance monitoring."
>
> Respondent #10

Apart from KPI, two out of ten respondents cited that the performance measurement was based on the cost and quality of work provided.

> "Extremely important. As mentioned earlier, as an upstream company, our main business is hydrocarbon production. For which we need to drill wells, which is scheduled based on DBC and keeping it on track means out performance is on track. There are various measures but top few are cost – cost of the operation/drilling, quality- how well the operation is executed and will the well flow, delivery- did we deliver based on our DBC, flexibility- were we able to modify and implement the modified plan".
>
> Respondent #4

> "Very important. It is how you measure how well the company is doing. It is measured by measuring the various factors that influence it such as cost, quality and etc".
>
> Respondent #5

The other response stated that the performance measurement was based on the requirements of each department.

> "See, the operational performance, it is important in any company, not only in our company as Company X. Today, the operational performance, if you need to improve your quality and your economical part, you need to improve more the operational performance. How you will record your operational performance, its different factors, especially when you are focusing about the HSE performance, about the care of your employee, like training of your employee and also technology, implement the technology and think differently than the existing practice"
>
> Respondent #2

In terms of the need to manage the operating cost, all the respondents stated that they were aware of the necessity of controlling operating costs. The effective management of operating costs is vital for Company X, as it directly impacts their financial resilience, operational efficiency, risk mitigation, and competitive positioning within the industry.

> "Cost is divided into two main groups in Company X. These are CAPEX and OPEX. CAPEX means capital expenditure such as long-term business investment and ventures, facilities installation and such things. Whereas OPEX refers to operating expenses. These are day to day expenses such as salaries, transportation and etc. We need to have a strong balance between these as CAPEX tend to give us tangible returns whereas OPEX is money that is spent without any tangible return. However, both are important and needs to be balance".
>
> Respondent #3

> "Effective cost management will give businesses in the oil and gas sector a competitive edge. The oil market is not as flexible as it once was. We know that investors and oil operators do spend a large amount of their capital investment on field development, and that oil cartels set the global price of oil. As a result, managers are expected to generate cost savings, even though we are frequently motivated to use cost avoidance strategies rather than cost saving ones. Managers will be more inclined to take on cost-savings projects if there is transparency and awareness of the process. In order to replace existing programs that are not meeting their goals, they will find new cost-saving initiatives. Any modifications to the "cost savings guidelines" ought to be implemented throughout the entire company".
>
> Respondent #6

> "Upstream industries including petroleum exploration, development, and production costs use cost management. Many petroleum companies, especially those in the exploration phase, don't give cost control much thought until they encounter financial difficulties, see a decline in production, or realize they are unable to complete their capital program on time, which causes them to miss deadlines, obligations, and required returns. In these cases, they begin to think about cost reduction or control."
>
> Respondent #8

Furthermore, the participants concurred that the cost element had an influence on the operational performance of their organization. Acknowledging the influence of cost on operational performance is a significant realization. Understanding this connection allows organizations to prioritize cost management to enhance operational efficiency, maintain financial stability, and achieve their strategic objectives. By addressing cost-related factors, companies can optimize their performance and ensure sustainable growth in a competitive business landscape.

> "If you are handling high cost or low cost, how will it affect operational performance? The operational performance, it will be effect when you have high cost. Today, the efficiency, it will be reduced, it will impact your performance operation".

Respondent #2

> "As mentioned in my previous answer, more cost will lead to longer recovery time and thus poor operational performance. Our goal should be to incur the least amount of cost and get the planned job done. That will result in outstanding operational performance."

Respondent #4

> "In order to secure the competitive advantage of being the low-cost operator or low-cost service provider, oil and gas companies should actively and continuously integrate structurally sustainable cost management practices, all the while maintaining high achievement levels along the other operational excellence parameters."

Respondent #7

> "In the current price situation, exploration and production (E&P) operators are frantically trying to centre on a smaller number of initiatives where they see a possibility to cut costs to a lower break-even level. An E&P company may weather a commodity price collapse better than its competitors by being the low-cost operator in a play or a basin, and it can also afford larger margins when prices climb. Continuous insight into every aspect of the cost components and their interactions is essential to attaining this. This makes it possible to identify cost-optimization methods using a range of strategies, including altering service and equipment purchase plans as well as equipment and operating practices."

Respondent #8

Every department's authorized officer oversees operating costs. That was the conclusion reached by the respondents, each of whom mentioned that this was the situation at Company X. This approach empowers department heads to manage costs effectively within their areas of operation, fostering a culture of financial prudence and operational efficiency. It also allows for targeted cost management strategies aligned with specific departmental needs and goals, ultimately contributing to improved overall cost control and organizational performance.

> "The responsibility for operational cost management varies based on the specific company and its defined processes and authority delegation. It is not solely determined by an individual, but rather by the level of spending authority and the defined scope of contracts and processes. Different levels of management are assigned different spending brackets without requiring prior approval. In my role, I do not have the authority to determine the amount of spending on specific items. For instance, in the case of drilling, the decision-making authority lies with concession holders and shareholders. However, the responsibility for spending that allocated budget falls on the drilling

department. I am primarily involved in providing recommendations regarding well drilling locations."

Respondent #1

"The operating cost management, each of us, each leader is responsible about his budget, about his controlling the expense. Today, we have the budget, you need to request your budget based on your activity to improve your performance. Try to reduce your expense by implement different approach like technology or different implementation or smart way by clubs, different activities, like different approach and proper planning to reduce any cost impact. That one, it will improve. So today, we have different level of responsible about the budget. But today, I have my budget and I am responsible on it."

Respondent #2

"Every department in this company is normally in charge of overseeing its own operating expenses. This aids in cost tracking for the business and guarantees that every division is working effectively and under budget."

Respondent #6

"The practice in Company X is each department is in charge of overseeing and regulating its running expenses. This duty makes sure that every department works within the financial constraints set forth and makes an effort to maximize its cost effectiveness. This strategy aids in upholding responsibility and budgetary restraint across the entire company."

Respondent #8

"Every department in an oil and gas business, especially those involved in upstream operations, contributes in some manner to operational expenses, albeit not every department is directly in charge of controlling those costs. Exploration and Production (E&P) is one example. E&P is responsible for the majority of controllable operational costs since it is the division that finds and extracts oil and gas. This covers costs for lifting, drilling, well operations, and production facilities. The same holds true for departments like facilities and engineering."

Respondent #10

Quality is an additional component of operational performance. The importance of quality in Company X was addressed by the respondents in a variety of ways. Six out of ten respondents said that a company's ability to operate efficiently depends on quality.

"Very important. It's very simple, see, we drill a bad quality well and it will give you various issues like poor flow rate of hydrocarbon, integrity issues and may also need workover which will incur more cost. So quality is very important."

Respondent #4

"For a number of reasons, quality is crucial for our company. Ensuring safety, reducing environmental damage, and averting accidents during the exploration, drilling, and extraction processes depend heavily on maintaining high-quality operations. Furthermore, higher resource recovery and cost-effectiveness are the results of high-quality production and exploration, which is crucial considering the significant capital outlay and inherent hazards involved in upstream activities. Additionally, upholding quality supports the company's overall industry reputation, regulatory compliance, and operational dependability."

Respondent #6

"Quality is very important to provide operational efficiency. Operational efficiency is increased when good quality is maintained throughout E&P activities. This include making use of cutting-edge drilling methods, putting safe machinery to work, and streamlining manufacturing procedures. Quality control procedures guarantee the safe, effective, and minimally interrupted execution of operations."

Respondent #8

"For our company, putting quality first has a domino effect that improves reputation and market position while also cutting costs and increasing operational efficiency. Not only is the finished product important, but fostering an excellence culture along the whole value chain is as well."

Respondent #10

According to a different response, three out of ten stated that quality is important when it comes to meeting shareholder needs.

"Quality, today, as Company X, we are working as a professional company and the quality is our main factor when we are working to satisfy our shareholders and our services to the others, other owners. Today, the quality, it is important to our company. Today, we are working as an operating company. We have different shareholders, and we need to be committed what we are delivering as a quality from the performance of the company, from the HSE, from the training. All these different factors, they are playing to improve our quality in our company."

Respondent #2

"Quality is the core of our reputation, and it is what guarantees trust from our customers. It's not merely a measure, but a commitment we make to all our stakeholders."

Respondent #3

"In the oil and gas sector, quality is extremely important, particularly for exploration and production businesses. For safe and effective operations, regulatory compliance, asset integrity, optimizing energy recovery, profitability, and upholding a favourable industry reputation, strict adherence to quality standards and controls is necessary. Inadequate quality raises expenses, raises the likelihood of environmental catastrophes. Quality has a

direct impact on the viability and success of E&P enterprises because of the high stakes involved in the oil industry."

Respondent #9

According to the other response, quality is crucial to meet the established criteria.

"Quality is of paramount importance in this company and is maintained through defined processes. For technical studies, a peer review process ensures that they meet the required standards and undergo validation. In the case of models developed over several years, milestone meetings are held at predefined stages. The company has established a set of quality reviews as part of its processes."

Respondent #1

In terms of the influence of quality for operational performance, seven out of ten respondents indicated that quality has an influence on Company X's productivity.

"How does this affect our operational performance? It is sure when you have good quality, you will improve your performance and operation, especially when you have everything is organized and under high quality. It will be better performance and it will improve your productivity."

Respondent #2

"It's directly proportional in my opinion. Poor quality will mean reduced hydrocarbon extraction, may also incur further cost, so poor operational performance."

Respondent #4

"Company X's operational performance is significantly impacted by quality in a number of ways, including production optimization, exploration accuracy, and drilling efficiency due to high-quality tools, equipment, and materials."

Respondent #6

"Quality has a direct impact on the viability and success of E&P enterprises because of the high stakes involved in the oil industry. To operate ethically, financially, and sustainably, exploration and production companies must invest in high-quality machinery, supplies, workflows, and labour. To put it simply, quality is the cornerstone of optimal, dependable, and legal E&P performance in the oil and gas industry."

Respondent #9

"It is impossible to overstate the significance of quality in oil and gas exploration and production since it influences both process efficiency and the end product."

Respondent #10

There was division in the replies received regarding who is responsible for what quality. Half of the respondents said that each person is responsible for the quality.

"Responsibility for ensuring quality is assigned based on the defined processes. For models, Company X upstream endorses the milestones for model construction. The individual responsible for performing the study holds the primary responsibility for quality. The management overseeing that person is accountable for ensuring quality, but ultimately, the responsibility rests with the individual performing the duty."

Respondent #1

"We do have difference gates/milestone where quality is checked and audited. However, in my opinion it is the responsibility of each individual.".

Respondent #5

"Every employee and department in Company X is accountable for quality. In order to create and foster a culture of quality across the entire company, management is essential. To guarantee that quality standards are fulfilled, they create quality standards, set quality goals, and allocate resources."

Respondent #6

"Quality is a team effort, and every person and division in this organization contributes to its assurance and upkeep."

Respondent #8

"Achieving quality in upstream oil and gas requires accountability at all levels, from top executives setting policy to frontline workers executing tasks. Cross-functional collaboration and robust systems are key to consistent quality performance."

Respondent #9

Other half stated that the quality is under purview of Quality Department.

"The quality we have in our company; we have a dedicated team for the performance company. Every time they are ensuring all the division, all the teams are as per the standard quality, they are trying to do the audit every quarter to ensure we have the right quality. If something is missing, they will directly report it. As you know, COMPANY X already has the ISO certificate, so that means we are working under quality."

Respondent #2

"There are various gates for quality check. Firstly, the engineer and/or employee doing the job should maintain good quality of work. They that needs to be 'checked' by his team leader along with all the tasks done by all the team members under him. Then it should be confirmed by the manager who over looks various teams and then at a division level. That one line. Additionally, we also have internal audits where there are team dedicated for quality control in different aspects of the business."

Respondent #4

"Particularly in charge of keeping an eye on and upholding quality across the entire organization is the Quality Control (QC) department. They create quality control protocols, carry out audits and inspections, and guarantee adherence to

rules and guidelines in the sector. All employees inside the organization, however, have a responsibility to uphold quality. It is the duty of every individual to observe safety regulations, follow quality procedures, and report any deviations or non-compliances that could affect quality."

Respondent #7

"Company X assign different divisions and staff different levels of direct responsibility for quality. For instance, the Quality Control Department has direct control over ensuring that all firm stakeholders receive high-quality service. Interdepartmental cooperation and communication are necessary for effective quality management. While operational teams bear the major responsibility for putting quality practices into effect in the field, quality assurance (QA) offers direction and oversight. Proactive feedback loops and collaborative problem-solving are essential for recognizing and effectively resolving quality concerns."

Respondent #10

The delivery issue in Company X is then investigated by the RQ1 in order to determine how significant this issue is in relation to operational performance. Six out of the ten respondents stated that the delivery is important to adhere to the business plan of the company.

"So, business plan delivery, like cost, quality, delivery is referring here is planning of activity and the follow up of this planning of activity. There again there's is a set of meetings and committees that follow the delivery against what has been promised by the company. Every year we update the business plan and there is a review though the committees though PDSK to review the business plan. It's an important part of the company wants to achieve the delivery is, we know it affects the Operational Performance because without meeting the deadline we are not meeting the production mandate."

Respondent #1

"Delivery is of extreme importance, especially in terms of business plan. It is what we have promised to our shareholder and failure to do so means we are lacking behind."

Respondent #3

"Delivery is also quite important. It is necessary that we deliver what we promised to our stakeholders. It shows our commitment to the business plan and field development plan that is decided on a yearly basis. All the division in this company are working tirelessly to achieve that one goal of delivering to the business pan that's decided. Different job functions but one goal."

Respondent #5

"The delivery in Company X is crucial for setting strategic direction, securing investment, managing risks, enhancing operational performance, fostering

> stakeholder confidence, ensuring compliance, and maintaining adaptability in a dynamic industry landscape."
>
> Respondent #6

Four out of then stated that delivery matter is related to the productivity of the company.

> "You don't deliver wells, then, you don't delivery hydrocarbon to shareholders as well as the global market. That's how important it is."
>
> Respondent #4

> "In upstream oil and gas company such as Company X, delivery is critical to overall success and operational excellence. Upstream businesses should continue to prioritize operational perfomrance for both structural and cyclical reasons. For this reason, upstream oil and gas businesses' total performance and competitiveness depend on the timely and effective delivery of exploration and production activities."
>
> Respondent #8

> "They improve reputation, stakeholder confidence, and competitive advantage while promoting cost control, safety, environmental stewardship, and operational efficiency. Businesses can guarantee long-term sustainability and successfully negotiate the changing energy landscape by placing a high priority on delivery quality."
>
> Respondent #9

After analysing the relationship between delivery and operational performance, the researcher found that six out of ten respondents said that delivery is contingent upon adhering to the company's business plan.

> "The business plan, it is sure to have the right clear objective of your company and to achieve the target, you need to have the business plan. Today, we have a business plan to request our CAPEX and OPEX to prepare our budget. We will have a business plan to secure our budget and our need and our goals for five years. We have a five-year business plan, and we have a long-term business plan. If I will focus on the short-term business plan, this we need to improve what we need to deliver and to cope based on our commitment to the shareholders and our main company as Company X. This is about the business plan. It is required your objective, your goals, your budget, and what you need to deliver based on the vision of your company."
>
> Respondent #2

> "Delivery commitments and timelines have a direct impact on operational efficiency and planning, which is why delivery is so important to our company's operational performance. Drilling, production, and maintenance activities are scheduled with delivery commitments taken into account.

> Respecting delivery deadlines aids in developing production plans, making the most use of labour, and reducing downtime."
>
> Respondent #6

> "Effective delivery ensures that operational activities are aligned with the strategic objectives outlined in the business plan. This alignment fosters a clear focus on priority projects, optimizing resource allocation and operational."
>
> Respondent #8

> "Company X's operational performance is directly impacted by the delivery of a business plan because it helps to manage risks, optimize resource allocation, foster accountability, improve efficiency, and enable adaptability in a dynamic industry."
>
> Respondent #9

In terms of delivery responsibility, five out of ten respondents indicated that the company's stakeholders bear responsibility for the delivery.

> "Responsibility for delivery lies with the relevant stakeholders involved in the planning and execution of activities outlined in the business plan. This includes project managers, teams responsible for specific tasks, and management overseeing the overall process. The collective efforts of these individuals and teams are essential for successful delivery within the company."
>
> Respondent #1

> "The responsibility for delivery in upstream oil and gas companies is typically shared among several key stakeholders and departments."
>
> Respondent #6

> "Within Company X, accountability for operational performance and business plan delivery is spread among stakeholders associate with the company."
>
> Respondent #10

However, four out of ten stated that each division is in charge of carrying out the delivery role.

> "Each division, they have their business plan, but at the end, we have one main objective. Today, if I will focus on our division as business plan, we have as a field development today, we are responsible to deliver the business plan about the need to achieve the target of production and what is required of the deliverable of activity or resources required to achieve this business plan."
>
> Respondent #2

> "It is the responsibility of the division as well as the project managers and stakeholder who are involved in the commitment."
>
> Respondent #3

> "When we talk about delivery, we are talking a large project level like divisional projects which are linked to divisional KPI. So, each division in the company is responsible for their delivery."
>
> Respondent #4

Another response stated that delivery function is related to the management role.

> "I think it's the management who is responsible to make sure that things are going according to the plan."
>
> Respondent #5

Flexibility is the final component of operational performance that this study looks at. The researcher wants to know how crucial flexibility is to Company X. According to the replies received, seven out of ten participants said that flexibility is necessary to deal with the constantly shifting market conditions.

> "See, oil and gas business is very volatile, anyone can tell you that. So having the ability to change your course of action based on situation that is not in your control is like do or die in this business. If you are not flexible to match the demands of the world, someone else will and you will be out."
>
> Respondent #4

> "In this business, flexibility is closely associated to survivability. That's how important it is."
>
> Respondent #5

> "Since the oil and gas sector is extremely unpredictable and prone to abrupt changes in market conditions, including shifts in commodity prices and demand, flexibility is crucial for Company X. Upstream businesses may swiftly respond to these developments by adjusting their production levels, strategy, and resource allocation thanks to flexibility. As a result, they can take advantage of opportunities, reduce risks, and maximize their performance in a market that is constantly changing."
>
> Respondent #6

> "In Company X, flexibility is vital to navigate market volatility, technological advancements, regulatory changes, project development, risk management, operational optimization, and strategic partnerships, ensuring adaptability in a dynamic and complex industry landscape."
>
> Respondent #7

Two respondents stated flexibility is required for the short-term and long-term plan.

> "Flexibility is very important both in short and long term as it determines the direction of the company's evolution and adjustment to the given conditions."
>
> Respondent #1

> "In the oil and gas business, flexibility is of extreme importance. This is mainly because you are dealing with uncertain market conditions, environmental conditions and geopolitical situation. Therefore, you need to have a short and long term plan and be agile and flexible to response to the evolving conditions around you."
>
> Respondent #3

Another response recorded mentioned about the flexibility is important to adhere to the HSE environment.

> "See, for the flexibility, there's a flexibility when you are not harming the HSE. Today the HSE is the priority, even if you try to do some adjustment or some mind tuning in the business plan based on the need, based on the new recorded data, based on the better quality data you are recording. Agile and flexibility, we are as a company flexible to update and to adjust the plan and the objective of the business plan."
>
> Respondent #2

In respect to delivery influence on Company X's operational performance, six out of ten respondents stated that it has paramount influence in addressing the current market conditions.

> "Ability to adjust to conditions is necessary to maintain optimal operational performance, but we need to make sure that this agility should not harm other aspects of the operations such as HSE, cost, quality and delivery."
>
> Respondent #3

> "Flexibility has a significant impact on the operational performance of upstream oil and gas companies in terms of providing the ability to quickly adjust production levels, schedules, and resource allocation in response to changing market conditions which is crucial for operational performance."
>
> Respondent #6

> "Flexibility allows for adaptability to market conditions, optimal resource allocation, technological integration, effective risk management, regulatory compliance, and strategic partnerships, all of which foster resilience and efficiency in a dynamic industry landscape. These benefits greatly improve the operational performance of Company X."
>
> Respondent #7

> "Flexibility is crucial for the operational performance of upstream oil and gas companies. It enables companies to adapt to market conditions, optimize their portfolios, adopt new technologies, build operational resilience, foster collaborations, and navigate the energy transition effectively. By being flexible, companies can improve their efficiency, profitability, and overall performance in a rapidly changing industry."
>
> Respondent #10

In addition, three participants mentioned that flexibility has an influence on the business plan of the company.

> "Agile and flexibility, we are as a company flexible to update and to adjust the plan and the objective of the business plan. But without impacting the HSE and also without harming our employee and in addition, without adding additional cost, not necessary if it is not required."
>
> Respondent #2

> "Without being flexible, you won't meet the updated business plan and thus you will be having poor operational performance."
>
> Respondent #4

The final influence on the company's flexibility concerned both the short- and long-term plans.

> "Flexibility holds significant importance in the company, both in the short term and long term. In the short term, the company considers the volatile nature of the market, including oil prices and demand, and utilizes systems such as quotas to guide decision-making. This enables the company to adapt its operations based on market conditions. In the long term, flexibility is seen in the company's ability to change and adapt to a changing world. Company X has demonstrated this through organizational stages and the implementation of new technologies in recent years."
>
> Respondent #1

In other aspect, seven out of ten respondents stated that management should fulfil the responsibility when it came to whose obligation's flexibility fell under.

> "Responsibility for flexibility lies with higher management. The instigation of new processes and initiatives, such as digital initiatives, is driven from the top-down approach. Company X's ability to be flexible and adaptable is influenced by the decisions and actions of higher organizational levels, setting the direction for the company's evolution."
>
> Respondent #1

> "The owner by himself. Today each owner, he is responsible about his objective and his goal, how he is flexible and what is justifiable today, he needs to justify how his need to be changed. If it is within the acceptance change, the company and the management, they will accept if there is benefit or it will add additional value or improvement of the CAPEX and OPEX. It's flexible. Every year we are trying to adjust to improve our activity and also try to reduce our cost and our budget by flexibility, by debarring or to do some methodize our activity by end of each year."
>
> Respondent #2

> "I think it will be higher management in this case."
>
> Respondent #4

> "The management and leadership of Company X assume the duty for maintaining flexibility inside the organization. Upstream oil and gas exploration and production research on flexibility management in the sector highlights the importance of dynamic skills in seizing opportunities and reducing strategic risks."
>
> Respondent #10

Meanwhile, two participants stated that the flexibility function need to be performed by each division.

> "I think every division is, but this is where we come into play bit more than the others. Our R&D strength allows the company to make modifications to the plan far more easily than it would in its absence. I think our R&D team facilitates flexibility in the company."
>
> Respondent #5

> "While executive leadership sets the tone, flexibility ultimately depends on coordination across functions to instil agility into all facets of the organization and operations. It is both a strategic priority and a competitive advantage."
>
> Respondent #8

The other response mentioned the flexibility was under the jurisdiction of the stakeholder.

> "Within Company X, different departments and stakeholders share responsibility for flexibility. The management team is primarily in charge of promoting flexibility because they establish the corporate culture and strategic direction."
>
> Respondent #6

In summary, the operational performance of Company X is intricately intertwined with cost, quality, delivery, and flexibility. Effectively managing these factors is essential for maintaining profitability, ensuring safety and compliance, meeting production schedules, and adapting to industry dynamics. By prioritizing cost-efficient, high-quality operations with reliable delivery schedules and adaptive flexibility, companies can navigate the complexities of the oil and gas sector, ensuring

sustained operational performance and competitive positioning within the industry. The Atlas.ti output as shown in Figure 4-1

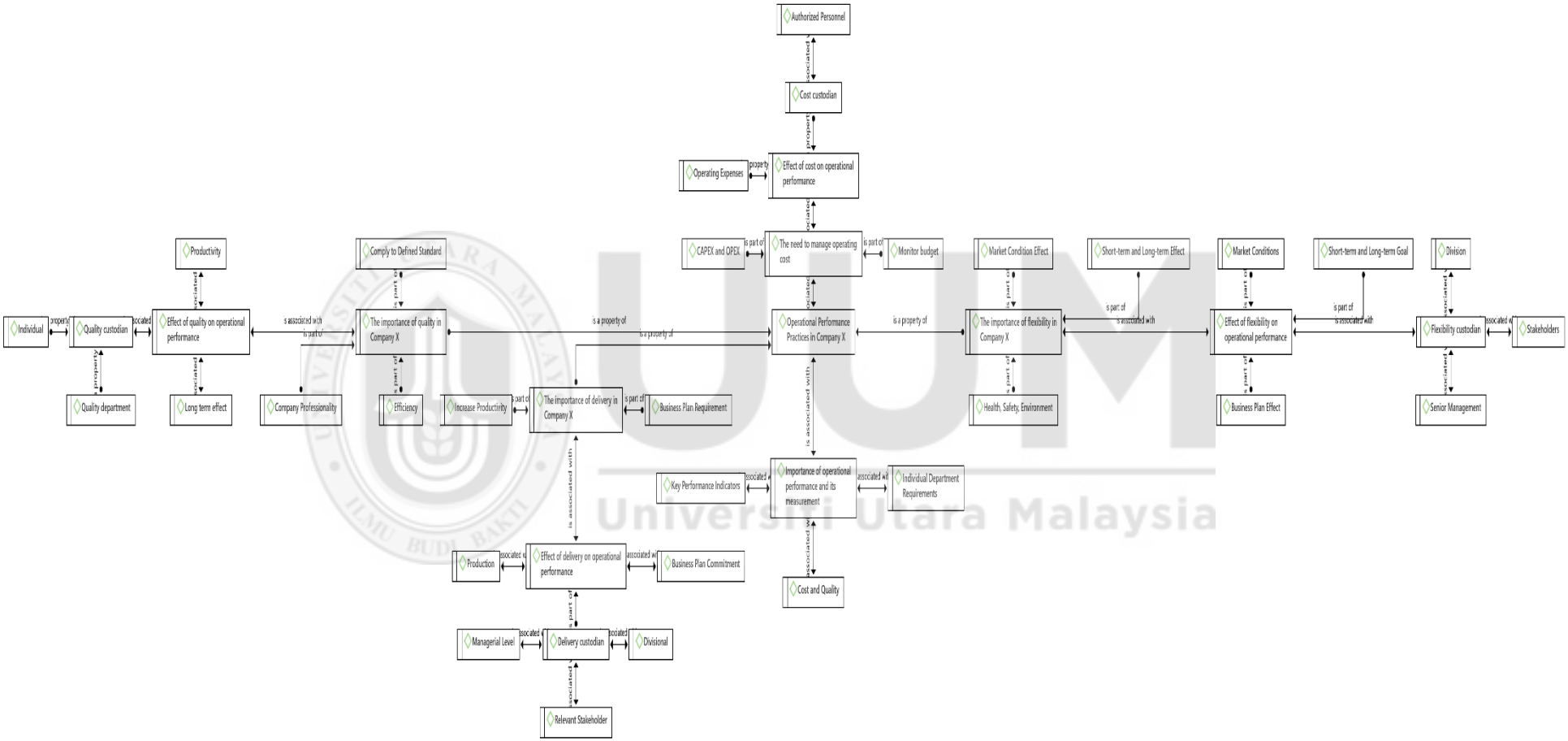

Figure 4-1:
Atlas.ti Output RQ1: Operational Performance Practices in Company X

4.4.2 Theme No. 2: Human Resource Practices influence operational performance in Company X

The research's Research Question 2, which asks how human resource practices impacts operational performance in this company, is directly related to Theme No. 2 as stated in Chapter 1. The research results are relevant to the research objective to investigate the human resource practices' influence on operational performance in Company X. Relevant information gathered via observation, document reviews, and interview sessions was taken into account as evidence and input for data analysis. A distinct breakdown of the interviewees' responses to this research issue is shown in Table 4-4, based on the themes and their main claims:

Table 4-4: *Significant Statements and Interpretative Meaning for Human Resource Practices*

Significant Statements	**Interpretative Meaning**
The influence of human resource practices has on Employee Engagement	
▪ Employee engagement, regarding their job responsibilities, is well explained within the technical domain (Respondent #1)	Responsibilities briefing
▪ Most of the roles are responsibilities are well explained and understood but there seems to be a greater need of transparency (Respondent #3)	
▪ I think HR is doing a good job when it comes to telling people what their job roles and their responsibilities (Respondent #4) is.	
▪ Most of our employees are well aware of their roles and responsibilities (Respondent #5)	
▪ Transparency in career development and progression is essential for employee engagement (Respondent #6)	
▪ See the most common HR practice, as you know, in any organization, your asset is your employees (Respondent #2)	Employee as an asset
▪ In terms of employee engagement, organizations are implementing clear career frameworks (Respondent #7)	
▪ The more that advancement pathways are clearly defined, communicated, and supported with resources (Respondent #8)	

▪ When employees understand their potential paths and how their current roles contribute to their future goals (Respondent #9) ▪ HR is performing a good job in creating a transparent work environment by providing digital access, facilitating internal communications, and promoting open dialogue about career development opportunities (Respondent #10)	Employee as an asset
<u>Work Environment</u>	
▪ This means, having proper hardware, software, support, colleagues and nurturing environment is important. (Respondent #1) ▪ We have good quality workstations, the general environment is good and comfortable (Respondent #4) ▪ Also, you have all the software, hardware, research material and journal subscription you need (Respondent #5)	Providing necessary infrastructure
▪ Today, we try to satisfy the employee by improving their career, change their environment, depending on their experience (Respondent #2) ▪ We do believe in equal opportunity and provide training to whoever required for career development (Respondent #3) ▪ HR practices collectively contribute to creating a work environment that is supportive, inclusive, rewarding, and conducive to employee well-being and professional growth (Respondent #6) ▪ The workplace becomes upbeat, interesting, and productive when HR procedures provide employees with support, voice, flexibility, belonging, and purpose (Respondent #7) ▪ Maintain a constant state of assessment and modification of the company's HR procedures to make sure they are fulfilling the requirements of staffs and fostering a happy workplace (Respondent #8) ▪ Employee engagement, satisfaction, and general productivity can all be significantly impacted by a great work environment (Respondent #9) ▪ By focusing on clear communication, employee engagement initiatives, performance management and development, work-life balance, diversity and inclusion (Respondent #10)	Providing adequate training
Employee motivation (job satisfaction and money)	
▪ In recent times, Company X's HR has shifted towards emphasizing management recognition	Management recognition

rather than material rewards for employee engagement (Respondent #1)

- Our HR practices and generally the company itself is looking to optimize cost too much in my opinion (Respondent #4)
- Compensation and Benefits Packages: Fair and competitive compensation, along with comprehensive benefits, (Respondent #2)
- I think HR should be more observant on employee commitment as sometimes lack of monetary benefits may be the cause of poor employee motivation (Respondent #3)
- There is not enough monetary stimulus for the employee and that is affecting the motivation (Respondent #5)
- But it's also critical to understand the importance of financial incentives in enhancing employee motivation (Respondent #6)
- HR practices can ensure that monetary incentives are thoughtfully implemented, positively impact employee motivation and performance (Respondent #7)
- Employers frequently utilize monetary incentives as a means of employee motivation, which can result in improved output and work performance (Respondent #8)
- Employee motivation and job happiness are significantly impacted by HR procedures, and money plays a big part in all of this (Respondent #9)
- Motivating employees, ensuring they are happy in their jobs, and ultimately ensuring the company's financial stability all depend heavily on efficient HR procedures (Respondent #10_

Monetary compensation

Employee commitment

- HR needs to ensure proper placement of employees within the organization (Respondent #1)
- Effective HR practices in recruitment and selection, which ensure the right fit between employees and the organization's culture and values (Respondent #2)
- I think HR should be more observant on employee commitment as sometimes lack of monetary benefits may be the cause of poor employee motivation (Respondent #3)
- One approach is to provide appropriate monetary compensation (Respondent #6)

Proper placement

Proper compensation

▪ Well, poorly motivated employees in my opinion will never be completely committed (Respondent #4)	Proper motivation
▪ Well lack of motivation is going to result in lack of commitment (Respondent #5)	
▪ HR procedures are the cornerstone for gaining employee loyalty by demonstrating the organization's shared dedication to the success and well-being of its workforce (Respondent #7)	HR procedures
▪ HR practices significantly impact employee commitment, shaping their dedication, loyalty, and willingness to go the extra mile for the company (Respondent #8)	
▪ Consequently, employee commitment is shaped by HR procedures, and employee commitment influences corporate success and performance (Respondent #9)	
▪ Motivating employees, ensuring they are happy in their jobs, and ultimately ensuring the company's financial stability all depend heavily on efficient HR procedures (Respondent #10)	
Training and development	
▪ Company X places a strong focus on training and development (Respondent #1)	HR training commitment
▪ Strategic Planning: HR practices that align training and development programs with the organization's strategic goals ensure that training efforts support the company's overall mission (Respondent #2)	
▪ There is a strong push recently by HR and Company X HQ to train employees (Respondent #3)	
▪ Since then, Company X has introduced a lot of training opportunities for its employees (Respondent #4)	
▪ Plenty of training going around recently (Respondent #5)	
▪ HR department is excelling in providing proper training and development for staff (Respondent #6)	
▪ At the moment, HR department is doing well with providing proper training and development for staff. (Respondent #7)	
▪ Investing in training and development is a continuous process and our HR is doing this excellently (Respondent #8)	
▪ HR's responsibility in employee training extends beyond program inception; it also includes ensuring that programs are appropriate and beneficial (Respondent #9)	

▪ In my opinion, it can be determined that the HR department is performing exceptionally well in providing proper training and development opportunities for staff (Respondent #10)	
Employee engagement effect	
Dedication	
▪ You need to be fully engaged and understand the importance of the time you dedicate to the task (Respondent #1) ▪ Employees who are actively involved in their work tend to be more efficient (Respondent #3) ▪ Engaged employees are more productive, innovative, and committed to their work (Respondent #6) ▪ Engaged workers are more productive, produce better work, are more efficient (Respondent #7) ▪ An engaged workforce is truly a competitive advantage when it comes to optimizing operational outcomes (Respondent #9) ▪ Engaged employees are motivated, committed, and dedicated to their work (Respondent #10)	Employee dedication
Transparency	
▪ So, all of this, it is required, and it will impact if you are implemented this and you will be transparent and you engage your employee, it will be positively impact for better improvement your operation (Respondent #2) ▪ Engaged employee will be aligned with the vision, mission and goal of the company, he/she will contribute knowing that they play a vital role in the bigger picture (Respondent #4) ▪ I would say directly proportional because the more engaged you are the more aligned you are to the company goals, and you work accordingly (Respondent #5) ▪ By focusing on creating a positive and engaging work environment, companies can harness the power of employee engagement (Respondent #8)	Transparent company
Work environment influence on operational performance	
Infrastructures	
▪ Computers, software, tools, and facilities are necessary (Respondent #1)	Infrastructures requirement
Positive working environment	
▪ A positive work environment that promotes well-being, collaboration, and job satisfaction can boost employee morale and engagement (Respondent #2)	Positive workplace

- A work environment that you don't feel like coming to will be demotivating to you and would will not give your 100% (Respondent #3)
- Well, having a good work environment will encourage employees (Respondent #4)
- I believe it acts as an enabler to operational performance (Respondent #5)
- ….. when employees feel physically, mentally, and emotionally well, they are more likely to perform at their best (Respondent #6)
- The optimal environment fuels productivity (Respondent #7)
- In creating a positive and supportive work environment, you can reap the numerous benefits it offers (Respondent #8)
- Factors such as safe and conducive working place play a crucial role in influencing employee motivation and productivity (Respondent #9)

Positive working environment

- Organizations that prioritize creating a conducive work environment are more likely to achieve higher levels of efficiency, productivity, and overall operational success (Respondent #10)

Positive workplace

Employee motivation (job satisfaction and money) influence on operational performance

Financial incentive

- Meaning, lack of monetary encouragement will have adverse effect on operational performance (Respondent #1)
- I concur that financial incentives and work satisfaction both have a direct effect on an organization's operational effectiveness (Respondent #6)

Monetary motivation

Job satisfaction

- Job satisfaction and fair compensation can motivate employees to give their best effort (Respondent #2)
- When employees are motivated both intrinsically through purposeful work and extrinsically through equitable pay, they become a powerful driver lifting operational capabilities (Respondent #7)
- The connection between employee motivation, job satisfaction, money, and operational performance is intertwined and complex (Respondent #8)

Job satisfaction

▪ Employee motivation, encompassing both job satisfaction and monetary incentives (Respondent #9) ▪ Satisfied employees are more productive, deliver higher-quality work, exhibit lower turnover and absenteeism rates, and provide better customer service (Respondent #10)	
Career development	
▪ For some people its career development, for some its monetary benefits (Respondent #3)	Career growth
Motivated employee	
▪ We need motivated individuals who will go an extra mile for the company goals (Respondent #4) ▪ You can have all the enablers you want, but if the employee is not motivated to do the job, then there is no result and thus poor operational performance (Respondent #5)	Motivated personnel
Employee commitment influence on operational performance	
Employee engagement link	
▪ For me, commitment is closely related to engagement (Respondent #1) ▪ ….. committed employees are highly engaged in their work (Respondent #2) ▪ Committed employees will deliver better results and improve operational performance (Respondent #3)	Employee engagement relationship
▪ Because if you are not motivated, you will not be committed (Respondent #4) ▪ Motivation leads to commitment in my opinion (Respondent #5) ▪ By fostering a culture that cultivates strong employee commitment, organizations can unlock a powerful force that drives significant improvements in operational performance (Respondent #8) ▪ ….. a valuable asset for organizations seeking to improve their overall effectiveness and success (Respondent #9) ▪ Organizations that prioritize fostering employee commitment are likely to achieve improved operational outcomes (Respondent #10)	Employee engagement relationship
Loyalty	
▪ Employees that are committed to their organization's aims and objectives have a great sense of dedication and loyalty (Respondent #6)	Loyalty element

▪ Their loyalty and care for the organization make them invaluable operational partners (Respondent #7)	
Training and development influence on operational performance Number 1 priority	
▪ Ranking: 1) Training (Respondent #1) ▪ Then also the training and development, it is one, this is one of the main objectives because of the people they try to develop with the change of the environment and change on the requirement that's required in the company (Respondent #2) ▪ Better trained staff, with strong motivation and commitment in good work environment will deliver the best results (Respondent #3) ▪ Well, training and development will give the employees the tool and knowledge to do the job in a better manner (Respondent #4) ▪ This too is an enabler to achieving high operational performance (Respondent #5) ▪ Training and development programs equip employees with the necessary skills, knowledge, and competencies to perform their roles effectively (Respondent #6) ▪ Training pays dividends through enhanced efficiency, consistency, agility and sustainable growth (Respondent #7) ▪ Common understanding is a skilled and engaged workforce is the foundation of any thriving organization (Respondent #8) ▪ In my opinion, training and development are essential for enhancing operational performance (Respondent #9) ▪ Training and development programs have a significant impact on operational performance (Respondent #10) ▪ Training and development programs have a significant impact on operational performance (Respondent #10)	Training is top priority

The RQ2 reveals the issue with Company X's HR procedures that has an influence on their operational performance. HR practices such as employee engagement, work environment, employee motivation (job satisfaction and money), employee commitment and training and development play a pivotal role in shaping the effectiveness and efficiency of an organization. These practices directly influence the quality of the workforce, employee engagement, job satisfaction, and overall productivity. By implementing robust HR practices, companies can optimize their operational performance, creating a work environment conducive to success, innovation, and sustained growth.

In terms of human resource practices influence on the employee engagement, five out of ten respondents stated that it is related to responsibilities briefing.

> "Employee engagement, regarding their job responsibilities, is well explained within the technical domain. However, when it comes to engagement with the company's objectives and directions, there is a need for greater transparency. Employees should have a clear understanding of their future in the company to feel connected to the bigger picture and truly belong."
>
> Respondent #1

> "I think HR is doing a good job when it comes to telling people what their job roles and their responsibilities is. At the same time, HR and higher management tend to reiterate the vision, mission and goals of the company at various occasions. This way I feel that employees are well aligned and aware of what is the bigger picture. So obviously they will be more engaged."
>
> Respondent #4

> "Transparency in career development and progression is essential for employee engagement. When employees have a clear understanding of their career path, they are more likely to be motivated, committed, and engaged in their work."
>
> Respondent #6

Another five stated that Company X performed the employee engagement because they treat their employee as an asset.

> "See, the most common HR practice, as you know, in any organization, your asset is your employees. Today, if the HR, they will not take care about improving and satisfy the employee, which mean you are losing your asset to achieve your objective."
>
> Respondent #2

> "HR is performing a good job in creating a transparent work environment by providing digital access, facilitating internal communications, and promoting open dialogue about career development opportunities that managed to significantly contribute to improved productivity and employee engagement within an organization."
>
> Respondent #10

Seven out of ten respondents said that HR is doing a good job of fostering a positive work environment to improve operational performance when asked how HR practices affect the work environment.

> "We do believe in equal opportunity and provide training to whoever required for career development. HR also keeps a strong eye on the behavioural aspect of things."
>
> Respondent #3

> "The workplace becomes upbeat, interesting, and productive when HR procedures provide employees with support, voice, flexibility, belonging, and purpose. This promotes performance, retention, and business success."
>
> Respondent #7

> "HR procedures must be customized to accommodate unique workforce, sector, and corporate culture in order to be effective. Maintain a constant state of assessment and modification of the company's HR procedures to make sure they are fulfilling the requirements of staffs and fostering a happy workplace."
>
> Respondent #8

Other three mentioned that providing necessary infrastructure is crucial to create proper working environment that conducive for operational performance.

> "HR plays a crucial role in determining the work environment of a company. This means, having proper hardware, software, support, colleagues and nurturing environment is important."
>
> Respondent #1

> "I think they are doing quite good. Look around you, the environment is quite good, isn't it? Also, you have all the software, hardware, research material and journal subscription you need."
>
> Respondent #5

Eight out of the ten respondents said that financial factors have a stronger influence on HR practices related to employee motivation (job satisfaction and money), which can improve operational performance.

> "Compensation and Benefits Packages. Fair and competitive compensation, along with comprehensive benefits, can motivate employees by showing that their work is valued and that they are being rewarded adequately."
>
> Respondent #2

> "HR does encourage management recognition of employees but lately there has been a lag in monetary benefits."
>
> Respondent #3

> "I think we have a problem in this matter. There is not enough monetary stimulus for the employee and that is affecting the motivation."
>
> Respondent #5

> "HR practices can ensure that monetary incentives are thoughtfully implemented, positively impact employee motivation and performance, and align with the overall strategic objectives and culture of the organization."
>
> Respondent #7

> "Employers frequently utilize monetary incentives as a means of employee motivation, which can result in improved output and work performance. We at organization X need to look into this since, as of right now, the organization is sure that workers are happy when they feel valued, appreciated, and like their work. There is a need for more discussion on this."
>
> Respondent #8

Meanwhile, the other two said that non-monetary recognition is more effective to motivate the employees.

> "In recent times, Company X's HR has shifted towards emphasizing management recognition rather than material rewards for employee engagement. Even though it is important for employees to be recognized and experience job satisfaction through such recognition."
>
> Respondent #1

> "I think this is something debatable. Our HR practices and generally the company itself is looking to optimize cost too much in my opinion. This way they have reduced monetary benefits/appreciation to the employees."
>
> Respondent #4

According to the study, different responses were obtained about employees' commitment to determine how HR practices were affected in relation to operational performance. Four out of ten participants cited the commitment was due to HR practices, while other reason mentioned were proper placement (two out of ten respondents), proper compensation (two out of ten respondents) and proper motivation (two out of ten respondents).

> "Employees that have emotional attachment and are more inclined to go above and beyond expectations are those who feel valued, involved, attached to a purpose, and supported in their career goals. HR procedures are the cornerstone for gaining employee loyalty by demonstrating the organization's shared dedication to the success and well-being of its workforce."
>
> Respondent #7

> "HR practices significantly impact employee commitment, shaping their dedication, loyalty, and willingness to go the extra mile for the company. By strategically deploying well-designed HR practices, companies can build a workforce that is not just skilled and knowledgeable, but also truly committed to its success. This, in turn, fuels a cycle of growth, innovation, and sustainable competitive advantage."
>
> Respondent #8

> "Certain HR procedures can improve company outcomes by influencing employee performance and commitment. Consequently, employee

commitment is shaped by HR procedures, and employee commitment influences corporate success and performance."

Respondent #9

"HR needs to ensure proper placement of employees within the organization, aligning their skills and capabilities with department or division objectives. Delays in recruiting staff and hiring the right level of seniority can impact employee commitment, as it affects the overall team dynamics and expertise. Factors such as remuneration, work conditions (including colleagues, software, and task-enabling environment), and job satisfaction also influence employee commitment."

Respondent #1

"Employee commitment within a company is greatly impacted by HR strategies. Organizations can cultivate a strong sense of commitment among their workforce by putting into practice efficient HR strategies. One approach is to provide appropriate monetary compensation."

Respondent #6

"Well, poorly motivated employees in my opinion will never be completely committed."

Respondent #4

In the meantime, Company X's HR department is doing a great job of making sure that these procedures allow for appropriate operational performance in terms of training and development.

"Company X places a strong focus on training and development, especially for new entrants like the Young Development Program (YDP). However, there are gaps in providing the right level of training that corresponds to employees' needs, suggesting room for improvement in this area as its slagging behind."

Respondent #1

"There is a strong push recently by HR and Company X HQ to train employees with advanced courses and on-job-training."

Respondent #3

"If you remember few years back, we did companywide survey where people said they want more training opportunities? Since then, Company X has introduced a lot of training opportunities for its employees. But to be honest, all of these a,b,c,d,e, they all need to go hand in hand in my opinion. You

> cannot motivate an employee by stopping monetary benefits and increasing training. It all needs to be in good balance."
>
> Respondent #4

> "HR department is excelling in providing proper training and development for staff. Effective training and development programs have numerous benefits for both employees and the organization as a whole."
>
> Respondent #6

The next issue with regards to RQ2, the researcher highlighted the influence of employee engagement on the operational performance of Company X. Based on the responses gathered, six out of ten respondents stated that employee engagement contribute to employee dedication in relation to operational performance. When employees are engaged, they are more dedicated to their roles, the organization's mission, and its success. This dedication translates into increased effort, higher productivity, and a willingness to go above and beyond to achieve company objectives.

> "You need to be fully engaged and understand the importance of the time you dedicate to the task. If not, then you won't deliver to your goals."
>
> Respondent #1

> "Employees who are actively involved in their work tend to be more efficient. They exhibit a higher degree of task-oriented focus, increased concentration, and are less prone to distractions. This heightened productivity directly contributes to improved operational output."
>
> Respondent #3

> "Employee engagement has a significant impact on operational performance. Engaged employees are more productive, innovative, and committed to their work, leading to increased profitability, productivity, and customer satisfaction."
>
> Respondent #6

> "The performance of operations is significantly impacted by employee engagement. Engaged workers are more productive, produce better work, are more efficient, have lower absenteeism and turnover, provide better customer service, and foster an innovative culture. Employers who place a high priority

on employee engagement are more likely to see improved operational results and an advantage over competitors in their sector."

Respondent #7

The remaining four participants stated that the way in which employees view the organization affects their level of involvement. Currently, the corporation is trying to convey that it is a transparent and caring organization that values its employees. When employees feel valued, respected, and appreciated, they are more likely to be engaged with their work and the overall mission of the organization. A positive company culture, clear communication, opportunities for growth, and a supportive work environment all contribute to how employees view and engage with their company. Ultimately, employee engagement reflects the extent to which employees are emotionally committed to the organization's goals and values.

"So, all of this, it is required, and it will influence if you are implemented this and you will be transparent and you engage your employee, it will be positively influence for better improvement your operation. Today, if you are not motivating the people, you are not encouraging the people and they will not be satisfied. So, the performance of the employee, it will be negatively impacting your organization. But today, if you are satisfied and you are recruiting and you are helping and supporting your employee, that it will be impacting positively in your organization and it will improve that performance of your company."

Respondent #2

"Engaged employee will be aligned with the vision, mission and goal of the company, he/she will contribute knowing that they play a vital role in the bigger picture. This will positively affect operational performance."

Respondent #4

In response to the aspect of work environment, the finding of this study echoed the common belief that it has a profound influence on operational performance. A positive and supportive work environment leads to higher employee satisfaction, engagement, and motivation, ultimately resulting in improved operational outcomes.

> "A positive work environment that promotes well-being, collaboration, and job satisfaction can boost employee morale and engagement. Engaged employees tend to be more productive and committed to achieving operational goals."
>
> Respondent #2

> "A work environment that you don't feel like coming to will be demotivating to you and would will not give your 100% thus resulting in sub-par operational performance."
>
> Respondent #3

> "The work environment is foundational to performance by giving employees the conditions required to successfully execute their responsibilities and work seamlessly with others. The optimal environment fuels productivity."
>
> Respondent #7

> "In creating a positive and supportive work environment, you can reap the numerous benefits it offers for both your employees and your organization's operational performance. Remember, happy and engaged employees are the foundation of a successful and sustainable business."
>
> Respondent #8

> "The work environment definitely has a significant impact on operational performance. Organizations that prioritize creating a conducive work environment are more likely to achieve higher levels of efficiency, productivity, and overall operational success."
>
> Respondent #10

Next, the issue of employee motivation (job satisfaction and money) influence on operational performance was asked to the study respondents. The responses were diverse. Five out of ten stated job satisfaction were the most important element in motivating employee.

> "Motivated employees tend to be more productive, leading to higher output and operational efficiency. Job satisfaction and fair compensation can motivate employees to give their best effort."
>
> Respondent #2

> "When employees are motivated both intrinsically through purposeful work and extrinsically through equitable pay, they become a powerful driver lifting

operational capabilities, efficiency, innovation and results. Their motivation becomes a performance accelerator."

Respondent #7

"The connection between employee motivation, job satisfaction, money, and operational performance is intertwined and complex, but the evidence overwhelmingly points to a significant and positive impact."

Respondent #8

Two responded that the motivation lies on the individuals.

"This is vital in my opinion. We need motivated individuals who will go an extra mile for the company goals. And that will boost operational performance."

Respondent #4

"See, lack of motivation will lead to nothing. You can have all the enablers you want, but if the employee is not motivated to do the job, then there is no result and thus poor operational performance."

Respondent #5

Two cited the financial incentives were the most influential in motivating the employee.

"You won't do the work if you don't have the financial incentive and job satisfaction associated with it. You don't work for free. Meaning, lack of monetary encouragement will have adverse effect on operational performance."

Respondent #1

"I concur that financial incentives and work satisfaction both have a direct effect on an organization's operational effectiveness, which in turn affects employee motivation."

Respondent #6

Another response mentioned about the career growth as motivating factor for the employee.

"Everyone works for a return and that needs to be matched for them to be motivated and do better for the company. For some people its career

> development, for some its monetary benefits. Whatever is required should to given as a reward to keep employees motivated and thus improve and/or maintain high level of operational performance."
>
> Respondent #3

Overall, the work environment plays a vital role in shaping operational performance. By creating a positive, supportive, and conducive work environment, organizations can optimize their productivity, efficiency, and overall success. Next, the finding will discuss the factor of employee commitment influence on the operational performance.

According to the responses, eight out of ten respondents stated that the relationship between employee engagement and operational performance is critical.

> "For me, commitment is closely related to engagement, and they go hand in hand automatically."
>
> Respondent #1

> "Employee commitment has a profound impact on operational performance in several ways. First, committed employees are highly engaged in their work, which leads to increased productivity. They willingly invest their time and effort in tasks, contributing to efficient operations."
>
> Respondent #2

> "By fostering a culture that cultivates strong employee commitment, organizations can unlock a powerful force that drives significant improvements in operational performance, financial success, and overall organizational wellbeing."
>
> Respondent #8

> "Employee commitment plays a vital role in influencing operational performance. Organizations that prioritize fostering employee commitment are likely to achieve improved operational outcomes and gain a competitive advantage in their industry."
>
> Respondent #10

Other two cited loyalty as the most mattered in employee commitment for operational performance.

> "Employees that are committed to their organization's aims and objectives have a great sense of dedication and loyalty. To make sure their jobs and projects are successful, they are prepared to put in more time and effort and go above and beyond. Better operational performance is a direct result of this increased effort and attention."
>
> Respondent #6

> "Employee commitment cultivates an ownership mentality that aligns workers' priorities with operational success. Their loyalty and care for the organization make them invaluable operational partners."
>
> Respondent #7

The last issue of HR practices influence on the operational performance was about the training and development. All respondents stated that training and development were the top priority for the HR department in Company X.

> "Then also the training and development, it is one, this is one of the main objectives because of the people they try to develop with the change of the environment and change on the requirement that's required in the company. So, training and development, it needs to be refreshing the people and to get more satisfied and more information and to refresh their mind about what's going on."
>
> Respondent #2

> "Better trained staff, with strong motivation and commitment in good work environment will deliver the best results. Thus, improve operational performance. It all needs to go hand in hand together."
>
> Respondent #3

> "Training and development programs equip employees with the necessary skills, knowledge, and competencies to perform their roles effectively."
>
> Respondent #6

> "Properly trained employees are an operational advantage. They have the skills and mindsets needed to perform at their peak individually and collectively. Training pays dividends through enhanced efficiency, consistency, agility and sustainable growth".
>
> Respondent #7

In summary, training and development initiatives have a profound influence on operational performance. They enhance employee skills and knowledge, increase

productivity and quality, foster adaptability and innovation, improve employee engagement and retention, support succession planning, and ensure safety and compliance. Organizations that prioritize training and development recognize its direct correlation to operational success.

4.4.2.1 Influence of HR Practices on Key Factors

Human Resource (HR) practices play a pivotal role in shaping the foundational aspects of employee experience, including employee engagement, work environment, employee motivation, employee commitment, and training and development. These practices are integral in fostering a culture that values transparency, inclusivity, and professional growth, which in turn drives operational efficiency and productivity.

For instance, employee engagement benefits significantly from HR's emphasis on clear role definitions and career progression opportunities. Similarly, creating a positive work environment with adequate resources, infrastructure, and training enhances overall job satisfaction and collaboration. Furthermore, monetary and non-monetary incentives tailored to employee needs ensure high levels of motivation, while strategic recruitment and placement align employees' skills with organizational objectives, fostering loyalty and commitment. Lastly, consistent and well-designed training programs provide employees with the skills and tools to adapt to industry changes, positioning the workforce as a critical driver of operational success. . The following Figure 4-2 showcase the Atlas.ti output for Influence of HR Practices on Key Factors

4.4.2.2 Influence of Key Factors on Operational Performance

The five factors shaped by HR practices—employee engagement, work environment, motivation, commitment, and training—exert a direct and profound influence on operational performance.

Engaged employees demonstrate heightened dedication and innovation, contributing to improved productivity and alignment with company objectives. A supportive work environment bolsters morale and collaboration, creating a foundation for sustained operational performance. Motivated employees deliver higher quality and more efficient outputs, while those with strong commitments to the organization go above and beyond to ensure operational success. Training and development initiatives equip employees to handle tasks efficiently, adapt to dynamic challenges, and maintain safety and compliance, ultimately driving sustainability and operational growth.

By aligning HR practices with these key factors, organizations can achieve a synergistic effect, where individual and collective employee performance aligns seamlessly with broader operational goals. This alignment not only enhances operational performance but also provides a sustainable competitive advantage, especially in complex industries like oil and gas. The following Figure 4-3 showcase the Atlas.ti output for RQ2.

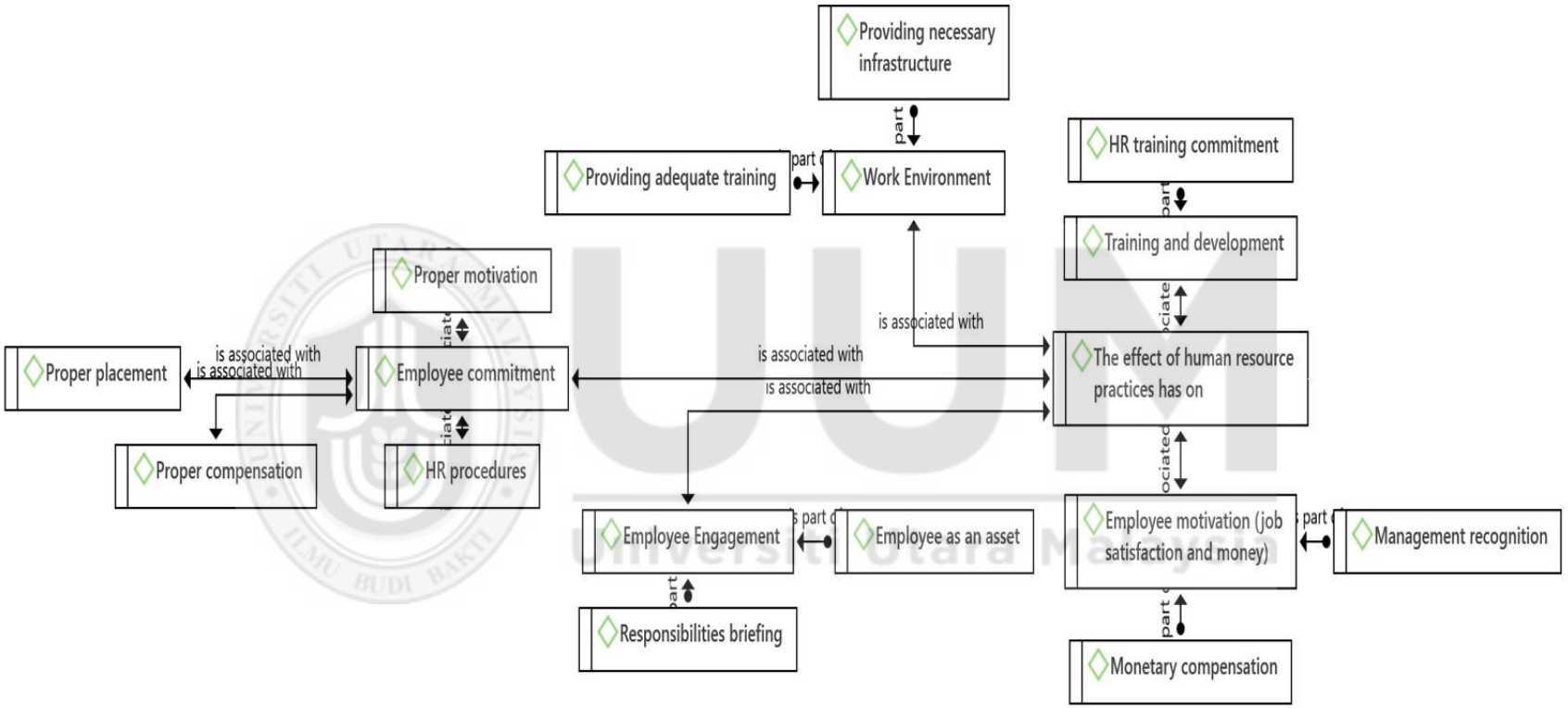

Figure 4-2:
Atlas.ti Output for Influence of HR Practices on Key Factors

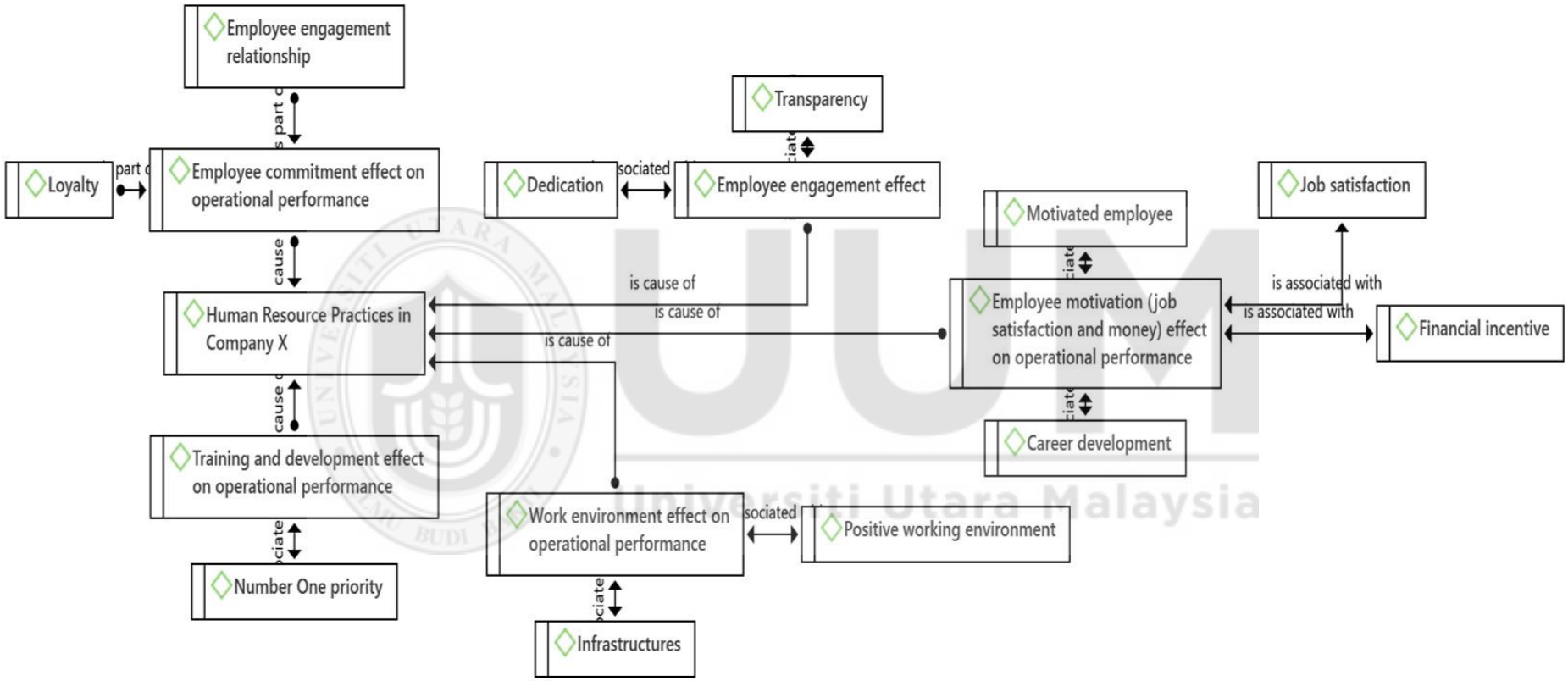

Figure 4-3
Atlas.ti Output for RQ2 Influence of Key Factors on Operational Performance

4.4.3 Theme No. 3: HSE practices influence on the operational performance of Company X

The research's Research Question 3, which asks how HSE influence the company's operational performance is directly related to Theme No. 3 as stated in Chapter 1. The research results are relevant to the resource objective to explore the HSE influence on operational performance, notably in Company X. Relevant information gathered via observation, document reviews, and interview sessions was taken into account as evidence and input for data analysis. A distinct breakdown of the interviewees' responses to this research issue is shown in Table 4-5, based on the themes and their main claims:

Table 4-5:
Significant Statements and Interpretative Meaning for HSE Influence

Significant Statements	**Interpretative Meaning**
Safety hazards and health hazards classified and managed in Company X Proper category and manage by category ▪ They have categorized them in 12 categories in Company X, which allows people to focus and know which type of hazard fall in which category (Respondent #1) ▪ There are about 12 of them covering all aspect. There is a good management system as well that keeps track of past events and lessons learned (Respondent #3) ▪ We classify hazards based on their types. There is a strong framework for that. Usually, HSE department will classify the operations HSE risk before any operations are done (Respondent #4) ▪ We have categorized risks and hazards into various categories and sub-categories which are monitored at every level of the organization (Respondent #5) ▪ . Here, we have a proper process with at least 12 categories. A culture of safety is fostered and continuous improvement in safety procedures (Respondent #6)	According to category and managed accordingly

- Hazards are classified based on the type of risk they pose and their potential severity. Proactive engagement from our EHS team, management leadership, and employees at all levels drive our strong safety and health culture (Respondent #7)

Management system and managed by qualified personnel

- The management system, this is one system for the work authority. They give the authority for the people. You will not give any authority if the people, they are not qualified to that work, to be sure that the operation is done with the same factor (Respondent #2)
- Effective management of these hazards is crucial for protecting employees, the environment, and the company's assets (Respondent #8)
- Our EHS team has established standards and enforcement requirements to help prevent injuries and deaths in the oil and gas industry (Respondent #9)
- Robust safety management systems, comprehensive training programs, regular inspections, and continuous improvement initiatives are implemented to minimize risks and ensure the well-being of workers and the surrounding environment (Respondent #10)

Management system and managed by qualified staff

Characterize HSE practice

Definition method

- There is a good system, though the definition of the different safety hazards in categorizing the different safety hazards (Respondent #1)
- Based on types as mentioned earlier (Respondent #3)
- Based on type, based on whether it’s an occupational risk or environmental risk and etc (Respondent #4)
- It is categorized based on types and kinds (Respondent #5)
- A comprehensive approach to HSE categorization helps companies identify and manage specific risks related to health hazards, safety incidents, environmental impacts, regulatory compliance, and emergency situations (Respondent #7)
- Categorization plays a crucial role in understanding and mitigating these risks. By effectively categorizing and managing HSE hazards, we can create a safer work environment (Respondent #9)

Definition

Organization commitment

- Our priority to SEE the HSE as the people and also the environment and to co-op with our nation and our country commitment (Respondent #2) — Obligation
- ….. crucial for managing risks and ensuring the well-being of employees, protecting the environment, and complying with regulations (Respondent #6)
- Company X can enhance operational performance, minimize accidents and incidents, protect the environment, and foster a culture of safety and environmental stewardship (Respondent #8)
- The best approach to operational HSE management in the oil and gas industry is prevention, and the use of predictive analytics can help minimize risk and guide emergency response.

HSE evaluation method

Key Performance Indicator (KPI)

- HSE evaluation in the company involves the use of specific parameters and key performance indicators (KPIs) (Respondent #1) — KPI
- We have HSE KPI, and that is measured from a 100% HSE safe standards (Respondent #4)
- Against the KPI that is set (Respondent #5)
- Through various evaluation methods, such as audits, inspections, incident reporting, and KPI monitoring, companies can assess their HSE performance and identify areas for improvement (Respondent #6)
- Hence, we established key performance indicators (KPIs) (Respondent #7)
- Evaluating HSE performance in upstream oil and gas companies involves monitoring key performance indicators (Respondent #10)

Management system

- We have the management system for the HSE (Respondent #2) — Management system
- By utilizing a comprehensive approach that balances lagging and leading indicators, incorporating diverse evaluation methods (Respondent #8)
- The evaluation of HSE in the upstream oil and gas industry is a multifaceted process that encompasses various technological, managerial, and operational aspects to ensure the well-being

of workers, protect the environment, and minimize operational risks (Respondent #9)

Industry risk metric

- There is an industry risk matrix that is used to evaluate the risk involved in a task (Respondent #3) — Industry risk metric

Procedures to evaluate the HSE practices

HSE related KPIs

- In addition to incident rates, other KPIs related to HSE (Respondent #1) — HSE KPIs
- So, I think as HSE, we are following the standard worldwide HSE practices (Respondent #2)
- Based on company KPIs we measure the performance (Respondent #3)
- All of these are evaluated against our 100% HSE KPI (Respondent #5)
- Procedures used to evaluate HSE practices in upstream oil and gas companies are essential for assessing compliance, identifying areas for improvement, and promoting a strong safety culture (Respondent #6)
- Proactive assessments and reactive performance monitoring across leading and lagging indicators are both used in a well-developed HSE evaluation program (Respondent #7)
- Evaluating HSE practices in Company X is critical for ensuring the safety of employees, protecting the environment, and minimizing operational risks (Respondent #8)
- Hence, we have adequate indicators such as TRIR and TRIF and all of these are evaluated against our 100% HSE KPI (Respondent #9)
- We evaluate the key performance indicators (KPIs) that are used to monitor environmental and safety measures (Respondent #10)

Risk matrix

- …. there are criteria to measure the risk related to an event, we have a risk matrix (Respondent #4) — Risk matrix

The biggest challenges in managing HSE

Integration of HSE principles into daily operation

- One of the biggest challenges in managing HSE is ensuring that individuals integrate HSE principles into their day-to-day behaviours and work practices (Respondent #1)

Integrate HSE principles in work operation

Employee different background

- See, the big challenge facing the HSE, today you have different experience from the people (Respondent #2)
- People (Respondent #3)
- The biggest challenge we are facing with HSE right now is the mentality of the people and their behavior in relation to HSE (Respondent #4)
- The biggest challenge I would say is human behavior like carelessness, not taking HSE seriously (Respondent #5)

Diverse personnel background

HSE operational complexity

- Managing HSE (Health, Safety, and Environment) in Company X comes with several significant challenges such as operational complexity (Respondent #6)
- The nature of upstream oil and gas operations presents inherent HSE risks at every stage (Respondent #7)
- Even with the tremendous advancements, a number of crucial obstacles still need to be addressed, including changing and dynamic risks, behavioural safety, human factors, data-driven decision making, and ongoing development (Respondent #8)
- These challenges include risk assessment, technological advancement, diverse workforce and regulatory compliance (Respondent #9)
- These difficulties result from the industry's complexity and high level of risk (Respondent #10)

HSE complexity

HSE problem related management

Organize proper reporting

- We have a system in place for managing HSE issues, which includes the reporting of incidents (Respondent #1)
- HSE meetings to make sure like they are aware of how to deal with an HSE situation and how to not go beyond their work permit (Respondent #2)
- We are setting strict criteria as well as educating people by meetings, seminars and workshops to make them understand the seriousness of the matter (Respondent #4)

Reporting organization

- We have run-downs of tasks as demonstrations, weekly HSE reminders, HSE moments before meetings along with other methods that are related to HSE reporting and lessons learned (Respondent #5)

Mitigate the risk

- Our first step is to mitigate the risk. Then we investigate how it happened and gain lesson learned (Respondent #3) — Risk mitigation
- Managing all problems related to HSE in this company requires a systematic and proactive approach (Respondent #6)
- Company X faces inherent HSE risks that require diligent management and a capable workforce (Respondent #7)

Comprehensive approach

- Effectively managing HSE in Company X is not about finding a singular solution to all problems, but rather adopting a comprehensive, collaborative, and continuous improvement approach (Respondent #8) — HSE comprehensive approach
- Managing all problems related to HSE in the Company X requires a comprehensive approach that encompasses various technological, managerial, and operational aspects (Respondent #9)
- ….. robust HSE management systems (Respondent #10)

Cost of accident influence on operational performance

Increase on the cost

- Having to financially compensate or incur an expense due to an accident will obviously have a negative impact on operational performance as it will increase the cost (Respondent #1) — Increase cost
- And this, it will impact your activity and the performance and this one, it will add more cost (Respondent #2)
- Could be cost of life, cost of facility or monetary loss (Respondent #5)
- The cost of accidents can have a significant impact on operational performance in several ways such as direct financial costs (Respondent #6)
- Accidents directly hamper operational performance through costly asset damage, lengthy business interruptions, and most importantly, severe injuries or fatalities among the workforce (Respondent #7)

- These costs can significantly impact a company's bottom line, reducing profitability, hindering growth, and potentially jeopardizing long-term financial stability (Respondent #8)
- These costs are associated with injuries, work-related ill-health, and various direct and indirect expenses (Respondent #9)

Influence on reputation

- Now this cost can be loss of reputation (Respondent #3)
- Badly. Having an incident will have repercussions. It may cost us monetarily, may cost us in terms of time, reputation, loss of life (Respondent #4)
- Financial burdens, loss of productivity, reduced employee morale, damage to company reputation, are all consequences of accidents (Respondent #10)

Operational down time influence on operational performance

Influence Company X positively and negatively

- On the negative side, downtime reduces productivity and efficiency …. on the positive side, downtime can be utilized for necessary maintenance and optimization activities (Respondent #1)

Negative and positive

Negatively affect the operation

- These disruptions can result in us missing production targets, which in turn affects our revenue projections (Respondent #2)
- As long as this time is lost and nothing is gained out of it, it will have a negative effect on operational performance (Respondent #3)
- Unless it’s an unplanned shut down, we will fall behind in our delivery and that will affect negatively (Respondent #4)
- That’s loss time that could have been used for profitable outcome. So, it effects negatively (Respondent #5)
- Operational downtime negatively impacts operational performance (Respondent #6)
- For Company X, operational downtime immediately lowers output, revenue, and productivity (Respondent #7)
- Operational downtime directly cripples operational performance by halting production, incurring costs, and damaging efficiency (Respondent #8)

Negatively

▪ ….. operational downtime has a substantial negative influence on operational performance (Respondent #9) ▪ Operational downtime undermines operational performance (Respondent #10)	
Employee Morale influence operational performance Negative morale negatively affects operational performance	
▪ So negative morale will have a negative impact on operational performance (Respondent #1) ▪ Conversely, low morale can lead to apathy and reduced attention to detail (Respondent #2) ▪ Poor safety will have a negative impact on employee morale as they will not feel safe in the company environment (Respondent #3) ▪ So obviously it will have a negative impact on operational performance (Respondent #4) ▪ Negatively (Respondent #5)	Negative morale led to negative performance
Positive morale positively affects operational performance	
▪ Higher employee morale fuels operational performance by boosting productivity, engagement, and reducing turnover (Respondent #6) ▪ High employee morale pays invaluable dividends for operational performance in oil and gas companies (Respondent #7) ▪ Employee morale significantly influences operational performance by impacting productivity, efficiency, and overall success within a business (Respondent #8) ▪ Employee morale strongly influences operational performance as motivated and engaged employees exhibit higher productivity (Respondent #9)	Positive morale led to positive performance
Influence negatively and positively	
▪ Employee morale significantly impacts operational performance as high morale leads to increased motivation, engagement, and productivity, while low morale can result in decreased motivation, disengagement, and reduced productivity (Respondent #10)	Positive and negative impact

The RQ3 was related to HSE influence the company's operational performance. Health, Safety, and Environment (HSE) practices generally have a substantial influence on operational performance within organizations. Implementing effective HSE practices is crucial for ensuring the well-being of employees, minimizing risks, and maintaining a sustainable and productive work environment. By prioritizing HSE, organizations can experience several benefits that positively influence operational performance.

The first issue is concerning safety hazards and health hazards classified and managed in Company X. According to the findings of, six out of ten respondents stated that the HSE is properly categorized and managed based on its category.

> "There is a good system, though the definition of the different safety hazards in categorizing the different safety hazards. They have categorized them in 12 categories in Company X, which allows people to focus and know which type of hazard fall in which category. Ex line of fire, working at height. Of course, there will not relate to our day to day work in office, but they are of primary importance at site."
>
> Respondent #1

> "HSE is a core pillar of Company X. All work is planned and executed with HSE in mind. Naturally there is a good system to classify and categorize them. So, they are categorized based on type such as fire, height, lack of light and etc. There are about 12 of them covering all aspect. There is a good management system as well that keeps track of past events and lessons learned."
>
> Respondent #3

> "First of all, HSE is in our DNA as a Company X employee. We classify hazards based on their types. There is a strong framework for that. Usually, HSE department will classify the operations HSE risk before any operations are done. Additionally, overall, in Company X we have 10 lifesaving rules to classify the risks, and 'stop-card' to stop any unsafe activity."
>
> Respondent #4

> "Our main business is to produce oil and gas in an offshore environment. This is one of the riskiest jobs that are out there for our rig personnel. We are a company who treat out employees like our family and we want them to return

> to their families safely after work. So HSE becomes the most important factor for us. It is embedded into our culture and in everything we do. We have categorized risks and hazards into various categories and sub-categories which are monitored at every level of the organization."
>
> Respondent #5

Other four stated that the HSE is controlled by the management system and managed by qualified personnel.

> "See, the HSE, it is our DNA things. So, the HSE and our facility integrity, this is the main task, and this is our top priority and our vision in this company. Today, if you need to save your people to be high standard and high qualified HSE company. Today, we have a lot of training. We are not keeping anyone who's staying in the office or he's going to the site without mandatory courses of the HSE, at least to be co-op and to be satisfied and to be already trained and how he can handle any abnormal operation. So, our HSE is our priority by training the people, by trying to give different sessions and even today, if I will focus about the site, they have the toolbox. Today, the toolbox, they are trying to give the people the full summary about any operation before any start, any operation. Also, we have the management system. The management system, this is one system for the work authority. They give the authority for the people. You will not give any authority if the people, they are not qualified to that work, to be sure that the operation is done with the same factor."
>
> Respondent #2

> "Company X prioritize the identification, assessment, and management of safety and health hazards. Robust safety management systems, comprehensive training programs, regular inspections, and continuous improvement initiatives are implemented to minimize risks and ensure the well-being of workers and the surrounding environment. Compliance with relevant regulations and industry best practices is considered a fundamental aspect of upstream operations."
>
> Respondent #10

In terms of characterizing HSE, six out of ten respondents mentioned that it is being done via definition method.

> "Based on type, based on whether it's an occupational risk or environmental risk and etc. So, it's based on type, based on evens and situation."
>
> Respondent #4

> "Effective HSE management requires classifying and mitigating risks across all three areas (safety, health and environment). A comprehensive approach to

> HSE categorization helps companies identify and manage specific risks related to health hazards, safety incidents, environmental impacts, regulatory compliance, and emergency situations. This allows for the implementation of targeted measures and controls to mitigate these risks and promote a safe and sustainable work environment."
>
> Respondent #7

> "Categorization plays a crucial role in understanding and mitigating these risks. By effectively categorizing and managing HSE hazards, we can create a safer work environment for employees, minimize their environmental impact, and ensure the long-term sustainability of their operations. This requires a commitment to continuous improvement, collaboration, and innovation, ultimately contributing to a more responsible and successful industry."
>
> Respondent #9

The remaining four respondents indicated that management was responsible for defining HSE.

> "Our priority to SEE the HSE as the people and also the environment and to co-op with our nation and our country commitment to the organization to assure there is not any pollution, there is not any impacting or harming any subsurface or any subsea environment. All of this today, we are committed for it from surfaces, from the environment, from the people, our people, all this group. When you are coming for the HSE, different group, as you are highlighting, group focusing on our employee, group focusing on the environment and also last group is saving our integrity facilities. The last group is saving our integrity facilities."
>
> Respondent #2

> "The categorization of HSE (Health, Safety, and Environment) in Company X is crucial for managing risks and ensuring the well-being of employees, protecting the environment, and complying with regulations. By categorizing HSE into specific areas, such as health, safety, environment, regulatory compliance, and emergency preparedness and response, companies can effectively address the diverse challenges and responsibilities related to HSE."
>
> Respondent #6

The research then examines the HSE assessment process. The procedures and instruments used to evaluate the efficacy of Health, Safety, and Environment (HSE) practices within the organization are referred to as HSE evaluation methods.

According to the feedback, seven out of ten respondents stated that Company X uses the KPI as its evaluation approach.

> "HSE evaluation in the company involves the use of specific parameters and key performance indicators (KPIs) such as Total Recordable Incident Rate (TRIR) and Total Recordable Incident Frequency (TRIF). These metrics allow for the tracking and analysis of incidents on a monthly basis to assess the overall trend of HSE performance. TRIR measures the total number of incidents, while TRIF takes into account the frequency of incidents relative to the number of man-hours worked. These parameters serve as evaluation criteria to assess the effectiveness of the company's HSE initiatives and identify areas for improvement."
>
> Respondent #1

> "We have HSE KPI, and that is measured from a 100% HSE safe standards. Anything less than 100 safe is considered below standard."
>
> Respondent #4

> "Against the KPI that is set. Generally, it is 100% HSE. We do not compromise even 1% on HSE."
>
> Respondent #5

> "Evaluating HSE (Health, Safety, and Environment) performance in Company X is critical for ensuring the well-being of employees, protecting the environment, and maintaining compliance with regulations. Through various evaluation methods, such as audits, inspections, incident reporting, and KPI monitoring, companies can assess their HSE performance and identify areas for improvement."
>
> Respondent #6

Two mentioned the establishment of management system which used to conduct the evaluation of HSE in Company X.

> "See, for the HSE, yes, we have a system, a record system in our organization. We have the management system for the HSE. And also, we have different record, different colouring for the HSE based on how the criticality is and how is the dangerous, if we will say, the HSE. So, it categorizes different from different colouring to at least to get more attention and more focusing about the important and how is the criticality, how the people need to be engaged or to very well known about this HSE. So, this is the standard we have, the system. And we have colouring about each HSE package."
>
> Respondent #2

> "The evaluation of HSE in the upstream oil and gas industry is a multifaceted process that encompasses various technological, managerial, and operational aspects to ensure the well-being of workers, protect the environment, and minimize operational risks."
>
> Respondent #9

Other response said that there are industry metric that being used to evaluate HSE.

> "There is an industry risk matrix that is used to evaluate the risk involved in a task."
>
> Respondent #3

The researcher then inquired about the processes used to assess Company X's HSE practices. Nearly majority of the responses to this question stated that it was accomplished by using KPIs relevant to HSE.

> "In addition to incident rates, other KPIs related to HSE may include the number of near misses, safety observations, safety audits, compliance with safety regulations, and implementation of safety improvement initiatives. These KPIs help evaluate various aspects of HSE performance and highlight areas that require attention or improvement."
>
> Respondent #1

> "There are various stringent ways to evaluate it that practiced in this company. We look at if it is a Near-miss even or has it actually happened. We looks at the industry specific risk matrix against which the risk is assessed. As for incidents we have indicators such as TRIR and TRIF. All of these are evaluated against our 100% HSE KPI."
>
> Respondent#5

> "Procedures used to evaluate HSE practices in upstream oil and gas companies are essential for assessing compliance, identifying areas for improvement, and promoting a strong safety culture. The procedures, which include HSE audits, incident reporting and investigation, performance monitoring, and management system assessments, provide comprehensive evaluations of HSE practices within the organization."
>
> Respondent #6

> "Evaluating Health, Safety, and Environment (HSE) practices in Company X involves assessing the effectiveness of safety and environmental management systems. We understand that Effective HSE practices require robust risk assessment and management processes. Evaluate whether the company

conducts comprehensive risk assessments to identify potential hazards, assess their severity and likelihood, and implement appropriate control measures. Hence, we have adequate indicators such as TRIR and TRIF and all of these are evaluated against our 100% HSE KPI."

Respondent #9

The other respondent stated the procedure which relates to the industry metric.

"Yes, it's based on events like near-miss events, or actual incidents or behavioural incidents. Also, there are criteria to measure the risk related to an event, we have a risk matrix. And finally, lessons learned."

Respondent #4

Subsequently, the research examined the primary obstacles associated with HSE. Five out of ten surveyed responded by saying it has to do with the operational complexity of HSE.

"Managing HSE (Health, Safety, and Environment) in Company X comes with several significant challenges such as operational complexity, high-risk activities, regulatory compliance as well as contractor management. By addressing these challenges head-on, our company can prioritize employee safety, protect the environment, and ensure operational excellence in their HSE practices. This not only safeguards the well-being of employees but also contributes to maintaining the industry's social license to operate and sustainable business success."

Respondent #6

"The nature of upstream oil and gas operations presents inherent HSE risks at every stage. However, with diligent leadership, robust processes, technology adoption, and workforce engagement, upstream oil and gas companies can work to overcome these challenges. By making HSE an integrated business value rather than an afterthought, excellence in HSE performance can be achieved, leading to operational sustainability."

Respondent #7

"Managing HSE in the upstream oil and gas industry comes with a special set of difficult obstacles that call for ongoing attention to detail and preventative action. Even with the tremendous advancements, a number of crucial obstacles still need to be addressed, including changing and dynamic risks, behavioural safety, human factors, data-driven decision making, and ongoing development. Despite these formidable obstacles, sustained dedication, cooperation, and ingenuity can open the door to a future for the upstream oil and gas sector that

> is safer, healthier and more environmentally responsible future for the upstream oil and gas industry."
>
> Respondent #8

Four respondents brought up the problem of the personnel's varied backgrounds.

> "See, the big challenge facing the HSE, today you have different experience from the people. The main challenge, sometimes you will see some people, they try to do any activity or any operation without knowing the operation and also by themselves. Today, I will see some accidents that's happened in the past. The people, they think they can do the operation without supporting, without helping, without getting any orientation on that. And by themselves, they will try to go and to solve that issue. This is the main challenge."
>
> Respondent #2

> "People. We can put all the criteria and procedures all we want, but people need to believe and engrave it in their DNA to follow the safest measure inherently as second nature."
>
> Respondent #3

> "The biggest challenge we are facing with HSE right now is the mentality of the people and their behavior in relation to HSE. Some people are complacent with HSE protocols and then to now follow them which later causes HSE concerns."
>
> Respondent #4

The other challenges mentioned were related to integration of HSE principles into daily operation.

> "One of the biggest challenges in managing HSE is ensuring that individuals integrate HSE principles into their day-to-day behaviours and work practices. While procedures and rules provide a framework for managing safety, it's the personal commitment and actions of individuals that ultimately determine the success of HSE efforts. The challenge lies in promoting a strong safety culture where every employee feels a personal responsibility for their own safety and the safety of their colleagues."
>
> Respondent #1

Regarding the other matter, the investigator asked how Company X is handling the HSE-related issue. The answers to this were not all the same. According to four out of the ten surveyed, it was handled by setting up an appropriate reporting mechanism.

"We have a system in place for managing HSE issues, which includes the reporting of incidents. Incidents are classified based on their severity, ranging from near misses to fatalities and catastrophic events."

Respondent #1

"And we have different morning meetings to our meetings, HSE meetings to make sure like they are aware of how to deal with an HSE situation and how to not go beyond their work permit. Exactly. This is essential."

Respondent #2

"We are trying to make people aware and understand the need of HSE. We are setting strict criteria as well as educating people by meetings, seminars and workshops to make them understand the seriousness of the matter."

Respondent #4

"We have run-downs of tasks as demonstrations, weekly HSE reminders, HSE moments before meetings along with other methods that are related to HSE reporting and lessons learned."

Respondent #5

Three respondents mentioned about the practice of mitigating the risks.

"Our first step is to mitigate the risk. Then we investigate how it happened and gain lesson learned."

Respondent #3

"Company X faces inherent HSE risks that require diligent management and a capable workforce. HR plays a strategic role in cultivating the organizational culture, capabilities, and commitment needed to achieve HSE excellence by providing the critical human infrastructure and support needed for sustainable success."

Respondent #7

The rest of three respondents stated that this practice required a comprehensive approach.

"Effectively managing HSE in Company X is not about finding a singular solution to all problems, but rather adopting a comprehensive, collaborative, and continuous improvement approach. While challenges abound, a well-defined strategy addressing key areas can pave the way for a safer, healthier, and more sustainable future."

Respondent #8

> "Managing all problems related to HSE in the Company X requires a comprehensive approach that encompasses various technological, managerial, and operational aspects. By properly taking these initiatives, the company can work towards ensuring the well-being of its workforce, protecting the environment, and sustaining safe and efficient operations."
>
> Respondent #9

In terms of cost of accident influence on operational performance, seven out of ten respondents stated that it will increase the cost.

> "Having to financially compensate or incur an expense due to an accident will obviously have a negative impact on operational performance as it will increase the cost. Cost can be related to compensation, damaged equipment, penalties, loss of assets, loss of license to operate and many more. For example, if you have a high rate of accident, you will have a penalty on you from the shareholder, concessions holder and the country in which you operate. You might even lose the ability to operate in a country. A company like "Confidential", takes the risk of losing its license to operate if their rate of accident is too high. Not to mention that this will have a negative influence on company reputation that can affect its businesses worldwide."
>
> Respondent #1

> "Definitely in a negative manner. Could be cost of life, cost of facility or monetary loss. All of it effects negatively."
>
> Respondent #5

> "The cost of accidents can have a significant impact on operational performance in several ways such as direct financial costs, downtime and disruption, employee morale and engagement as well as reputation and stakeholder relationships."
>
> Respondent #6

> "The cost of accidents in the upstream oil and gas industry has a significant influence on operational performance. These costs are associated with injuries, work-related ill-health, and various direct and indirect expenses. Therefore, effective accident prevention and safety measures are essential to mitigate the financial and operational repercussions of accidents in this industry."
>
> Respondent #9

Other three stated that it will influence the reputation of the company.

> "Badly. Having an incident will have repercussions. It may cost us monetarily, may cost us in terms of time, reputation, loss of life. There is no positive side

to an accident in my opinion. And obviously affect operational performance negatively."

Respondent #4

"The cost of accidents has a significant influence on operational performance. Financial burdens, loss of productivity, reduced employee morale, damage to company reputation, are all consequences of accidents. By prioritizing and investing in proactive safety measures, companies can mitigate the costs of accidents, protect operational performance, and enhance overall business sustainability."

Respondent #10

From the aspect of operational down time influence on operational performance, most of the respondents mentioned that it will have a negative impact.

"Operational down time directly affects our production capacity. Every hour we're not operational translates to lost barrels of oil or cubic meters of gas. These disruptions can result in us missing production targets, which in turn affects our revenue projections."

Respondent #2

"Negatively. As long as this time is lost and nothing is gained out of it, it will have a negative influence on operational performance."

Respondent #3

"That's loss of time. Unless it's an unplanned shut down, we will fall behind in our delivery and that will affect negatively."

Respondent 4

"That's loss time that could have been used for profitable outcome. So, it effects negatively."

Respondent #5

"Operational downtime undermines operational performance by disrupting productivity, delaying projects, reducing output, and incurring financial losses."

Respondent #10

One respondent looked at this issue from both points of view as well.

> "Operational downtime can have both negative and positive impacts on operational performance. On the negative side, downtime reduces productivity and efficiency, resulting in a decrease in operational performance. When operations are halted or disrupted, it can lead to delays, missed deadlines, and lower output, ultimately affecting the company's overall performance. However, on the positive side, downtime can be utilized for necessary maintenance and optimization activities. It provides an opportunity to address issues, improve equipment or processes, and enhance performance. By using downtime effectively, companies can emerge from the period with improved operational activity, which can have a positive impact on operational performance. Therefore, the influence of operational downtime on operational performance is not always clear-cut and can vary depending on how it is managed and utilized."
>
> Respondent #1

The last concern about the influence of HSE is morale among employees. Every responder stated that it will affect operational performance in a way that is either favourable or negative.

> "A company that has a high rate of incident and accident will have poor operational performance because employees will be concerned about their safety and not be attracted to the company. Employee will choose to work for a safer company and that way you will lose talent that might result in less employees to perform the task and hence poor operational performance. That's particularly the case for HSE but it can be the case for general moral that it can be a result of other influence like HRM practices and so on. So negative morale will have a negative impact on operational performance."
>
> Respondent #1

> "Definitely. High morale directly correlates with high productivity. When our employees feel valued, respected, and motivated, they are more dedicated to their tasks, leading to increased efficiency and fewer errors. Conversely, low morale can lead to apathy and reduced attention to detail."
>
> Respondent #2

> "Higher employee morale fuels operational performance by boosting productivity, engagement, and reducing turnover."
>
> Respondent #6

> "Employee morale has a significant influence on operational performance in the oil and gas industry. Employees with high morale tend to be more engaged, motivated, productive, and willing to go the extra mile to help operations succeed. Their enthusiasm builds an energetic, collaborative culture that lifts team performance. Low morale caused by factors like work overload, lack of

> recognition or poor leadership manifests through higher absenteeism, errors, safety risks, conflicts, and distractions from efficient operations. Maintaining positive morale is critical for extracting discretionary effort from employees, enabling smooth teamwork, and fostering the care and pride in their work needed for operational excellence. High employee morale pays invaluable dividends for operational performance in oil and gas companies."
>
> Respondent #7

> "Employee morale significantly impacts operational performance as high morale leads to increased motivation, engagement, and productivity, while low morale can result in decreased motivation, disengagement, and reduced productivity."
>
> Respondent #10

In the essence, there is a clear symbiotic relationship between HSE excellence and optimized operations in oil and gas. Effective health and safety practices protect the workforce executing complex processes from injuries or hazards, enhancing morale, skills and reliability. Investing to mitigate risks through training, procedures, protective equipment and advanced technologies like automation pays dividends through less downtime, greater efficiency, and reduced exposure of humans to dangerous conditions. Keeping operations compliant with environmental regulations and proactively lowering ecological impacts avoids penalties, legal actions or reputational damage that could disrupt projects.

Strong HSE culture and performance provides a foundation where both people and assets can thrive. Workforces feel valued through a commitment to their wellbeing. Asset integrity and productivity are maximized by proactively addressing risks. High-performing organizations recognize HSE capabilities are not just a compliance necessity but a strategic driver of improved process excellence, cost management and reliable outcomes. When HSE suffers, so does operational performance, making it a competitive imperative. The Atlas.ti output for RQ as shown in Figure 4-4

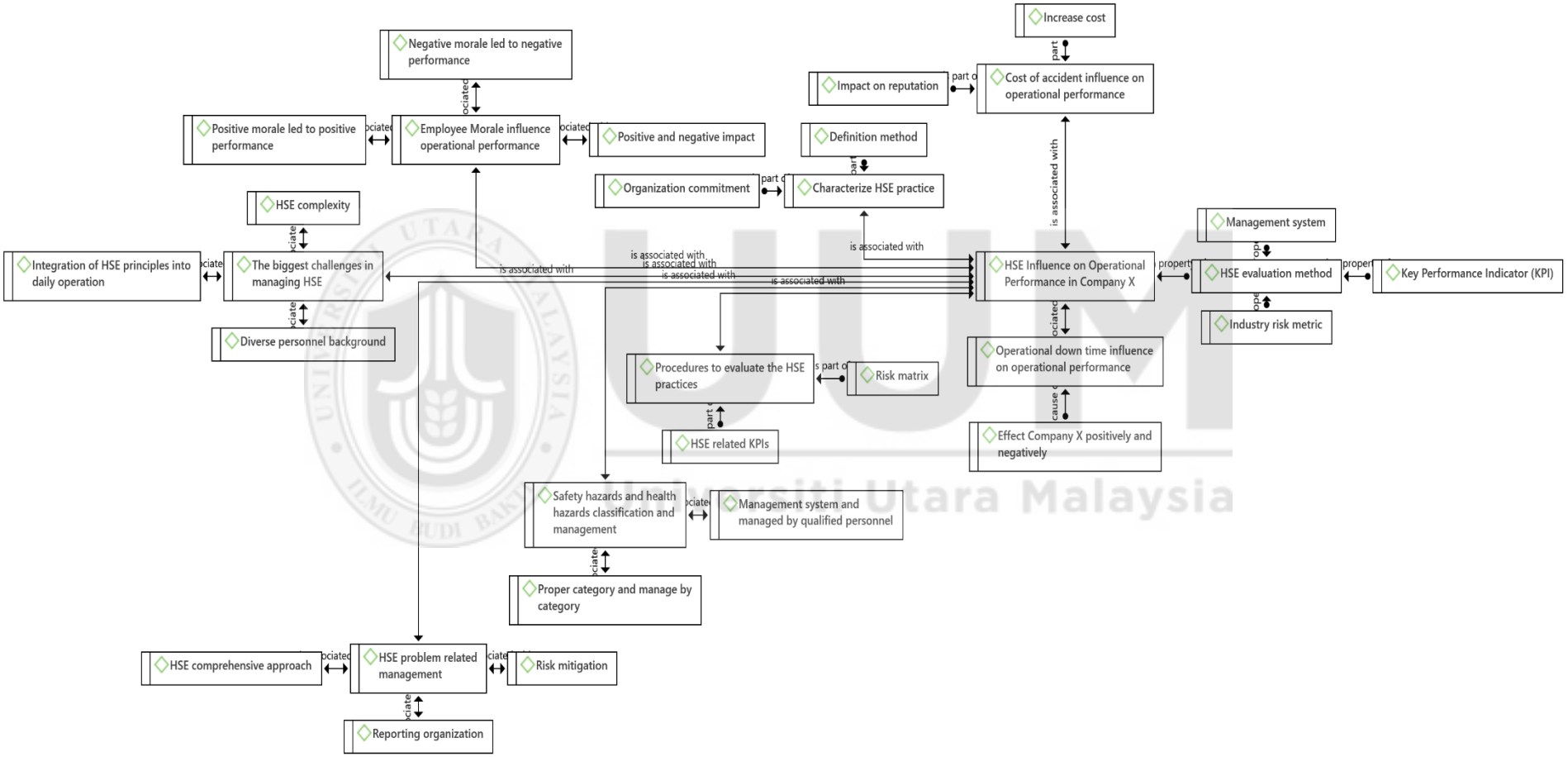

Figure 4-4:
Atlas.ti Output RQ3: The influence of HSE on the operational performance of Company X

4.4.4 Theme No. 4: Technology Adoption effects on operational performance of Company X

The research's Research Question 4, which asks how technology adoption affects the company's operational performance is directly related to Theme No. 4 as stated in Chapter 1. The research results are relevant to the resource objective to explore the technology adoption influence on operational performance, notably in Company X. Relevant information gathered via observation, document reviews, and interview sessions was taken into account as evidence and input for data analysis. A distinct breakdown of the interviewees' responses to this research issue is shown in Table 4-6, based on the themes and their main claims:

Table 4-6:
Significant Statements and Interpretative Meaning for Technology Adoption Effect

Significant Statements	**Interpretative Meaning**
Technology adoption definition Understanding of reason for change ▪ Change can be daunting. We prioritize transparent communication, ensuring that all employees understand the reasons behind the adoption and the benefits it brings (Respondent #1) ▪ Think outside the box by implementing different approach to approach your activity, to achieve your objective (Respondent #2)	Change mindset
Providing platform ▪ Company X has created platform that looks into implementing various technological advancements (Respondent #3) ▪ Not only in operations but also in various aspects like work from home, digitization and visualization like 'Thamama Centre" and many more (Respondent #4)	Platform initiation
R&D related function ▪ Technology adoption in the company is closely related to R&D and that is what we do (Respondent #5)	R&D initiative
Integration of latest technology ▪ Latest technology adoption in Company X refers to the continuous integration and utilization of	Continuous technology advancement

cutting-edge technological advancements (Respondent #6)

- Latest technology adoption in our company entails the integration of advanced digital innovations (Respondent #7)
- Technology adoption in Company X include the ongoing integration and implementation of emerging technologies (Respondent #8)
- The technology adoption in Company X involves integrating advanced digital tools (Respondent #9)
- Technology adoption in this company can be associated with the integration and utilization of cutting-edge technologies (Respondent #10)

Technology adoption influence on operational performance

Enhance operational efficiency

- It enhances our operational efficiency, strengthens our safety record, and signals to stakeholders that we are future ready (Respondent #1) — Enhance efficiency
- Implementation of good technology that saves time, cost, improves quality, ensures delivery and flexibility (Respondent #3)
- So positive adoption of technology that adds benefit to our production will definitely affect operational performance positively (Respondent #5)
- By optimizing processes, increasing automation, and improving data-driven decision-making, technology adoption in this company, we can unlock significant improvements in operational performance (Respondent #7)
- The adoption of digital technologies in Company X, such as data analytics, machine learning, and connectivity, has the potential to significantly improve operational performance (Respondent #8)
- The adoption of technology in this company has significantly enhance operational performance by improving efficiency, reducing costs, and enabling real-time data analysis (Respondent #10)

Able to access new reserve

- By adopting advanced drilling and extraction technologies, we've been able to access reserves that were previously out of reach (Respondent #2) — New reserve exploration

▪ Technology adoption in Company X has a profound impact on operational performance. By integrating and leveraging advanced technologies, we can enhance exploration accuracy, optimize drilling and production processes (Respondent #6) ▪ Company X's technology adoption positively impacts operational performance by enabling more accurate reservoir characterization, efficient drilling and production processes (Respondent #9)	
Depends on technology adopted	
▪ Well, it depends on the technology to be honest. Many things are associated with it. It can be positive or negative (Respondent #4)	Positive and negative impact
Overcoming psychological factor that acts as barrier to technology adoption	
Technology valuation is priority	
▪ We prioritize technologies that offer the most value and ensure that each adoption phase is followed by a period of consolidation and mastery (Respondent #1)	Prioritize technological valuation
Shareholder acknowledgement	
▪ Today we have, in our company, we have what is called roadmap technology. We are trying to present our challenge every quarter to our shareholders by our challenge and what's the, how they can help us with this implement technology (Respondent #2) ▪ . However, we have industry leading shareholders who are far more technologically advanced than we are (Respondent #3) ▪ ….. it is important for organizations to understand and address key facilitators and barriers, such as corporate decision makers acting as both facilitators and barriers, attitudes towards trust and risk (Respondent #10)	Management support
Initiate technology acceptance	
▪ So, I think people's mind set is also change due as more and more technology is being implemented and we are seeing their return in short and long term (Respondent #4) ▪ Yes, that's true. But things are changing now, and we are moving into Industry 4.0 which is more technologically focused then anything we have ever seen (Respondent #5) ▪ By emphasizing the potential benefits of technology adoption, creating a positive environment for experimentation, and addressing	Staff technology acceptance

any concerns or resistance, companies can help employees embrace and adopt new technologies with confidence (Respondent #6) ▪ O&G industries win over hearts (trust) and minds (benefits) to break down tech adoption fears (Respondent #7) ▪ Psychological factors such as personality traits, attitudes, and motivations can influence the willingness to adopt technology (Respondent #8) ▪ Oil and gas industries overcome psychological barriers to technology adoption by implementing effective change management strategies (Respondent #9)	
Automation and robotic implementation influence on operational performance	
Industry leader in innovation	
▪ Embracing automation and robotics not only boosts our operational efficiency but also solidifies our reputation as industry innovators (Respondent #1)	Innovator leader
Operational efficiency	
▪ Automation and robotics have significantly streamlined our operations (Respondent #2) ▪ This allows operations to run 24/7 in high risk environment (Respondent #3) ▪ Heavily and positively. A lot of our work is in dangerous environment and being able to do those tasks through robotics, 24/7 (Respondent #4) ▪ Yes, the implementation of Automation and Robotic technologies has a significant impact on the operational performance of upstream oil and gas companies by improving efficiency (Respondent #6) ▪ Automation and robotics in a company can significantly boost operational performance by enhancing efficiency (Respondent #7) ▪ Yes, the implementation of automation and robotics in Company X significantly affects operational performance by improving efficiency (Respondent #8) ▪ These benefits include increased safety, reduced human error, efficiency, and the ability to conduct accurate and efficient operations (Respondent #9)	Streamline the operation
Dangerous work environment	
▪ Heavily and positively. A lot of our work is in dangerous environment and being able to do	Risk mitigation

those tasks through robotics, 24/7 (Respondent #4) ▪ This allows us to operate in conditions that may not be suitable for humans to operate in (Respondent #5) ▪ The implementation of automation and robotics in Company X have a positive impact on operational performance by improving safety, reducing operational costs, increasing productivity, and enabling tasks to be performed in hazardous or challenging environments (Respondent #10)	
IoT influence on operational performance Cybersecurity protection ▪ We've invested heavily in cybersecurity measures tailored to protect IoT infrastructures (Respondent #1)	Cybersecurity protection
Decision making based on real-time data ▪ IoT devices, spread across our operations, provide real-time data on everything from equipment health to environmental conditions (Respondent #2)	Real-time data provider
Decision making based on real-time data ▪ With IoT, we can bring all information to one station and facilitate accurate decision making in a holistic manner with diverse data, amongst many other things (Respondent #3) ▪ And you know how heavily it is used for high level decision making (Respondent #4) ▪ Having all your information collated on a single platform enables better decision making (Respondent #5) ▪ IoT (Internet of Things) technology positively impacts the operational performance of Company X by enabling real-time monitoring, predictive maintenance, data-driven decision-making (Respondent #6) ▪ IoT in Company X unlocks real-time data-driven insights, optimizing asset performance, maintenance, and decision-making (Respondent #7) ▪ The implementation of IoT (Internet of Things) in this company has enhances operational performance by enabling real-time monitoring, predictive maintenance, remote asset management, and data-driven decision-making (Respondent #9)	Real-time data provider

Operational efficiency ▪ The adoption of IoT in Company X significantly affects operational performance by enhancing efficiency (Respondent #8) ▪ The Internet of Things (IoT) can be used to manage drilling and extraction processes more effectively (Respondent #10)	Enhance efficiency
Artificial Intelligent (AI) influence on operational performance Complement human capability ▪ While AI provides tools and insights, the human element remains invaluable (Respondent #1) ▪ This will allow complete automation, however, under the surveillance of human professional (Respondent #3) ▪ It gives us the power to complement human intelligence. That's a big thing (Respondent #4) ▪ Again, positively. However, implementation of AI needs to be guided by Human Intelligence (Respondent #5)	Enhance human capability
Provide lean management function ▪ Today, we have in one of our fields, we call it like a lean operation (Respondent #2)	Lean management
Provide operational efficiency ▪ Yes, the implementation of Artificial Intelligence (AI) significantly boosts operational performance for Company X by enhancing data analysis (Respondent #6) ▪ AI in Company X can revolutionize operational performance by analysing vast data, predicting problems, and optimizing decisions (Respondent #7)	Operation efficiency
Provide operational efficiency ▪ Yes, the adoption of Artificial Intelligence (AI) in a company significantly affects operational performance by enabling companies to reduce costs, increase operational efficiency (Respondent #8) ▪ Yes, the integration of Artificial Intelligence (AI) in a company such as ours enhances operational performance by enabling advanced data analysis (Respondent #9) ▪ Artificial intelligence (AI) can significantly improve a company's operational performance through cost savings, increased productivity, optimized production processes, predictive maintenance, enhanced decision-making through data analytics (Respondent #10)	

The final research question, RQ4 was related to technology adoption influence on the company's operational performance. Upstream oil and gas industries must embrace technology because it may increase efficiency, reduce costs, improve safety, and foster environmental sustainability. Advances in automation, robots, data analytics, and other technology allow businesses to reduce their environmental impact, enhance safety measures, and optimize their operations. Upstream oil and gas companies may maintain their competitiveness, reduce risks, and help ensure a more sustainable energy future by using technology. In light of this, the interview began with the researcher asking the respondents to clarify what they understood by the term "technology adoption."

The responses gathered were varied. Five out of ten stated that it is related to continuous technology advancement.

> "Latest technology adoption in Company X refers to the continuous integration and utilization of cutting-edge technological advancements, such as artificial intelligence, machine learning, advanced analytics, Internet of Things (IoT), digitalization, and automation, among others. This enable the company to stay at the forefront of innovation, increase operational efficiency, reduce costs, minimize risks, and capitalize on emerging opportunities in the ever-evolving energy landscape."
>
> Respondent #6

> "Latest technology adoption in our company entails the integration of advanced digital innovations like sensors, automation, drones, artificial intelligence, and control systems to enable enhanced operational visibility, optimized production, rapid response capabilities, data-driven decision making, and integrated operations across the exploration, drilling, and extraction value chain."
>
> Respondent #7

> "Technology adoption in Company X include the ongoing integration and implementation of emerging technologies across exploration, development, production, and transportation phases, aimed at optimizing efficiency, safety, sustainability, and cost-effectiveness, while navigating challenges like data management, integration complexity, and regulatory approvals."
>
> Respondent #8

> "Technology adoption in this company can be associated with the integration and utilization of cutting-edge technologies, such as advanced data analytics, artificial intelligence, automation, and remote sensing, to optimize exploration, production, safety, and environmental performance."
>
> Respondent #10

Two cited it required the change in the mindset.

> "Change can be daunting. We prioritize transparent communication, ensuring that all employees understand the reasons behind the adoption and the benefits it brings. By involving them in the process, seeking feedback, and addressing concerns, we foster a culture that is open and adaptive to technological advancements."
>
> Respondent #1

> "See, our company today, we have something, let's call it the project light. Today, the project light, one of the main tools, it's saving the cost per barrel. If I will compare last year in our company, today, the project light, what's mean by project light? Implement different technology. Think outside the box by implementing different approach to approach your activity, to achieve your objective. All of this, it will affect positively by achieving and to save your cost. Today, we try to reduce our cost and cost optimization. With normal activity, without thinking, with approach, with different technology, with something that can help you, then you cannot achieve, and you cannot save that one. So, the technology, in one important factor, it can help, it will save your company and to reduce your cost."
>
> Respondent #2

Two mentioned that the technology adoption referred to the initiation of platform to enhance the company performance.

> "Company X has created platform that looks into implementing various technological advancements primarily to save cost and thus improve operational performance."
>
> Respondent #3

> "Well, I think in recent times we have started to adopt different technologies quite heavily. Not only in operations but also in various aspects like work from home, digitization and visualization like 'Thamama Centre" and many more. It is quite evident now that we are encouraging technology adoption and motivating employees to bring in new technology and rewarding them for it. For example, we have the 'Innovation Forum and Award'."
>
> Respondent #4

The other response stated that it relates to the Research and Development (R&D) initiative.

> "Technology adoption in the company is closely related to R&D and that is what we do. I feel that we are quite on par with adoption of technology in the company. However, we still have long way to go."
>
> Respondent #5

Next, the study uncovered the technology adoption influence on the Company X's operational performance. Six out of ten participants said that it has enhance the efficiency of the company.

> "Being at the forefront of technology adoption gives us a distinct competitive advantage. It enhances our operational efficiency, strengthens our safety record, and signals to stakeholders that we are future ready. In a rapidly evolving industry, this positions us as leaders and innovators."
>
> Respondent #1

> "Implementation of good technology that saves time, cost, improves quality, ensures delivery and flexibility will obviously have a positive impact on operational performance. This does not necessarily have to be immediate but can also be in the long run."
>
> Respondent #3

> "Our team conducts research in every domain possible that will assist us in optimizing our output which is hydrocarbon production. But there are various factors that are associated with it. We need to see that the overall output is more profitable than the investment. Basically, it will need to better the existing circumstances and then only it can be implemented completely. So positive adoption of technology that adds benefit to our production will definitely affect operational performance positively."
>
> Respondent #5

> "By optimizing processes, increasing automation, and improving data-driven decision-making, technology adoption in this company, we can unlock significant improvements in operational performance, boosting efficiency, safety, and cost-effectiveness. However, successful implementation requires overcoming challenges like data management, integration complexity, and regulatory hurdles."
>
> Respondent #7

Three cited that it has provide the opportunity to access the new reserved.

> "By adopting advanced drilling and extraction technologies, we've been able to access reserves that were previously out of reach. This not only expands our operational capacity but also ensures that we extract resources more efficiently, leading to higher yields."
>
> Respondent #2

> "Technology adoption in Company X has a profound impact on operational performance. By integrating and leveraging advanced technologies, we can enhance exploration accuracy, optimize drilling and production processes, improve safety practices, streamline workflows, enhance data analysis and decision-making, and increase overall operational efficiency. This leads to improved productivity, reduced costs, minimized risks, enhanced environmental stewardship, and ultimately, maximized operational performance and profitability for the company."
>
> Respondent #6

The other response stated that the influence on operational performance is dependent on the technology adopted.

> "Well, it depends on the technology to be honest. Many things are associated with it. It can be positive or negative. Imagine you invest heavily in a technology that does not give you the optimization that you initially though, so it's a bad invest with low return, that's a cost incurred, and time wasted right? So that's a negative impact on operational performance. And the same thing can be other way around. So, what is important is what technology is being adopted and how much research have we done behind its success."
>
> Respondent #4

Regarding the overcoming psychological factor that acts as barrier to technology adoption, six out of ten respondents mentioned that it depends on staff acceptance.

> "Well, that's an old industry saying right. But times are changing now. We are in Industrial Revolution 4.0, which is all about technology adoption, Automation, AI, Machine Learning and other advanced technology. So, I think people's mind set is also change due as more and more technology is being implemented and we are seeing their return in short and long term. So that's getting the ball rolling."
>
> Respondent #4

"O&G industries win over hearts (trust) and minds (benefits) to break down tech adoption fears. By actively addressing these psychological factors, O&G companies can create a supportive and collaborative environment that encourages positive attitudes towards technology, ultimately leading to successful adoption and improved operational performance."

Respondent #7

"Psychological factors such as personality traits, attitudes, and motivations can influence the willingness to adopt technology, and external factors like competitiveness, cybersecurity, ease of doing business, and political stability/non-violence can also impact technology adoption rates at a country level, but understanding and addressing these factors are crucial for organizations and policymakers to promote technology adoption in the oil and gas industry."

Respondent #8

"Oil and gas industries overcome psychological barriers to technology adoption by implementing effective change management strategies that involve clear communication, employee engagement, comprehensive training, and fostering a culture of innovation and adaptability."

Respondent #9

Three stated that overcoming the barriers required the support of the management.

"See, today we are working with our shareholders who's implementing different approach, different technology worldwide. Today we have, in our company, we have what is called roadmap technology. We are trying to present our challenge every quarter to our shareholders by our challenge and what's the, how they can help us with this implement technology. And to be honest, we implement different technology from support from our shareholders' worldwide technologies. And that one, when we presented to the management, it was appreciated because it will save a lot of the cost. And also, it will be achieving, and you accelerate your objective and improve your performance and achieving your business plan ahead of time."

Respondent #2

"True. Oil and Gas business is generally slow in terms of technology adoption. However, we have industry leading shareholders who are far more technologically advanced than we are. This is to our advantage as we get to assess what technologies they use and how we can use it to solve our problems."

Respondent #3

Other response gathered stated that evaluation of the technology needs to be done first in order to overcome the barrier of technology adoption for Company X.

> "We're mindful of this. Technology adoption is paced to ensure that the team has ample time to adapt and isn't overwhelmed. We prioritize technologies that offer the most value and ensure that each adoption phase is followed by a period of consolidation and mastery."
>
> Respondent #1

On the issue of automation and robotic implementation influence on operational performance, six out of ten respondents mentioned that it has managed to streamline the operation that increased the efficiency of the company.

> "Automation and robotics have significantly streamlined our operations. For instance, automated drilling systems maintain a consistent pace and precision, resulting in faster well completions and a reduction in non-productive time."
>
> Respondent #2

> "This allows operations to run 24/7 in high risk environment that sometimes saves time as well as HSE concerns thus having a positive impact on operational performance."
>
> Respondent #3

> "Yes, the implementation of automation and robotic technologies has a significant impact on the operational performance of upstream oil and gas companies by improving efficiency, accuracy, safety, and reducing costs across various processes and activities."
>
> Respondent #6

> "Automation and robotics in a company can significantly boost operational performance by enhancing efficiency, safety, and cost-effectiveness, but careful planning and addressing psychological barriers are crucial for success."
>
> Respondent #7

Three respondents stated that it assisted in performing the dangerous tasks.

> "Heavily and positively. A lot of our work is in dangerous environment and being able to do those tasks through robotics, 24/7, in any environment, while keeping our employees safe is a win for us."
>
> Respondent #4

> "Positively I would say. This allows us to operate in conditions that may not be suitable for humans to operate in. Thus have a positive impact in our performance."
>
> Respondent #5

The other response stated that automation and robotic has increased the reputation of the company.

> "Embracing automation and robotics not only boosts our operational efficiency but also solidifies our reputation as industry innovators. In a competitive market, being at the forefront of technological adoption gives us an edge, ensuring we deliver value to stakeholders while staying ahead of industry challenges."
>
> Respondent #1

Regarding the other matter, the participants were questioned regarding the influence of IoT on operational performance. Seven out of ten surveyed claimed that the capacity to use real-time data has improved the decision-making process.

> "IoT devices, spread across our operations, provide real-time data on everything from equipment health to environmental conditions. This instantaneous feedback allows us to respond to potential issues immediately, ensuring optimal operations and minimizing downtimes."
>
> Respondent #2

> "With IoT, we can bring all information to one station and facilitate accurate decision making in a holistic manner with diverse data, amongst many other things. This improves our accuracy of operations leading to better quality of operations as well as saves time and money. This improving operational performance."
>
> Respondent #3

> "An example of IoT is the "Confidential Visual Centre". And you know how heavily it is used for high level decision making. IoT helps us being all the data together in one display and allow accurate decision making, be it small or high level. This improves our capability to optimize operations amongst many things. So definitely IoT has a positive effect on operational performance."
>
> Respondent #4

> "Positively as well. Having all your information collated on a single platform enables better decision making."

Respondent #5

Two said that it has increased the efficiency of the company.

> "The adoption of IoT in Company X significantly affects operational performance by enhancing efficiency, minimizing downtime, improving safety, reducing costs, and providing real-time insights into equipment performance and maintenance."
>
> Respondent #8

> "The Internet of Things (IoT) can be used to manage drilling and extraction processes more effectively, cut down on idle time, optimize supply chain, fleet, and pipeline operations, streamline distribution and processing, and increase overall operational effectiveness. All of these benefits can result in a significant improvement in operational performance."
>
> Respondent #10

The other respondent mentioned about the cybersecurity protection.

> "We've invested heavily in cybersecurity measures tailored to protect IoT infrastructures. Regular audits, encrypted communication, and advanced threat detection systems ensure that our operational data remains secure and uncompromised."
>
> Respondent #1

The last topic dealt with how artificial intelligence (AI) affects the operational performance Regarding this, a range of responses has been received. Five out of ten cited the AI has increased the efficiency of the company.

> "AI in Company X can revolutionize operational performance by analysing vast data, predicting problems, and optimizing decisions, potentially leading to increased production, reduced costs, and improved safety, but ethical considerations and data quality challenges must be addressed."
>
> Respondent #7

> "Yes, the adoption of Artificial Intelligence (AI) in a company significantly affects operational performance by enabling companies to reduce costs, increase operational efficiency, and double down on safety and compliance, while also providing real-time insights into equipment performance and maintenance."
>
> Respondent #8

> "Yes, the integration of Artificial Intelligence (AI) in a company such as ours enhances operational performance by enabling advanced data analysis, predictive modelling, optimized asset management, and automation of complex tasks, leading to increased efficiency, cost savings, and improved decision-making."
>
> Respondent #9

Four stated that it has increased the capability of staffs.

> "A great question. While AI provides tools and insights, the human element remains invaluable. We view AI as a complementary tool, enhancing our team's capabilities. All AI-driven decisions are validated by our experts, ensuring a balance between technological advancements and human expertise."
>
> Respondent #1

> "This will allow complete automation, however, under the surveillance of human professional. Having a positive impact on operational performance."
>
> Respondent #3

> "Well, its Artificial Intelligence plays a very important role when it comes to technology adoption process. It gives us the power to compliment human intelligence. That's a big thing. It can allow us to see warning signs that we could have missed. Bring into our attention areas of optimization that we might have overlooked. So yes, it has a positive impact on operational performance. Overall, I would say that we need a variety of technology that complement each other to be implemented simultaneously to have a stronger impact in an era that is promoting an industrial revolution."
>
> Respondent #4

The other respondent claimed that AI gave their business lean operational management.

> "See, the artificial intelligence, when like, see, the technology, today, as a petroleum, I am handling petroleum, I am thinking different technology and smart way for the downhaul for our wells. Okay, and also smart technology in the surface, like automated technology by translating the data directly as digitalization. Today, we have in one of our fields, we call it like a lean operation. That one, it reduces the manpower outside and this, it will improve and save your HSE and to reduce the manpower outside and it will be the people, they will try to work it from the real-time centre in the main base and this big achievement for our company."
>
> Respondent #2

In conclusion, technology adoption is indispensable for driving operational performance in upstream oil and gas companies. The digital transformation of the sector facilitates data-driven decision-making and enables remote monitoring of operations. Ultimately, technology adoption leads to cost reduction, improved profitability, and a competitive advantage for upstream oil and gas companies in today's dynamic market landscape. By embracing digital transformation initiatives, companies can unlock new efficiencies, enhance safety measures, reduce costs, and promote sustainability within their operations. To navigate the challenges associated with technology adoption successfully, organizations must prioritize strategic planning, investment in workforce development, and a culture of innovation to realize the full potential of digital technologies in shaping the future of the upstream oil and gas industry. Figure 4-5 Showcased the Atlas.ti output relating to RQ4.

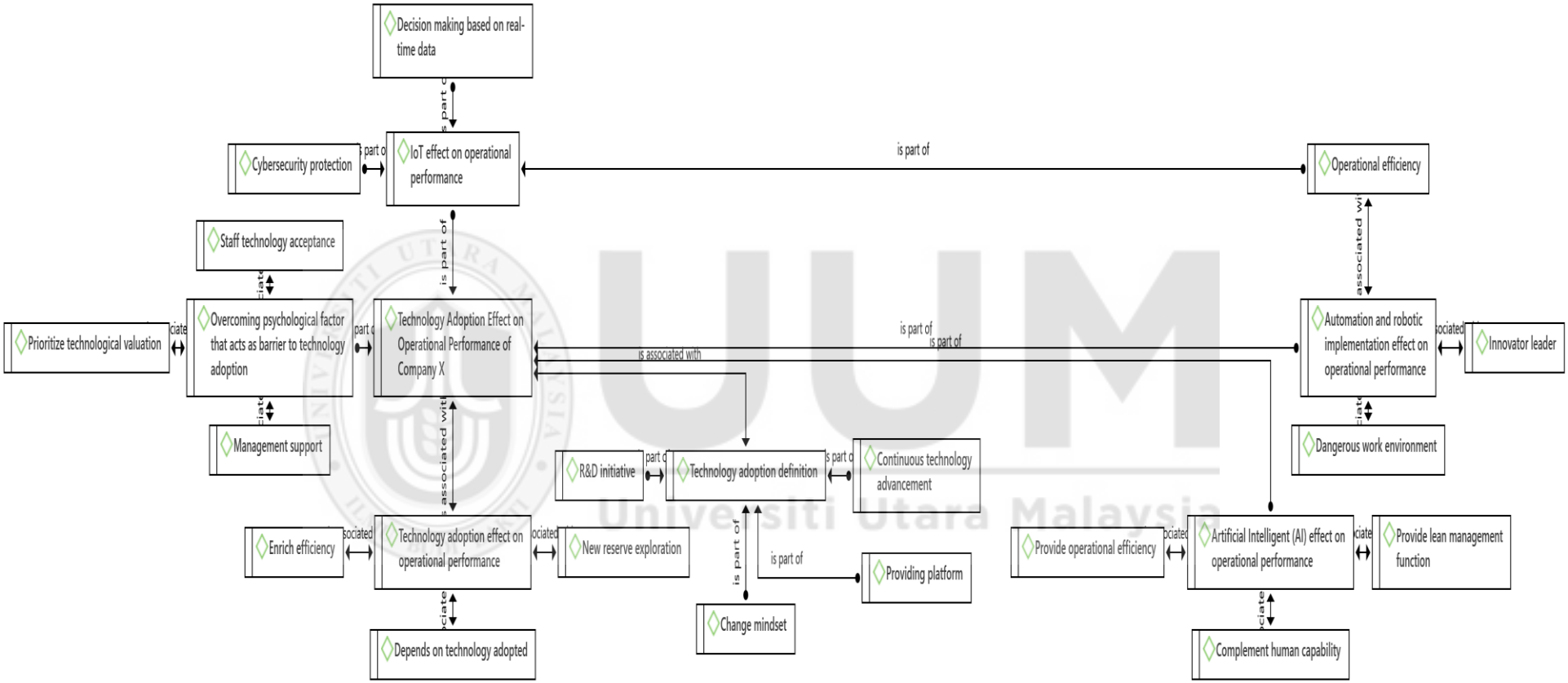

Figure 4-5:
Atlas.ti Output RQ4: The influence of Technology Adoption on operational performance in Company X

4.5 Chapter summary

This chapter included an in-depth discussion of the outcomes and data analysis carried out using the raw data from the previous phase through interview sessions, document reviews, and research observations. To analyse qualitative data, transcripts of the raw data were produced and fed into the Atlas.ti software system. An extensive display of the Atlas.ti output was also included in this chapter.

A full description and suggestions for improving the processes are provided in the next chapter, Chapter 5, which also offers guidance on how to address the issue raised.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5. Introduction

This chapter concludes our exploration of Operational Performance Management Best Practices in Oil and Gas Upstream Organization by summarizing the key findings and insights presented throughout the previous chapters. The researcher will revisit the research objectives and delve into the results obtained through the interviews, observation and document reviews.

The chapter then transitions into actionable steps by outlining recommendations based on the conclusions drawn. These recommendations are intended to provide opportunities to establish a new perspective in the review of operating performance for upstream oil and gas company. The researcher also acknowledges the limitations of this work and suggest avenues for further exploration to advance the understanding of operational performance in oil and gas industry. Hence, this chapter serves to bring the work to a close by solidifying the significance of the research and offering practical takeaways for future endeavours.

5.1 Implication of the Study

Examining the study's findings reveals Company X's operational performance methods. Important components include the company's approaches to human resources (HR), health, safety, and the environment (HSE) and technology adoption. During the interview, observation, and document review sessions, these components were thoroughly investigated. Accordingly, the findings of this study can provide

important implications for theoretical (academic implication), methodological, and practical (managerial implication).

5.1.1 Theoretical Implications

Theoretical implications of operational performance management extend to the broader contributions that findings on operational performance make to existing theories and literature within the field of operations management and related disciplines (Deepu & Ravi, 2023). This section aims to deepen the understanding of theoretical models, concepts, and frameworks that are instrumental in the study of operational performance. By analysing these implications, the research enhanced knowledge about the factors that influence operational performance and their impacts on overall organizational effectiveness. Furthermore, this section highlights gaps and limitations in the current literature that the study addresses, providing a foundation for suggesting potential avenues for future research and further theoretical advancements in the field.

For upstream oil and gas enterprises like Company X, operational performance is a critical area of focus, especially in the context of fluctuating oil prices and the pressing need for operational improvements. Operational performance has emerged as a cornerstone for these enterprises, as it emphasizes identifying the most efficient and effective ways to conduct operations, thereby maximizing productivity and minimizing costs (Abor & Karimu, 2023). Achieving superior operational performance enables organizations to optimize their production processes, improve efficiency, and ultimately enhance their overall effectiveness (Shekaili, Balushi, Kumar, & Marin, 2023).

The findings of this study underscore the importance of operational performance for Company X in maximizing its exploration, production, and extraction activities. Operational performance not only contributes to enhanced efficiency, safety, and profitability but also aligns with the unique challenges faced by upstream oil and gas companies. These findings echo key theoretical approaches and frameworks associated with operational performance, focusing on principles and methodologies tailored to the complexities of the industry.

This theoretical foundation sets the stage for a detailed exploration of four key theories—Resource-Based View (RBV), Human Capital Theory, Risk Management Theory, and Socio-Technical Systems Theory—each linked to a specific theme of this research. These theories provide comprehensive insights into understanding and improving operational performance within the context of Company X's unique challenges and opportunities.

Theory 1: Resource-Based View (RBV)

The Resource-Based View (RBV) is a strategic management framework that emphasizes the role of a firm's internal resources in achieving sustained competitive advantage and superior performance. Proposed by Wernerfelt (1984) and refined by Barney (1991), RBV identifies resources as strategic assets when they possess the VRIN characteristics: valuable, rare, inimitable, and non-substitutable. Resources can be tangible (e.g., financial capital, infrastructure) or intangible (e.g., knowledge, culture, capabilities).

RBV also integrates the concept of dynamic capabilities, which underscores a firm's ability to reconfigure and renew resources to address changing environments (Helfat & Peteraf, 2003). For industries like oil and gas, characterized by high volatility and

operational complexities, the RBV offers a robust lens to analyse how unique resources can lead to sustained success. Recent literature stresses the alignment of resources with strategic objectives, particularly in resource-intensive and risk-prone sectors such as upstream oil and gas (Ngugi & Goosen, 2023).

In the context of Operational Performance Management at Company X, the RBV theory explains how leveraging unique resources contributes to operational performance:

- Key Performance Indicators (KPIs): RBV highlights the importance of effectively using internal resources to design KPIs that measure and track performance. Company X's KPIs reflect its focus on optimizing resource utilization, ensuring that financial, human, and technological resources are aligned with operational goals.
- Cost Optimization: RBV underscores the strategic allocation of resources like CAPEX and OPEX. Company X's emphasis on achieving a balance between long-term investments (CAPEX) and operational efficiency (OPEX) aligns with RBV's focus on maximizing resource utility to sustain performance under fluctuating market conditions.
- Quality Management and Compliance: Company X's approach to maintaining operational performance through stringent quality standards and compliance practices demonstrates the utilization of intangible resources like knowledge and organizational culture. This is critical in ensuring safety, efficiency, and regulatory adherence, which are essential in the oil and gas sector.

By applying RBV, Company X can prioritize the management of its unique resources (e.g., skilled workforce, advanced technology, proprietary processes) to maintain operational efficiency, minimize costs, and achieve long-term competitiveness.

Actionable Steps Based on RBV for Operational Performance Management

1- Identify Core Resources: Conduct a resource audit to identify the VRIN resources within Company X, including proprietary technologies, skilled personnel, and financial resources.

2- Enhance Dynamic Capabilities: Develop strategies to reconfigure and adapt resources in response to external changes, such as market fluctuations, technological advancements, or regulatory updates. This includes cross-training employees and investing in flexible infrastructure.

3- Optimize Resource Allocation: Use RBV principles to allocate resources strategically, ensuring that CAPEX investments lead to long-term gains while maintaining OPEX efficiencies for short-term operations.

4- Integrate KPIs with Resource Management: Design KPIs to monitor the effectiveness of resource utilization, ensuring alignment with strategic objectives. For example, track resource productivity metrics and assess cost-to-output ratios.

5- Invest in Innovation and Training: Strengthen intangible resources by fostering a culture of continuous learning and innovation. Provide employees with access to advanced training programs and cutting-edge technologies to improve operational efficiency.

6- Foster Collaboration: Leverage internal and external partnerships to co-develop solutions, share knowledge, and enhance resource utilization across the value chain.

7- Monitor and Evaluate Resource Effectiveness: Establish regular performance reviews to assess how effectively resources are contributing to operational performance and identify areas for improvement.

Theory 2: Human Capital Theory (HCT)

Human Capital Theory (HCT) posits that individuals' knowledge, skills, and competencies are valuable economic resources that can be developed and leveraged for organizational success. Originating from the works of Becker (1993), the theory highlights the role of investments in education, training, and health to enhance productivity and organizational outcomes. In the context of operations management, HCT emphasizes the strategic importance of workforce development and alignment with business goals to improve overall performance (Becker, 1993; Bontis et al., 2020).

In this study, HCT aligns with the exploration of HRM's influence on operational performance in Company X. The findings highlight the importance of training, employee well-being, and alignment of workforce competencies with organizational objectives. These are listed below:

- Skill Development through Training Programs: Company X leverages structured training programs to upskill employees and address specific departmental requirements (e.g., safety, technology adaptation). This reflects HCT's principle of maximizing returns on investments in employee education and development.
- Workforce Empowerment: By emphasizing individual accountability and department-specific KPIs, Company X fosters an empowered workforce that aligns its personal performance with organizational objectives. This aligns with HCT's focus on nurturing intrinsic motivation and capabilities to achieve higher productivity levels.
- Cost Management and Performance Optimization: HCT explains how Company X's approach to optimizing CAPEX and OPEX is interlinked with effective HR

practices. A skilled workforce ensures operational tasks are performed efficiently, minimizing resource waste and operational downtime.

- Quality and Safety Adherence: The integration of high-quality standards and safety measures in operations is directly influenced by employees' competencies. HCT underscores that investing in health, safety, and skill training builds a robust and resilient workforce capable of delivering optimal operational performance.

By applying HCT, Company X's focus on building and leveraging its human capital can address specific operational challenges, such as achieving efficiency, safety compliance, and innovation in upstream oil and gas activities (Wright et al., 2014). Additionally, through HCT, Company X can ensure its human capital contributes maximally to operational performance, positioning it to remain competitive and adaptable in the upstream oil and gas sector.

Actionable Steps Based on HCT for HR-Driven Operational Performance

1- Implement Targeted Training Programs: Regularly evaluate workforce skills and design training initiatives that address gaps, particularly in emerging areas such as digital technologies, safety compliance, and lean operations.

2- Establish Leadership Development Pathways: Develop structured programs to identify and groom future leaders within the organization, enhancing decision-making and team management capabilities.

3- Promote Cross-Functional Learning: Facilitate cross-departmental collaboration and knowledge-sharing initiatives to break down silos and enhance organizational agility.

4- Align HR Practices with Operational Goals: Integrate HR metrics with operational performance metrics, such as productivity and quality KPIs, to ensure alignment between employee performance and company objectives.
5- Incentivize Performance: Create a reward and recognition system linked to operational performance achievements, encouraging a high-performance culture across the organization.
6- Monitor Employee Well-Being: Implement mechanisms to monitor and improve employee morale, health, and well-being, which have direct implications for productivity and operational efficiency.
7- Leverage Technology for Workforce Management: Adopt HR analytics and digital tools to optimize workforce planning, training, and performance management.
8- Develop Long-Term Workforce Strategies: Forecast future industry trends and workforce needs, ensuring that human capital investments align with anticipated technological and operational changes.

Theory 3: Risk Management Theory (RMT)

Risk Management Theory (RMT) emphasizes the systematic identification, assessment, and mitigation of risks to achieve organizational resilience and sustainability. The theory draws from frameworks like COSO ERM and ISO 31000, offering guidance on embedding risk practices into business operations. By fostering proactive risk anticipation and control, RMT helps organizations minimize financial, operational, and reputational damages, ensuring continuity in uncertain environments (COSO, 2017; ISO, 2018).

In this study, RMT is directly connected to the examination of HSE's influence on operational performance at Company X. The findings underscore the importance of hazard identification, risk categorization, and mitigation strategies in high-risk upstream operations. By leveraging RMT, Company X can implement structured safety practices and compliance measures, safeguarding its workforce, assets, and operational outcomes (Aven & Renn, 2020). Some of the findings associated with RMT are listed below:

- Categorization and Mitigation of Hazards: Company X employs a structured framework to classify risks into 12 categories, aligning with RMT's emphasis on identifying and assessing risks systematically. This ensures focused mitigation strategies tailored to specific hazard types.
- Management Systems and Protocols: The deployment of robust safety management systems and the assignment of qualified personnel to oversee HSE practices reflect RMT's emphasis on operational resilience and accountability.
- HSE Key Performance Indicators (KPIs): By linking HSE performance metrics, such as Total Recordable Incident Rate (TRIR), to operational goals, Company X integrates RMT into its performance evaluation framework. This enables continuous monitoring and improvement of safety standards.
- Impact on Costs and Downtime: Risk mitigation practices, such as proactive safety measures and comprehensive reporting systems, directly minimize accident-related costs and operational downtime. These practices illustrate how RMT enhances operational efficiency while safeguarding personnel and resources.
- Cultural Integration of Safety Practices: The study findings highlight the importance of integrating safety principles into everyday operations, fostering a

culture of risk-awareness and prevention. This aligns with RMT's focus on embedding risk management into organizational culture.

By aligning HSE practices with Risk Management Theory, Company X can demonstrate a strategic approach to mitigating hazards and safeguarding operational performance. The integration of structured risk assessment frameworks, advanced safety protocols, and continuous performance evaluation not only ensures compliance with industry standards but also enhances efficiency, reduces costs, and fosters a culture of proactive safety. These practices underscore the critical role of RMT in addressing the unique challenges of upstream oil and gas operations, ultimately contributing to the company's long-term sustainability and sustained operational performance.

Actionable Steps Based on RMT for HSE-Driven Operational Performance

1- Implement Advanced Risk Assessment Tools: Use predictive analytics and digital dashboards to monitor potential risks in real time, enabling proactive identification and mitigation.

2- Develop Comprehensive Safety Protocols: Update and refine HSE procedures regularly to reflect changes in technology, operations, and regulatory requirements.

3- Conduct Regular Safety Drills: Organize scenario-based training and emergency response drills to prepare employees for real-world risks and emergencies.

4- Strengthen Reporting Mechanisms: Encourage transparent incident reporting by simplifying the process and providing incentives for timely reporting of hazards and near-misses.

5- Establish Cross-Functional Risk Committees: Create dedicated teams to assess and manage risks across departments, ensuring alignment with organizational goals.

6- Adopt Risk-Based Resource Allocation: Prioritize resources for high-risk areas, such as offshore drilling, to ensure adequate protection against potential hazards.

7- Integrate HSE Metrics with Performance Reviews: Incorporate HSE KPIs into departmental and individual performance evaluations to reinforce the importance of safety compliance.

8- Leverage Technology for Risk Monitoring: Implement IoT devices and AI-powered analytics to monitor environmental conditions, equipment health, and safety parameters in real time.

9- Promote a Safety-First Culture: Foster organizational values that emphasize employee well-being, proactive risk identification, and continuous improvement in safety standards.

10- Collaborate with Stakeholders: Engage with regulatory bodies, industry experts, and local communities to align HSE practices with global standards and local expectations.

Theory 4- Socio-Technical Systems (STS)

Socio-Technical Systems (STS) Theory highlights the interplay between the social (human) and technical (technological) components within an organization, emphasizing their interdependence for optimal performance. Developed by researchers at the Tavistock Institute in the 1950s, this theory focuses on designing systems where both human and technological aspects work in harmony to achieve organizational goals (Trist & Bamforth, 1951). Key principles of STS include:

1- Joint Optimization**:** Ensuring that social and technical systems are co-designed to work synergistically.

2- System Thinking**:** Viewing the organization as an integrated whole, considering how changes in one subsystem affect the others.

3- Employee Participation**:** Involving workers in the design and implementation of technological solutions to increase acceptance and efficiency (Clegg, 2000).

STS Theory is particularly relevant in contexts where technological changes significantly impact operational processes, necessitating careful planning to balance human factors such as skills, attitudes, and workflows with the functionality of advanced technologies like automation and AI.

The findings from Company X's exploration of technology adoption strongly resonate with the principles of STS Theory. The upstream oil and gas sector is highly dependent on cutting-edge technologies to optimize operations, enhance safety, and reduce costs. However, as the findings reveal, successful adoption of these technologies requires addressing both the technical and social dimensions. For example:

- The need for employee training and mindset shifts, as highlighted by respondents, aligns with the STS principle of joint optimization.

- The adoption of IoT, AI, and robotics necessitates restructured workflows and participatory design approaches to ensure their seamless integration.
- Challenges such as psychological resistance to technology adoption and the role of management in fostering a supportive environment further underscore the importance of addressing social factors alongside technological innovation.

By leveraging STS Theory, Company X can navigate these complexities, ensuring that technological advancements do not disrupt social harmony but instead enhance productivity and employee satisfaction.

Actionable Steps Based on Socio-Technical Systems Theory

To maximize the influence of technology adoption on operational performance, Company X can take the following actions:

1- Inclusive Technology Design**:** Engage employees from all operational levels in the design, testing, and implementation of new technologies. Create feedback loops to continuously refine technologies based on user input.

2- Targeted Training Programs**:** Conduct tailored training sessions to build employee confidence and proficiency in using new tools such as IoT and AI. Offer ongoing skill development opportunities to keep employees updated with technological advancements.

3- Cultural Transformation Initiatives**:** Promote an organizational culture that embraces innovation by communicating the benefits of technology adoption. Address resistance through transparent dialogue and by celebrating early successes in technology integration.

4- Integrated Systems Monitoring**:** Develop metrics to monitor the performance of both technological tools and their impact on human workflows. Use these

insights to make iterative improvements and align technology with operational goals.

5- Management and Leadership Support**:** Ensure strong backing from leadership to prioritize technology adoption and foster a culture of collaboration. Provide resources for change management strategies that minimize disruptions during transitions.

6- Focus on Safety and Sustainability**:** Implement safety-focused automation and robotics to perform hazardous tasks. Utilize AI for predictive maintenance and environmental monitoring to enhance sustainability.

5.1.2 Methodological Implications

The significance of the current study is also evaluated from a methodological perspective. The originality of the thesis is also supported by its methodology (Onyeme & Liyanage, 2023). The methodology leverages the informational value of individual classification actions to identify relevant participants in a specific area of interest (Benabdelkrim, Levallois, Savinien, & Robardet, 2020). Qualitative research on upstream oil and gas operations has the potential to make several meaningful methodological contributions (Prasetya, Sunitiyoso, & Wasesa, 2023). Given the capital-intensive, high-risk nature of exploration and production activities, gaining an immersive understanding through qualitative inquiry is valuable. One notable contribution according to Baghdadi, Khamseh and Madani (2023) would be the use of grounded theory methodologies to build new conceptual models grounded in the data. Qualitative research often takes place in naturalistic settings, allowing researchers to observe and collect data in real-world contexts. In the case of upstream oil and gas companies, this could involve conducting interviews or observations at drilling sites, exploration areas, or document review. By immersing themselves in the natural environment of the industry, researchers can gain a more comprehensive understanding of the challenges, practices, and interactions within the upstream sector. Through open coding of interview transcripts, observations and documents review data sources, the researcher could inductively derive theoretical frameworks specific to upstream operational challenges. This bottom-up theory building could provide fresh perspectives on issues like operational performance, human resources management, HSE and new technology adoption.

One notable methodological contribution in qualitative research is methodological triangulation, which involves using multiple research methods to enhance the

credibility and dependability of the study. Specially that most of the previous research in this section has been quantitative. This approach helps researchers to validate their findings and increase the trustworthiness of their conclusions. Qualitative researcher as the current study employing these methodologies bring much-needed empirical richness to an industry rife with commercial sensitivities on sharing data. Concentrated descriptions building trustworthiness would balance historically one-sided, positivist investigations led by major producers (Unnikrishnan & Pratapkumar, 2023). When field studies are used, methodological contributions may entail changes in the design of previous studies which; 1) Reduce potential variance problems in the shared method through the judicious use of several measurement methods; 2) Enhance the generalization of research through more appropriate sampling methods; 3) Enable the study of the plausibility of the "explanations of the third variable" for the results of past studies; and 4) Improve the conceptual validity of key metrics by using more specific multi-element metrics and/or measurement approaches that are not based on self-declarations (Asgari, 2015; Ågerfalk & Karlsson, 2020).

Furthermore, qualitative research can contribute to the development of theories and frameworks that explain the complex dynamics of the upstream oil and gas industry (Mahmood, Afrin, Huang, & Yodo, 2023). Prasetya, Sunitiyoso and Wasesa (2023) stated by analysing patterns, themes, and relationships in qualitative data, researchers can uncover underlying structures, processes, and key factors that shape industry practices and performance. The context-specific insights provided by qualitative research enhance the understanding of the industry's complexities and contribute to the advancement of theoretical frameworks that capture the intricacies of the upstream oil and gas sector (Alhammadi, et al., 2023).

In addition, reflexivity and researcher positionality are methodological contributions that acknowledge the influence of the researcher's background, perspectives, and interactions on the research process and findings (Savolainen, Casey, & Schwerdtle, 2023). According to Ide and Beddoe (2023), researchers in qualitative studies on upstream oil and gas companies should critically reflect on their own biases, assumptions, and values that may shape the research process and interpretations. By adopting a reflexive approach, researchers can enhance the transparency, credibility, and objectivity of their findings, and provide a more nuanced understanding of the complexities within the industry.

This study employed semi-structured interview sessions with key personnel at Company X to identify issues related to operational performance. This research represents the first of its kind conducted within the company. In addition, the observation approach also conducted to enhance the understanding of the researcher relating to matter under study. These approaches in addition to the review of Company X documents in justifying and explaining certain practices regarding operational performance which complements other O&G industry research in terms of methodological contribution. These are key methodological considerations that enhance the rigor, validity, and applicability of qualitative research findings. By employing these methodological contributions, researcher was able to generate nuanced insights into the experiences, perspectives, and practices within the upstream oil and gas industry, contributing to a more comprehensive understanding of this complex sector.

5.1.3 Practical Implications

The study correspondingly have the influence on the managerial contribution in terms of developing a profile of top management contributions and to understand; 1) the way management work influences work processes and organizational outcomes; 2) factors that undermine management's contribution to performance; and 3) the way a "enabling environment" for management work can be assembled and maintained (Buchanan, et al., 2013; Sorce & Issa, 2021). The management functions are generally categorized as Planning, Organization, Leading and Controlling (POLC) regardless of the field of study (Harris, McCaffe, Baldwin, & Edum-Fotwe, 2020).

Planning will enable work in upstream operations to be safer, more economical, and more productive than unstructured activity. Inadequate planning results in overstaffing, overtime, missed deadlines, and expensive urgent orders, all of which are expensive. Unsafe circumstances might arise from larger and more abrupt operations and activities. Safe, dependable, and economical operations are facilitated by the removal of inefficiencies and idle operating time (McCreery & Phillips, 2013; Sircar, Yadav, Rayavarapu, Bist, & Oza, 2021). In terms of organization, today's upstream oil and gas companies must understand the old adage of resource scarcity. As a result, companies create big, intricate structures with well-defined primary departments. When needed, they can use this strategy to manage significant political and operational risks, handle difficult technical issues, and deploy exceptional talent globally (Handscomb, Sharabura, & Woxholth, 2016; Baro-Tijerina & Piña-Monarrez, 2021). Leading function for upstream oil and gas operators is to determine how the company can remain ahead of the competition. To do this, the business must respond quickly to challenges like heightened competition and emerging technologies

that allow for novel strategies (Shuen, Feiler, & Teece, 2014; Adeleke, Ajibike, Muuka, Darun, & Moshood, 2021).

The last managerial function to be discussed is controlling. Companies are responsible for ensuring that all practices related to operational performance are monitored and controlled to ensure proper functioning operations. Companies put operational performance, human resource management, health, safety and environment (HSE), technological adoption, assets, production, local and public image at the forefront of their operations (Masudin, Tsamarah, Restuputri, Trireksani, & Djajadikerta, 2024; Albeldawi, 2023; Che Hasni, 2023)

Based on this understanding, upstream oil and gas operators such as Company X need to be on top of thing in ensuring all facets of operation been run in the most effective and efficient manner. On that note, the finding of this research stated that in the dynamic and competitive world of upstream oil and gas, operational peroformance management is not simply an ideal, it's an imperative. By focusing on cost reduction, revenue maximization, and efficient processes, companies can secure financial stability, build a competitive edge, and foster a sustainable and safe work environment (Cherepovitsyn, Kazanin, & Rutenko, 2023). Ultimately, prioritizing optimal operational performance lays the groundwork for long-term success and positions the company for future growth (Cheng, Chen, & Su, 2023; Trindade, Duarte, Perico, & Bandeira, 2023).

Furthermore, the study's finding highlighted that in the demanding and often hazardous world of upstream oil and gas, a robust Human Resource Management (HRM) strategy is central to achieving highest level of operational performance management. According to Yusof, Bawan, Djuli, Wijaya and Idrus (2023), by implementing effective recognition programs that acknowledge and reward

contributions, offering competitive compensation packages that attract and retain skilled talent, and investing in comprehensive training and development initiatives that equip employees with the necessary expertise, upstream companies can cultivate a highly motivated and capable workforce. This empowered human capital then becomes the driving force behind efficient and safe operations, propelling the organization towards sustainable growth and long-term success (Ayanaba, McLellan, Kourouklis, & Cano, 2023).

Next, a robust Health, Safety, and Environment (HSE) culture is not simply a regulatory obligation, but a fundamental pillar of operational performance in the upstream oil and gas industry (Osbornea, et al., 2023). According to the current study findings, by prioritizing a safe and environmentally responsible work environment, companies can minimize accidents, injuries, and environmental incidents, reducing operational downtime and associated costs. Furthermore, a strong HSE culture fosters employee trust and engagement, leading to improved decision-making, productivity, and overall performance. Ultimately, integrating comprehensive HSE practices into core operations is not only the right thing to do, but also a strategic investment that strengthens operational effectiveness and paves the way for sustainable long-term success (Sharma, Joshi, Prasad, & Bartwal, 2023; Che Hasni, 2023).

Lastly, the study's findings also stressed that in the ever-evolving upstream oil and gas industry, embracing technological advancements is no longer an option, but a necessity for achieving optimal operational performance. By strategically adopting innovative technologies like automation, data analytics, and the Internet of Things (IoT), companies can unlock a multitude of benefits (Al-Rbeawi, 2023). According to George and George (2023), these advancements can streamline operations, optimize production processes, enhance decision-making through real-time data insights, and

ultimately lead to increased efficiency, cost reduction, and improved safety. Integrating these technologies empowers companies to not only stay competitive but also navigate the complex challenges of the industry, propelling them towards a future of sustainable growth and responsible resource management (Musa, 2023; Shakya & Tripathi, 2023).

In conclusion, attaining and maintaining proper operational performance in the dynamic field of upstream oil and gas depends on a three-pronged strategy.: effective human resource management (HRM), a robust Health, Safety, and Environment (HSE) culture, and strategic technology adoption. By investing in a skilled and motivated workforce through strategic HRM practices, fostering a safe and environmentally responsible work environment through robust HSE practices, and embracing innovative technologies like automation and data analytics, upstream companies can unlock a multitude of benefits. This combined approach leads to increased efficiency, reduced costs, improved safety, and ultimately, positions the company for long-term success and sustainable growth in a competitive and ever-evolving industry.

5.2 Discussion

The discussion section of this research provides an in-depth exploration of the findings categorized according to the research questions (RQs) that guided the study. Each research question is addressed separately to offer a clear, focused analysis of the key themes and dimensions identified during the study. This approach ensures a comprehensive understanding of how various factors influence operational performance in Company X. The analysis emphasizes the critical performance metrics—cost, quality, delivery, and flexibility—providing insights into their interconnected roles in shaping the company's efficiency, resilience, and competitive advantage. From the management of operational performance metrics to the impact of human resource practices, health, safety, and environment (HSE) protocols, and technology adoption, the discussion examines the multifaceted dynamics that underpin Company X's operational success. Below, the detailed discussions for each research question are presented, providing a nuanced and structured analysis of the findings.

RQ1- How is operational performance of upstream activities being managed in Company X?

Answer: Operational performance in Company X is managed through a comprehensive framework that prioritizes key metrics such as cost efficiency, quality assurance, timely delivery, and operational flexibility. By strategically balancing these dimensions, the company aligns its resources and processes with its production goals, financial objectives, and sustainability commitments, ensuring resilience and competitiveness in the upstream oil and gas industry.

Operational performance management in Company X is a structured and multifaceted approach that leverages key metrics such as cost, quality, delivery, and flexibility to ensure operational efficiency and alignment with strategic goals. By embedding these dimensions into its management framework, Company X successfully navigates the challenges of a highly competitive upstream oil and gas sector. This approach balances production targets, financial optimization, and sustainability, reinforcing the company's position in the industry.

The findings align seamlessly with the Resource-Based View (RBV), which underscores the importance of leveraging unique internal resources to achieve a competitive advantage. Metrics such as cost, quality, delivery, and flexibility reflect the strategic utilization of Company X's tangible and intangible resources. Cost management through CAPEX and OPEX optimization ensures financial stability and operational efficiency, directly enhancing profitability and long-term sustainability. The company's rigorous focus on quality highlights its commitment to safety, reliability, and regulatory compliance, which are crucial for mitigating risks and enhancing productivity. Similarly, emphasis on delivery aligns operational outputs with business mandates, minimizing disruptions and fostering stakeholder confidence. Lastly, flexibility enables the company to adapt to volatile market conditions, ensuring

resilience and operational continuity. These four matrices are discussed in detail below:

- Cost: The dual focus on CAPEX (capital expenditure) and OPEX (operational expenditure) underpins cost efficiency at Company X. CAPEX drives long-term investments in exploration and infrastructure, while OPEX supports daily operational needs. This balance ensures financial resilience and strategic resource allocation. Respondents emphasized the tangible returns CAPEX provides and the need to optimize OPEX for daily efficiency. For instance, Respondent #1 highlighted that reducing waste and improving the cost per barrel significantly impact profitability. This structured cost management approach ensures sustainable operations while positioning the company for competitive success.
- Quality: Pivotal in driving operational performance, ensuring safety, and maximizing resource recovery. Respondents stressed that maintaining high-quality standards minimizes setbacks such as poor well integrity and environmental compliance failures. Respondent #4 emphasized that substandard quality leads to increased remediation costs and inefficiencies, whereas Respondent #10 associated quality with operational performance and reputational strength. Through rigorous quality assurance, Company X reduces operational risks, enhances productivity, and builds trust among stakeholders, thereby fostering long-term sustainability.
- Delivery: Adherence to delivery timelines is critical for Company X's strategic and operational alignment. Meeting deadlines ensures that production outputs match shareholder expectations and financial goals. Respondent #4 noted the negative implications of missed deadlines on production and revenue. Conversely, timely delivery enhances operational efficiency and stakeholder confidence. By

ensuring seamless project delivery, Company X achieves better resource utilization and sustains alignment with its overarching strategic vision.

- Flexibility: Cornerstone of operational performance in the dynamic oil and gas industry. Respondents highlighted the importance of adaptability to changing market conditions, environmental variables, and regulatory landscapes. For instance, Respondent #6 underscored flexibility as essential for mitigating risks and responding to unforeseen challenges, ensuring operational continuity. By fostering a culture of adaptability, Company X remains agile, resilient, and positioned to capitalize on opportunities in a volatile and evolving sector.

To sum up, Company X's operational performance is governed by a holistic framework that emphasizes cost management, quality assurance, precise delivery, and operational flexibility. These interrelated aspects work together to help the company meet its strategic objectives, sustain financial stability, and promote a culture of continuous improvement. This cohesive approach not only aligns with the Resource-Based View principles but also reinforces Company X's standing as a robust and competitive entity in the upstream oil and gas sector.

RQ2- How does human resource practices influence operational performance in Company X?

Answer: Human resource practices in Company X significantly influence operational performance by shaping critical employee-related factors such as engagement, work environment, motivation, training, and commitment. These factors collectively foster a capable and dedicated workforce, ensuring cost efficiency, adherence to quality standards, timely delivery of projects, and flexibility to navigate the complexities of the oil and gas industry. By aligning HRM initiatives with strategic goals, Company X creates a synergy that drives both individual and organizational excellence, reinforcing its operational resilience and competitive edge.

Human resource practices in Company X play a pivotal role in shaping five critical employee-related factors that collectively enhance operational performance.

- Employee Engagement**:** Company X fosters engagement through initiatives such as recognition programs, open communication channels, and opportunities for employee participation in decision-making. Engaged employees, as noted by respondents, demonstrate higher productivity, lower absenteeism, and a stronger alignment with organizational goals, which directly impact operational outcomes.
- Work Environment**:** A safe, inclusive, and supportive work environment is prioritized, with stringent health, safety, and environmental (HSE) standards ensuring employee well-being. Respondent #6 highlighted how a positive work environment reduces accidents, fosters teamwork, and enhances focus, all of which contribute to consistent operational efficiency.
- Employee Motivation**:** Competitive compensation, recognition programs, and growth opportunities drive motivation within the workforce. Respondent #3

emphasized that motivated employees are more committed to their tasks, leading to fewer errors, enhanced productivity, and a culture of excellence.

- Training and Development**:** Comprehensive training programs ensure employees are equipped to meet the challenges of the oil and gas industry. Respondent #5 highlighted how continuous skill-building and leadership development enable employees to adapt to new technologies and processes, directly impacting quality and operational efficiency.
- Employee Commitment**:** Transparent communication, alignment of personal goals with organizational objectives, and supportive leadership cultivate employee loyalty. Respondent #4 noted that committed employees consistently go the extra mile, contributing to reliability in operations and resilience in challenging circumstances.

The enhancement of these factors directly translates into improved operational performance across key metrics: cost, quality, delivery, and flexibility.

- Cost**:** HRM practices reduce costs by fostering employee retention and minimizing turnover, which lowers recruitment and training expenses. Motivated and well-trained employees are less prone to costly errors or accidents, optimizing labour efficiency. Respondent #1 emphasized that effective HRM practices contribute to significant cost savings in operational activities.
- Quality**:** Skilled and motivated employees ensure adherence to stringent quality standards, reducing rework and improving operational outcomes. Respondent #4 highlighted how employee expertise and commitment drive the delivery of high-quality outputs in processes such as drilling and production.

- Delivery**:** HR initiatives, such as training and engagement, align employees with project timelines and deliverables. Respondent #3 noted that a well-coordinated and engaged workforce ensures timely project completion, reducing delays and maximizing productivity.
- Flexibility**:** By fostering a culture of innovation, adaptability, and continuous learning, HR equips employees to navigate the volatile nature of the oil and gas industry. Respondent #7 emphasized that adaptive employees are better prepared to implement technological advancements and respond to market fluctuations, ensuring operational resilience.

Human resource practices in Company X are deeply interwoven with its operational performance, creating a workforce that is engaged, motivated, and equipped to deliver high-quality, cost-efficient, timely, and flexible outcomes. By investing in its people, Company X ensures its ability to meet strategic goals and maintain competitiveness in the complex and demanding oil and gas industry.

This integrated approach resonates with Human Capital Theory, which positions employees as strategic assets whose skills, expertise, and engagement are pivotal to organizational success. By emphasizing ongoing training and development, Company X not only equips its workforce with the necessary competencies but also cultivates a mindset geared toward innovation and excellence. This focus on employee growth and well-being creates a virtuous cycle where higher motivation and commitment lead to better performance, which, in turn, reinforces employee satisfaction and loyalty.

The alignment of HRM practices with operational metrics highlights the company's strategic foresight. Cost efficiency emerges from reduced turnover and enhanced productivity, while adherence to stringent quality standards underscores the importance of skilled employees in maintaining operational performance. A motivated

and well-trained workforce ensures projects are completed on time, contributing to delivery effectiveness, while fostering adaptability enables the company to remain resilient in the face of industry challenges. By integrating Human Capital Theory into its HR framework, Company X can effectively strengthens its competitive edge, ensuring long-term sustainability and adaptability in a dynamic oil and gas sector.

RQ3- How HSE Practices influence Company X's operational performance?

Answer: HSE in Company X are systematically managed through robust hazard classification, performance evaluations using KPIs, and proactive risk mitigation strategies. Despite challenges like integrating HSE principles into daily operations and managing a diverse workforce, HSE significantly influences operational performance. Effective HSE practices reduce costs associated with accidents, enhance quality through compliance and safety measures, ensure timely delivery by minimizing disruptions (operation downtime), and foster flexibility by building a resilient workforce (strong employee moral) and adaptive operational systems.

In Company X, HSE (Health, Safety, and Environment) practices are characterized by a well-defined and systematic approach that emphasizes hazard classification, rigorous evaluations, and strategic risk management. Hazard classification is central to ensuring safety, with Company X employing a structured system that categorizes hazards into specific types—such as fire, height, or lack of light—enabling tailored responses and mitigating risks effectively. Respondents highlighted the importance of a proactive classification system, as seen in the identification of 12 distinct hazard categories, fostering clarity and focus across operational levels. For example, Respondent #1 emphasized the role of this system in empowering employees to address hazards confidently, while Respondent #3 pointed out the integration of

lessons learned into HSE practices to continuously refine the company's safety culture.

The evaluation of HSE practices in Company X relies heavily on KPIs (Key Performance Indicators), such as Total Recordable Incident Rate (TRIR) and Total Recordable Incident Frequency (TRIF). These metrics provide a comprehensive framework to assess safety standards and compliance, enabling the company to identify areas for improvement. Respondents consistently noted that HSE performance is closely monitored against a 100% safety benchmark, underscoring the company's unwavering commitment to achieving excellence in safety standards (Respondent #4). Additionally, industry risk matrices are employed to quantify risks and prioritize mitigation measures, further enhancing the company's evaluative capacity.

Despite this robust framework, challenges persist in integrating HSE principles into daily operations and addressing the diverse workforce's varying experiences and attitudes toward safety. Respondents such as #2 and #4 pointed out that ingraining safety-first mindsets requires sustained engagement and training to overcome complacency and resistance to protocols. The complexity of upstream oil and gas operations, coupled with the inherent risks of exploration and production, compounds these challenges. Nevertheless, proactive management strategies, such as comprehensive reporting mechanisms, regular safety meetings, and targeted risk mitigation plans, ensure that HSE concerns are addressed systematically. Respondents emphasized that fostering a culture of safety, through initiatives like pre-operation toolbox meetings and periodic audits, has been instrumental in maintaining high safety standards and operational continuity (Respondent #5).

The influence of HSE practices on operational performance in Company X is profound, as evidenced by their impact on critical metrics such as cost, quality, delivery, and flexibility. Three key dimensions—cost of accidents, operational downtime, and employee morale—highlight the integral role of HSE in shaping these outcomes.

- Cost of Accidents: Accidents in upstream oil and gas operations carry substantial direct and indirect costs, ranging from equipment damage to regulatory fines and reputational losses. Respondents like #1 emphasized that effective HSE practices significantly mitigate these costs by preventing accidents and minimizing liabilities. The financial burdens associated with accidents—such as compensation, downtime, and loss of life—are curtailed through robust safety protocols, translating into cost efficiency. Respondent #9 highlighted that proactive safety measures not only protect assets but also strengthen the company's bottom line, reinforcing its financial resilience.
- Operational Downtime: HSE practices directly influence the extent of operational downtime, a critical factor in maintaining productivity and meeting delivery schedules. Respondents #2 and #6 noted that unplanned shutdowns, often triggered by safety incidents, disrupt production and delay project timelines, adversely affecting delivery. Conversely, by prioritizing preventive maintenance and ensuring compliance with safety standards, Company X minimizes disruptions, enabling timely delivery of projects. This alignment of HSE practices with operational continuity ensures that the company maintains its reputation for reliability and efficiency in a highly competitive market.
- Employee Morale: HSE practices profoundly impact employee morale, which in turn influences operational performance. A strong safety culture fosters trust,

engagement, and commitment among employees, as highlighted by Respondent #4, who emphasized the importance of a safe work environment in boosting employee confidence and focus. Conversely, low morale due to inadequate safety measures can lead to reduced productivity and increased turnover, further straining operational efficiency. By investing in training, communication, and leadership engagement, Company X cultivates a resilient and motivated workforce, enhancing both flexibility and quality in its operations.

The enhancement of HSE practices and their focus on accident prevention, operational continuity, and employee well-being directly translates into improved operational performance across the key dimensions of cost, quality, delivery, and flexibility. Each dimension benefits significantly from Company X's systematic approach to managing HSE.

- Cost: Accident prevention and proactive risk management reduce the direct and indirect costs associated with workplace incidents. Respondents like #1 highlighted that the financial implications of accidents—including equipment repair, compensation, regulatory fines, and reputational damage—can strain operational budgets. By minimizing accidents, Company X achieves significant cost savings, optimizing resource allocation and improving cost per barrel metrics. Additionally, planned maintenance and compliance measures ensure that unplanned expenses, often resulting from safety lapses, are effectively curtailed, reinforcing the company's financial resilience.
- Quality: High safety standards directly correlate with quality outcomes in Company X. As noted by Respondent #4, adherence to stringent safety protocols ensures that processes are executed with precision, reducing the likelihood of defects, rework, or substandard outputs. By fostering a culture of safety and

accountability, Company X empowers employees to maintain operational performance, thereby safeguarding product quality. Furthermore, compliance with regulatory and environmental standards strengthens the company's reputation and reinforces its commitment to excellence in upstream activities.

- Delivery: Timely project delivery is intricately linked to operational continuity, which is supported by strong HSE practices. Respondents #2 and #6 emphasized that unplanned shutdowns due to safety incidents disrupt production schedules and delay project milestones. By minimizing disruptions through preventive safety measures and regular audits, Company X ensures adherence to delivery timelines, bolstering stakeholder confidence. This reliability in meeting deadlines enhances the company's competitive edge in the dynamic oil and gas industry.
- Flexibility: Flexibility in operations is reinforced by the strong safety culture cultivated at Company X. Respondents such as #4 noted that a motivated and well-trained workforce, supported by comprehensive HSE protocols, is better equipped to adapt to shifting market conditions and operational challenges. The company's ability to integrate safety practices with adaptive strategies ensures resilience in the face of unforeseen circumstances, allowing it to respond swiftly to changes in regulatory requirements, market demands, or environmental constraints without compromising operational performance.

The systematic management of HSE practices in Company X, as well as their profound influence on operational performance metrics, is firmly underpinned by Risk Management Theory. This theory highlights the importance of identifying, assessing, and mitigating risks to ensure organizational continuity, safety, and sustainability, making it particularly relevant to the high-stakes environment of upstream oil and gas operations.

Risk Management Theory offers a structured framework for addressing the inherent uncertainties and hazards associated with exploration, production, and other operational activities. In Company X, the theory's principles are evident in the proactive classification of hazards, the use of KPIs like TRIR and TRIF for safety evaluation, and the emphasis on robust risk mitigation strategies. These practices align with the theory's tenets by minimizing the likelihood and impact of adverse events, as emphasized by Respondents #1 and #9, who underscored the financial and operational benefits of accident prevention and compliance with safety standards.

The application of Risk Management Theory ensures that HSE practices contribute directly to improved operational performance across cost, quality, delivery, and flexibility. Effective risk management reduces the financial impact of accidents and unplanned incidents by identifying potential hazards early and implementing preventive measures, allowing Company X to avoid significant expenses related to equipment damage, regulatory penalties, and reputational harm. The systematic mitigation of risks ensures adherence to safety and environmental standards, fostering high-quality operational outcomes and supporting process integrity, which directly correlates with the quality of upstream activities in Company X. Risk management strategies also reduce the likelihood of disruptions, ensuring that operations align with project timelines and delivery schedules, enabling the company to meet stakeholder expectations and maintain its competitive position. Moreover, by equipping the organization to anticipate and adapt to risks, Risk Management Theory enhances operational flexibility, allowing Company X to respond swiftly to dynamic market conditions, environmental changes, and regulatory shifts while building resilience through robust HSE practices, as emphasized by Respondent #4.

RQ4- How technology adoption influence operational performance in Company X?

Answer: Technology adoption significantly influences operational performance by integrating advanced tools such as automation, IoT, and AI to enhance efficiency, safety, and decision-making. Automation and robotics streamline workflows and reduce human errors, IoT enables real-time monitoring and predictive maintenance to improve resource utilization and delivery timelines, and AI supports flexibility and quality through data-driven insights and optimization. Collectively, these technologies drive cost efficiency, improve quality standards, ensure timely delivery, and enable adaptive and resilient operations in the dynamic oil and gas industry.

Technology adoption in Company X represents a strategic and transformative initiative that underscores the company's commitment to enhancing operational performance through innovation. Defined by the continuous integration of advanced digital tools—such as automation, the Internet of Things (IoT), and artificial intelligence (AI)—technology adoption is embedded into the fabric of the company's upstream operations. This approach fosters operational visibility, improves safety, and optimizes production processes. Respondents frequently emphasized the importance of this strategic direction, with Respondent #6 noting that technology adoption involves "continuous integration and utilization of cutting-edge advancements," enabling the company to remain competitive. Similarly, Respondent #7 described how these tools create a more data-driven and responsive operational environment.

While the oil and gas industry has historically exhibited caution in embracing new technologies due to factors such as high implementation costs and operational complexity, there is now a palpable shift in sentiment. Respondents highlighted the growing recognition of the potential of technologies to address industry-specific challenges. For example, Respondent #5 acknowledged the industry's movement into

"Industry 4.0," which emphasizes technologies such as AI and automation. This strategic evolution has positioned Company X as a leader in leveraging technology to navigate the demands of cost-efficiency, environmental sustainability, and operational resilience.

Within this context, three specific dimensions of technology adoption—automation and robotics, IoT, and AI—are particularly impactful in shaping Company X's operations:

- Automation and Robotics**:** These technologies redefine workflows by enabling precision, reducing human involvement in hazardous tasks, and ensuring continuous operations even in challenging environments. Respondent #4 emphasized that robotics allow operations to proceed "24/7 in any environment," minimizing downtime and ensuring safety. Automation streamlines repetitive processes, improves accuracy, and mitigates risks associated with human error.
- Internet of Things (IoT)**:** IoT provides real-time insights that enhance operational oversight and decision-making. Respondents such as #2 and #3 underscored how IoT facilitates predictive maintenance, reduces equipment downtime, and integrates data across the organization. Respondent #4 noted that IoT devices bring "all operational data into a single platform," fostering efficiency and enabling swift responses to emerging challenges.
- Artificial Intelligence (AI)**:** AI drives data-driven insights, predictive modelling, and operational optimization. Respondent #7 described AI as a tool for "analysing vast amounts of data to predict problems and optimize decisions," resulting in improved quality, reduced costs, and enhanced flexibility. Advanced analytics supported by AI enable the company to remain agile and proactive in addressing operational complexities.

These technological dimensions influence key performance metrics—cost, quality, delivery, and flexibility—fundamentally reshaping Company X's operational landscape:

- Cost**:** Technology adoption has a profound impact on reducing operational costs through efficiency gains and risk mitigation. Automation and robotics streamline repetitive tasks, eliminating inefficiencies and minimizing the need for extensive manual labour in high-risk areas. This not only reduces labour costs but also mitigates expenses associated with workplace accidents. Respondent #4 highlighted how robotics enable operations in hazardous environments, ensuring safety while reducing costs related to downtime and human error. IoT, with its real-time data monitoring and predictive maintenance capabilities, prevents unplanned equipment failures, saving significant repair and downtime costs. Respondent #3 noted that predictive insights from IoT devices allow for optimized resource allocation, ensuring every expenditure contributes directly to operational efficiency. AI further enhances cost management by enabling precise forecasting and resource planning, which reduces wastage and ensures investment in high-impact areas. Together, these technologies create a cost-conscious operational environment that bolsters Company X's financial resilience.
- Quality**:** The integration of advanced technologies into Company X's operations ensures adherence to high-quality standards, a cornerstone of operational performance. Automation eliminates variability associated with manual processes, delivering consistent and precise outcomes in production and exploration activities. Respondent #6 observed that automation reduces defects and ensures precision in high-stakes tasks, contributing to superior output quality. IoT facilitates continuous monitoring of equipment and environmental conditions,

ensuring real-time detection of anomalies that might compromise quality. For example, Respondent #4 highlighted how IoT devices consolidate operational data to provide actionable insights, enabling pre-emptive measures to maintain quality standards. AI complements these efforts by identifying subtle patterns and trends in operational data, allowing for predictive interventions and quality assurance. By integrating these technologies, Company X reinforces its commitment to delivering outputs that meet regulatory standards, enhance customer satisfaction, and maintain its reputation for operational performance.

- Delivery**:** Timely project delivery, a critical metric for operational success, is significantly enhanced by technology adoption. Automation ensures uninterrupted production cycles, particularly in hazardous or remote environments where human involvement may be limited. Respondents emphasized how automation enables round-the-clock operations, reducing downtime and accelerating project timelines. IoT supports this by offering centralized data platforms that improve coordination and execution efficiency. Respondent #3 noted that IoT devices enable seamless communication across operational units, ensuring all components of a project are aligned and progressing as planned. AI contributes to delivery efficiency by optimizing resource allocation and anticipating potential bottlenecks. For instance, Respondent #7 highlighted AI's role in analysing resource availability and demand fluctuations, enabling proactive adjustments that prevent delays. Together, these technologies ensure that Company X consistently meets project deadlines, bolstering stakeholder confidence and enhancing its competitive position in the oil and gas sector.
- Flexibility**:** In an industry characterized by volatility and complexity, flexibility is a vital component of operational performance. Technology adoption enhances

Company X's ability to adapt to changing market conditions, regulatory requirements, and operational challenges. Automation and robotics provide the agility to scale operations up or down without compromising efficiency or safety. IoT's real-time monitoring capabilities allow the company to respond swiftly to emerging issues, such as equipment malfunctions or shifts in environmental conditions, as highlighted by Respondent #2. AI extends this flexibility by enabling scenario analysis and decision-making in dynamic contexts. Respondent #5 emphasized how AI tools empower the company to anticipate market shifts and adapt strategies accordingly, ensuring resilience and sustained performance. Collectively, these technologies enable Company X to navigate uncertainty with confidence, maintaining operational continuity and seizing new opportunities in a rapidly evolving industry landscape.

The strategic embrace of technology adoption in Company X aligns closely with the principles of Socio-Technical Systems (STS) Theory, which emphasizes the interdependence of technical systems and social components in achieving organizational success. By integrating advanced tools such as automation, IoT, and AI, Company X not only enhances its operational processes but also empowers its workforce to adapt to and thrive in a technology-driven environment. The alignment of technical advancements with employee engagement, skill development, and organizational culture underscores the company's commitment to fostering a balanced and synergistic system.

STS Theory highlights that the true value of technological innovation lies not just in the technical efficiencies it creates but also in how these tools are seamlessly integrated into the organizational fabric. Company X exemplifies this by pairing cutting-edge technologies with robust training programs, leadership engagement, and

a culture of innovation. Respondents noted that employee buy-in and alignment with the company's technological vision were instrumental in overcoming barriers to adoption, such as resistance to change and initial implementation challenges. This balanced integration ensures that technology not only supports operational goals but also enhances the resilience and adaptability of the workforce.

In terms of operational performance, the interplay between technology and socio-technical dynamics allows Company X to excel across key matrices. Cost reduction is achieved through precision, predictive insights, and optimized resource allocation, while quality is reinforced by consistent processes and real-time monitoring. Delivery timelines are met with greater efficiency and coordination, supported by data-driven decision-making and automation. Finally, flexibility is cultivated through adaptive technologies that respond to market shifts and operational challenges, supported by an engaged and innovative workforce.

By leveraging the principles of STS Theory, Company X can effectively navigate the complexities of the upstream oil and gas industry. This integration of social and technical systems can ensure not only immediate operational gains but also long-term sustainability and competitiveness. As the company continues to align its technological initiatives with its organizational and workforce dynamics, it sets a benchmark for how oil and gas firms can achieve optimal operational performance in an era of rapid technological evolution.

This study has provided a comprehensive exploration of the key factors influencing the operational performance of Company X, with the ultimate goal of proposing a robust framework for operational performance management tailored to the company's unique context. Each theme examined—operational performance metrics, human

resource practices, health, safety, and environment (HSE) protocols, and technology adoption—has been intricately linked to an established theoretical framework. These theories, namely the Resource-Based View, Human Capital Theory, Risk Management Theory, and Socio-Technical Systems Theory, not only illuminate the underlying mechanisms driving operational success but also dictate actionable steps required for improvement. The integration of these theoretical insights ensures that the proposed framework is both strategic and practical, enabling Company X to enhance cost efficiency, quality assurance, delivery precision, and operational flexibility while fostering resilience and sustainability in its upstream operations. This study sets the foundation for implementing a systematic approach to operational performance, ensuring that Company X remains competitive and adaptive in the dynamic oil and gas industry.

Table 5-1:
Proposed Operational Performance Management Framework

Grounded Theory	Actionable Steps	Topic	Research Focus
Resource-Based View (RBV)	1. Identify Core Resources 2. Enhance Dynamic Capabilities 3. Optimize Resource Allocation 4. Integrate KPIs with Resource Management 5. Invest in Innovation and Training 6. Foster Collaboration 7. Monitor and Evaluate Resource Effectiveness	Operational Performance Management	RQ1- How is operational performance of upstream activities being managed in Company X? Answer: Operational performance in Company X is managed through a comprehensive framework that prioritizes key metrics such as cost efficiency, quality assurance, timely delivery, and operational flexibility. By strategically balancing these dimensions, the company aligns its resources and processes with its production goals, financial objectives, and sustainability commitments, ensuring resilience and competitiveness in the upstream oil and gas industry.
Human Capital Theory (HCT)	1. Implement Targeted Training Programs 2. Establish Leadership Development Pathways 3. Promote Cross-Functional Learning 4. Align HR Practices with Operational Goals 5. Incentivize Performance 6. Monitor Employee Well-Being 7. Leverage Technology for Workforce Management 8. Develop Long-Term Workforce Strategies	Human Resource Practices	RQ2- How does human resource practices influence operational performance in Company X? Answer: Human resource practices in Company X significantly influence operational performance by shaping critical employee-related factors such as engagement, work environment, motivation, training, and commitment. These factors collectively foster a capable and dedicated workforce, ensuring cost efficiency, adherence to quality standards, timely delivery of projects, and flexibility to navigate the complexities of the oil and gas industry. By aligning HR initiatives with strategic goals, Company X creates a synergy that drives both individual and organizational excellence, reinforcing its operational resilience and competitive edge.

Grounded Theory	Actionable Steps	Topic	Research Focus
Risk Management Theory (RMT)	1. Implement Advanced Risk Assessment Tools 2. Develop Comprehensive Safety Protocols 3. Conduct Regular Safety Drills 4. Strengthen Reporting Mechanisms 5. Establish Cross-Functional Risk Committees 6. Adopt Risk-Based Resource Allocation 7. Integrate HSE Metrics with Performance Reviews 8. Leverage Technology for Risk Monitoring 9. Promote a Safety-First Culture 10. Collaborate with Stakeholders	Health, Safety and Environmental Practices	RQ3- How HSE influence Company X's operational performance? Answer: HSE practices in Company X are systematically managed through robust hazard classification, performance evaluations using KPIs, and proactive risk mitigation strategies. Despite challenges like integrating HSE principles into daily operations and managing a diverse workforce, HSE significantly influences operational performance. Effective HSE practices reduce costs associated with accidents, enhance quality through compliance and safety measures, ensure timely delivery by minimizing disruptions (operation downtime), and foster flexibility by building a resilient workforce (strong employee moral) and adaptive operational systems.
Socio-Technical Systems (STS)	1. Inclusive Technology Design 2. Targeted Training Programs 3. Cultural Transformation Initiatives 4. Integrated Systems Monitoring 5. Management and Leadership Support 6. Focus on Safety and Sustainability	Technology Adoption Practices	RQ4- How technology adoption influence operational performance in Company X? Answer: Technology adoption significantly influences operational performance by integrating advanced tools such as automation, IoT, and AI to enhance efficiency, safety, and decision-making. Automation and robotics streamline workflows and reduce human errors, IoT enables real-time monitoring and predictive maintenance to improve resource utilization and delivery timelines, and AI supports flexibility and quality through data-driven insights and optimization. Collectively, these technologies drive cost efficiency, improve quality standards, ensure timely delivery, and enable adaptive and resilient operations in the dynamic oil and gas industry.

5.3 Limitation of the Study

Studying upstream oil and gas companies presents a fascinating yet complex challenges, riddled with limitations that span various aspects of research methodology, access to data, and the inherent nature of the industry itself. Understanding these limitations is crucial for researchers and stakeholders to navigate the nuances of the industry and ensure accurate and valuable insights emerge from any study. However, the researcher was aware of the limitations and chose to continue with the study in order to add to the body of knowledge for academics and business professionals.

One significant constraint lies in the availability of data. Upstream operations often occur in remote locations, and companies are often hesitant to share commercially sensitive information or data related to proprietary technologies and processes. This limited access to data can restrict the scope of research and hinder efforts to build a comprehensive picture of the industry's practices and performance. This has to do with the Company X's relevant staffs' availability and schedule times. The staff had a very constrained amount of time to organize the interview session. Appointments were occasionally cancelled at the last minute, which also cost time without data. Only a few staff members were willing to cooperate and attend the meeting, even though an invitation email was sent two weeks prior. This restriction was bypassed by sending a phone call and email reminder before the interview session. However, some employees are still unable to take part because of other commitments. Naturally, the researcher's time was limited while gathering qualitative data.

Furthermore, the complexity of the industry itself presents a challenge. Upstream operations involve an intricate interplay of various disciplines, from geology and engineering to finance and international relations. It can be difficult for academics with a single academic background to study this complex sector since it need a broad

range of talents and a thorough comprehension of various related subjects. As a result, the researcher needed to have a lot of background work in addition to prior expertise and experience. Since the researcher in this instance works for Company X, the limitation was appropriately managed.

Additionally, the political and economic climate surrounding the oil and gas industry can significantly impact research efforts. The industry is often subject to intense public scrutiny and regulatory changes, which can create a volatile research environment. Researchers must navigate these dynamics to ensure their findings are relevant and not excessively influenced by external pressures. This study was conducted exclusively in the Company X, as indicated within the defined scope of the study. Therefore, it is not pertinent to generalize the findings to different sectors or countries, and vice versa. The findings pertaining to operational performance as a mean to sustain competitive advantage within the given organizational context, were constrained solely to participants affiliated with a single organization. Hence, it presents a formidable task to make overarching conclusions.

Beyond the limitations inherent in the industry itself, the research methodology chosen can also introduce limitations. Qualitative studies, while offering rich insights into these aspects, are often limited by their small sample sizes and potential for subjectivity in interpretation. Qualitative data collection methods, such as interviews, observation and document reviews, rely heavily on the interpretation and analysis of researchers. This can introduce subjectivity and bias into the research. Researchers' own experiences, beliefs, and biases can inadvertently influence how they interpret participants' responses and shape the overall narrative of the research.

Finally, the ethical considerations involved in studying this industry are crucial to consider. Research involving companies and their employees raises concerns about data privacy, informed consent, and potential harm to participants or the wider community. Researchers must adhere to strict ethical guidelines to ensure their studies are conducted with integrity and respect for all stakeholders.

In conclusion, studying upstream oil and gas companies such as Company X demands a nuanced understanding of the limitations involved. From data access and industry complexity to research methodology and ethical concerns, researchers must navigate these challenges to conduct studies that are informative, reliable, and contribute valuable insights to the understanding of this critical yet complex industry. By acknowledging and addressing these limitations, researchers can ensure their work contributes to a more comprehensive and accurate picture of the upstream oil and gas landscape.

5.4 Recommendation for Future Research

The relentless pursuit of operational performance management remains a defining characteristic for success in the upstream oil and gas industry. As the industry grapples with evolving challenges and opportunities, future research on operational performance must adapt and explore new frontiers. This study ventures into few elements associated with operational performance such as HRM procedures, HSE practices and technological adoption strategy. The upstream oil and gas industry plays a crucial role in powering economies and meeting energy demands. With increasing complexities, challenges, and environmental concerns, there is a pressing need to continually improve operational performance. The following section proposes several

key areas for future research to ensure that upstream companies remain competitive, sustainable, and resilient in the years to come.

- Utilizing Predictive Analytics: One of the key areas for future research is the utilization of predictive analytics for operational performance optimization. By leveraging advanced data analytics techniques, companies can better predict asset performance, equipment failures, and maintenance requirements. This approach will enable operators to take proactive measures, reducing downtime, and improving overall operational efficiency.
- Improving Collaborative Technologies: Effective communication and collaboration among different stakeholders within the upstream oil and gas industry are essential for seamless operations. Future research can explore the development and implementation of collaborative technologies that facilitate real-time information sharing, decision-making, and task allocation. Such technologies can bridge gaps between offshore and onshore teams, contractors, and suppliers, leading to improved coordination, reduced delays, and enhanced operational performance.
- Enhancing Safety Culture: Safety is a paramount concern in the oil and gas industry. Future research should focus on developing and implementing strategies to enhance safety culture within upstream operations. This could involve conducting comprehensive safety audits, implementing safety education and training programs, and leveraging advanced technologies such as virtual reality (VR) to simulate hazardous scenarios for training purposes. By prioritizing safety and minimizing accidents/incidents, companies can significantly improve operational performance and minimize downtime.

- Sustainable Operations: The growing global focus on sustainability necessitates future research in exploring ways to improve the environmental performance of upstream oil and gas operations. Investigating and implementing strategies such as carbon capture and storage (CCS), renewable energy integration, and efficient water management can minimize the environmental impact, thus improving operational performance.
- Risk Assessment and Management: Risk management efforts should be a primary focus of future research in the upstream oil and gas sector. Studying and analysing potential risks associated with exploration, drilling, production, and transportation can help operators proactively mitigate potential threats. The research should focus on developing techniques/tools (e.g., risk-assessment matrices, simulation models) to effectively identify, assess, and manage risks, leading to improved operational performance and reduced losses.

In summary, the rapid evolution of the upstream oil and gas industry requires continuous research efforts to enhance operational performance. This study has highlighted various key areas that warrant future research, including predictive analytics, collaborative technologies, safety culture enhancement, sustainable operations, and risk assessment and management. By furthering our understanding in these areas, the industry can optimize operational efficiency, reduce costs, and mitigate environmental risks, ultimately leading to a more sustainable and successful oil and gas sector. Furthermore, this study can be carried out in other sectors and nations to enable generalizability. The findings can improve conceptualization, measurement techniques, and generalizability.

5.5 Conclusion

In the complex and volatile oil and gas industry, operators are constantly challenged by uncertainties that demand resilience and adaptability. The primary concern lies in assessing organizational efficacy in balancing stakeholder interests, particularly in a context like Company X, where the primary stakeholder is the nation. As with other corporate institutions, achieving and sustaining profitability remains a key focus, underscoring the importance of continually enhancing operational performance. In this dynamic environment, leveraging cutting-edge technologies, implementing robust systems, and cultivating a workforce equipped with the requisite knowledge, skills, and competencies are critical components for achieving organizational objectives.

This study has provided a comprehensive exploration of the key factors influencing operational performance in Company X, culminating in the development of a framework tailored to the company's unique needs. The framework integrates theoretical insights and actionable steps across four critical dimensions: operational performance management, human resource practices, health, safety, and environment (HSE) protocols, and technology adoption. By aligning these dimensions with strategic goals, the framework equips Company X to enhance cost efficiency, ensure quality, achieve timely delivery, and maintain operational flexibility.

The findings and recommendations of this study hold significant value not only for Company X but also for the broader oil and gas industry. By adopting the proposed framework, Company X can navigate industry challenges more effectively and achieve a sustainable competitive advantage. Future studies could build upon this research by exploring the evolving role of emerging technologies and further refining the integration of human and technical systems. It is hoped that the insights from this study will empower Company X to achieve greater operational performance

management, resilience, and sustainability, setting a benchmark for innovation and performance in the upstream oil and gas sector.

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