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Operational Strategies for Nigerian Refineries' Business Sustainability

Nosa Omorodion
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Walden University

College of Management and Technology

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Nosa Omorodion

has been found to be complete and satisfactory in all respects,
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Walden University
2021

Abstract

Operational Strategies for Nigerian Refineries' Business Sustainability

by

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BTech (Honors) Federal University of Technology (1990)

MSc, University of Aberdeen (2010)

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

Walden University

December 2021

Abstract

Inefficient operations strategies can negatively impact refinery operations output. Refinery senior leaders who struggle to achieve operations efficiency are at high risk of failure. Grounded in Ulrich's model of competency, the purpose of this qualitative multiple case study was to explore operations strategies leaders of oil and gas refineries in Nigeria used for business sustainability. The participants comprised five senior leaders in five refineries in Nigeria who demonstrated success in using operational strategies for business sustainability in oil and gas refineries. Data were collected from semistructured interviews and company documents consisting of the annual business plan, strategy document, and financial records. Thematic analysis was used to analyze the data. Nine themes emerged: (a) cost cutting and scaling up from smaller projects, (b) enforcing adequate operations and maintenance contracts, (c) guaranteeing consistent raw material supply, (d) exploring industry localization, (e) people-centric strategy, (f) establishment of effective management structure, (g) providing security architecture to local staff and foreigners, (h) creation of new revenue models, and (i) purpose-driven leadership. A key recommendation is for senior refinery leaders to collaborate with colleges and universities in Nigeria to develop a curriculum of successful operational strategies for refineries. The implications for positive social change include the potential for improved refinery industry sustainability, resulting in job creation and improved community development where refineries are located.

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Dedication

This doctoral study is dedicated to my family for their collective support towards making this journey a dream come. It was a tough journey with so many sacrifices, self-denials and at the time when it was almost impossible to continue as a result of the furlough and attendant commitment, their understanding and encouragement inspired me to push on. Their believe, became mine and their push became my sustaining motivation. Thank you Esosa, Nosa, Osaro, Erhun, Osaretin and Christine. We made it. And to God almighty for his unalloyed grace and strength this has been the most rewarding experience of a life time.

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I would like to thank the program director and the university research reviewer, Dr. Jamiel Vadell. Their comments and reviews were key contributors in the course doctoral study journey from prospectus through proposal stage in order to ensure the sustenance of Walden's the academic quality. To my cohorts on the doctoral journey, the engagements, discussions and various group and study sessions we had in the course of our journey were impactful and priceless as the lessons and interactive experiences shared in those sessions were very insightful in shaping some of the challenges encountered on the journey. My goal is to cumulatively apply the lessons and knowledge acquired in the DBA towards eventually shaping the public sector and be the impactful social change agent which was a major essence for embarking on this program

Table of Contents

List of Tables	v
Table 1. General and Demographic Information in the Refinery Operators	v
Table 2. Emmergence of Themes and Number of Occurence	v
Section 1: Foundation of the Study.....	1
Background of the Problem	2
Problem Statement.....	3
Purpose Statement.....	3
Nature of the Study	4
Research Question	5
Interview Questions	5
Conceptual Framework.....	6
Operational Definitions.....	7
Assumptions, Limitations, and Delimitations.....	9
Assumptions.....	9
Limitations	10
Delimitations.....	10
Significance of the Study	11
Contribution to Business Practice.....	11
Implications for Social Change.....	11
A Review of the Professional and Academic Literature.....	12
Organization of the Review	12

Literature Search Strategy.....	13
Conceptual Framework.....	13
Performance Management for Oil and Gas Refineries	14
Performance Measurement for Leaders in Oil & Gas	17
Operational Strategies for Oil and Gas	32
Performance Measurement for Alternative Energy	37
Oil and Gas Refineries Efficiency in Foreign Countries	38
Challenges of Oil and Gas Refineries in Nigeria.....	39
Transition and Summary.....	42
Section 2: The Project.....	43
Purpose Statement.....	43
Role of the Researcher	43
Participants.....	46
Research Method and Design	48
Research Method	48
Research Design.....	50
Population and Sampling	51
Ethical Research.....	53
Data Collection Instruments	55
Data Collection Technique	57
Data Organization Technique	59
Data Analysis	60

Reliability and Validity.....	62
Reliability.....	62
Validity	64
Transition and Summary.....	66
Section 3: Application to Professional Practice and Implications for Change	67
Introduction.....	67
Presentation of the Findings.....	68
People Centric Strategy Through Human Capital Community Sourcing.....	70
Creation of New Revenue Models: Sharing Financial Risk for Future Rewards.....	70
Theme 1: Cost Cutting and Scaling Up from Starting Small.....	71
Theme 2: Enforcing Adequate Operations and Maintenance Contract	73
Theme 3: Guaranteeing the Consistent Supply of Raw Materials: Crude Oil	75
Theme 4: Exploring Localization of Industry.....	79
Theme 5: People-Centric Strategy Through Human Capital Community Sourcing	81
Theme 6: Establishment of Effective Management Structure	84
Theme 7: Providing Security Architecture to Local Staff and Foreigners	85
Theme 8: Creation of New Revenue Models: Sharing Financial Risk for Future Rewards	87
Theme 9: Purpose-Driven Leadership Through Diversified Processing	88

Applications to Professional Practice	89
Implications for Social Change.....	90
Recommendations for Action	91
Recommendations for Further Research.....	92
Reflections	93
Conclusion	94
References.....	95
Appendix: Interview Protocol.....	111

List of Tables

Table 1. General and Demographic Information in the Refinery Operators.....69

Table 2. Emmergence of Themes and Number of Occurences.....70

Section 1: Foundation of the Study

For many oil and gas organizations in developed and developing countries, achieving knowledge efficiency requires cultural transformation within the strategic, operational, and project levels of the organization (Ochieng et al., 2018). Oil and gas organizations in Nigeria are facing operational challenges in handling data required to execute their business activities (Ochieng et al., 2018). The oil sector makes up 95% of Nigeria's foreign exchange earnings (Ayoola & Olasanmi, 2013), yet participation of small and medium enterprises (SMEs) in the Nigerian oil and gas industry (OGI) is low. Abdulkabir et al. (2015) appraised that low technological capacity, slow personnel manpower development, lack of funding by financial institutions, inadequate legislation, poor infrastructural development, and lack of collaboration between indigenous contractors and their foreign counterparts are reasons for low local content participation in the subsector.

Increasing SMEs' involvement in the oil sector is a means for indigenous entrepreneurs to build their capacities, reduce capital flight, and attain sustainable economic development (Abdulkabir et al., 2015). Section 1 includes the background of the problem, the problem statement, the purpose statement, the nature of the study, the study's research question, and the interview questions. In this section, I also present the conceptual framework, operational definitions, significance of the research, and the study assumptions, limitations, and delimitations. The section ends with a review of the academic literature and a transition to Section 2.

Background of the Problem

Despite having a nameplate capacity that should meet domestic demand, Nigeria still imports over 80% of refined products to meet its current needs. Unlike the production of crude, the production of refined products has been suboptimal, and Nigeria has consistently struggled to keep its refineries functioning optimally. (Adeosun & Oluleye, 2017). The Nigerian OGI has flourished since the discovery of crude oil in 1956, but indigenous business leaders only began to venture into the industry in the 1990s (Odeleye, 2014). There are great investment opportunities for SMEs in the upstream, midstream, and downstream sectors of the oil industry (Ochieng et al., 2018). SME participation is important to the oil industry because SMEs provide direct benefits to Nigerian society. These benefits include employment generation and the significant linkage to industrialization and manufacturing processes. Following the divestment from upstream and downstream of oil and gas, two of the SMEs have now set up modular refineries, one with a capacity of 1,000 barrels of oil per day (bopd) and the other of 5,000 bopd. Waltersmith 5,000 bopd is the first phase, and it is expected to increase to 25,000 bopd by 2022 (Ugoeze, 2020).

A business strategy is at the root of the existence of every organization. Business strategy is the outcome of decisions made to guide an organization on the environment, structure, and processes that influence its organizational performance (Bozkurt & Kalkan, 2014). Popa and Miricescu (2015) stated the introduction of strategic management in small business activity has become a necessity because of the dynamic economic

environment in which they operate. For the OGI in Nigeria, strategy formulation and implementation are important to achieving and maintaining competitiveness.

Problem Statement

In Nigeria, four refineries established 30 years ago with the capacity of refining 445,000 barrels per day (bpd) of crude are deemed inefficient because of lack of documented strategies for successful refinery operation (Ogbuigwe, 2018). The major challenges confronting the oil and gas production is the inability to meet the 70% fuel consumption in Nigeria as a result of insufficient operations strategies to allow the refineries to attain full capacity utilization (Ogbuigwe, 2018, p. 191). Seventy per cent of Nigerian rely on fuel for vehicles and generator set (Ogbuigwe, 2018). The general business problem is that oil and gas refineries in Nigeria have inadequate strategies for optimal operation, resulting in continued national dependence on foreign refineries for crude oil processing. The specific business problem is that some leaders of oil and gas refineries in Nigeria lack operations strategies required for business sustainability.

Purpose Statement

The purpose of this qualitative case study was to explore operations strategies leaders of oil and gas refineries in Nigeria require for business sustainability. The target population was five senior leaders in five refineries in Nigeria who have demonstrated success in using operational strategies for business sustainability in oil and gas refineries. The study implications for effecting positive social change include improved refinery industry sustainability resulting in job creation and improved community development at the locations where the refineries are located.

Nature of the Study

In preparing for the study, I considered three research methods: qualitative, quantitative, and mixed methods. Qualitative studies require the pursuit of research related to understanding the motive, whereas the quantitative method requires intellectual pursuits of understanding causes and reasons by examining hypotheses for variables' characteristics or relationships (Gammelgaard, 2017). Quantitative research was inappropriate for this study because researchers use the quantitative method to investigate relationships, cause-effect phenomena, and conditions (Gammelgaard, 2017). The quantitative method was not appropriate because testing hypotheses about variable characteristics or relationships is not aligned with the purpose of the study. Mixed methods studies involve the exploration of the research question through both qualitative and quantitative methods (McManamny et al., 2015). Mixed methods was not suitable for this study because there is a quantitative component in mixed methods. When a researcher's intention is to explore phenomena in-depth, the qualitative research method is preferable to the quantitative research method (Gammelgaard, 2017). Therefore, I concluded the qualitative method was most appropriate for this study for understanding refinery leaders' successful operations strategies.

For the purpose of this study, I considered the following qualitative designs: (a) case study, (b) phenomenology, (c) narrative, (d) ethnography, and (e) grounded theory. I used a multiple case study to conduct interviews with knowledgeable participants who could provide details on the phenomenon within a specified time and space. I used a multiple case study instead of single case because the participants represented multiple

refineries in Nigeria. Stake (2006) recommended 4-10 cases be studied when using a multiple case study because 2-3 cases may not show sufficient interactivity between them to establish rigor for qualitative generalization. A multiple case study was more appropriate than a single case study because the analytic benefits are much greater, and if conclusions are similar, generalizability is more likely (Yin, 2018). Because the phenomenological design is used to explore the personal meanings of lived experience of participants (Yin, 2018), phenomenology was not suitable for my study. Because researchers use ethnography to understand the culture of participants (Yin, 2018), an ethnographic design was not suitable for the study. Because researchers use narrative designs to engage in participants' story telling as a means of data collection (Creswell & Poth, 2016), the narrative design was not suitable for this study. Researchers use grounded theory to develop a theory for explaining observed phenomenon from the data collected (Strauss & Corbin, 1998); therefore, grounded theory was not suitable for this study, and I used a qualitative multiple case design.

Research Question

The central research question was:

RQ: What operations strategies do leaders of oil and gas refineries in Nigeria use for business sustainability?

Interview Questions

1. What operations strategies have you used to achieve business sustainability for your organization's refineries in the last 5 years in Nigeria?

2. What are some specific examples of operations strategies you used as leader of your organization's refineries in Nigeria for business sustainability?
3. What are the key challenges you faced to implement operations strategies for business sustainability?
4. How did you address the key challenges to implementing the strategies for business sustainability?
5. How did you promote policies and values that align with operations strategies used to achieve business sustainability in your organization?
6. What role has leadership played in the implementation of successful operations strategies used to increase rate of success in the refineries in Nigeria?
7. What other information would you like to share about operations strategies in your organization in Nigeria that has helped achieve your refineries' business sustainability?

Conceptual Framework

The conceptual framework I used was the Ulrich model of competency, developed by Ulrich in 1997. Ulrich (1997) explained the required strategies and practices to remain profitable and sustainable, thereby avoiding business failure. Ulrich stated a business professional must perform multiple roles in a business environment. The roles of a business professional include strategic formulation partner, administrative expert, employee advocate, and change agent. The role of the strategic partner in an organization requires business professionals to participate in the organization's strategic

decision making. The expert administrative role requires that business professionals engage in fixing broken processes in an organization's value chain as well as developing new processes in an organization. The employee advocate role requires business professionals to represent employees, become their voice, and act in the best interest of employees in the organization. Finally, the role of a change agent requires business professionals to help employees adapt to change and foster innovation in the workplace.

According to Ulrich (1997), business leaders using the Ulrich model may increase organizational performance, resulting in business continuity and long-term sustainability. Ulrich's (1997) model was suitable for my study because Ulrich claimed business professionals must think and behave in a manner that produces significant changes including the development and implementation of strategies. Development and implementation of operations strategies are necessary to decrease the failure rate of refineries in Nigeria; therefore, Ulrich's model provided an appropriate lens for this study's purpose. Applying the Ulrich model may enable business leaders in Nigeria to act as managing partners, become employee advocates, acquire knowledge to become administrative experts, and, most importantly, become effective change agents for challenging the status quo.

Operational Definitions

Business strategy: The long-term plans leaders implement to reach desired objectives and improve business performance. They contain the details of how the business leaders compete in the marketplace, maximize competitive advantage, and minimize competitive disadvantage (Gill, 2020).

Competitive advantage: A distinction in the features or dimensions of a company that enable the company to provide better services to customers than the competitors (Khodabakhshi & Ahmadi, 2021).

External environment: The industrial conditions, entities, events, trends, and factors faced by an organization that influence its activities and choices (Alda & Dammert, 2020). It is within the external environment that the firm relates to customers, competitors, and regulatory bodies. External factors determine an industry's opportunities and risks as well as influence the life, growth, and development of the firm.

Organizational capabilities: Practices or routines used to acquire, reconfigure, or assimilate knowledge for the organization. These represent the identity of a firm as perceived by both employees and customers. These capabilities contribute to the firm's ability to perform better than competitors using a distinctive set of resources, systems, and structures (Geo et al., 2020).

Operational performance: The measurable aspects of the outcomes of an organization's processes, such as reliability, production cycle time, and inventory turns. Operational performance in turn affects business performance measures such as market share and customer satisfaction (Marodin et al., 2019).

Operational strategy: The means by which an organization sets out to achieve its desired objectives and improve business performance. It contains the details of how the business leaders compete in the marketplace, maximize competitive advantage, and minimize competitive disadvantage (Marodin et al., 2019).

Resources: All assets, capabilities, organizational processes, attributes, information, and knowledge controlled by an organization to enable employees to develop and implement strategies to improve the company's efficiency and effectiveness. The two main types of resources are intangible knowledge-based resources, and tangible property-based resources such physical and financial resources (Agusti et al., 2020).

Small and medium enterprises (SMEs): Nonsubsidiary, independent companies that employ fewer than a given number of employees. This number varies across countries. The most frequent upper limit designating an SME is 250 employees, as in the European Union. However, some countries set the limit at 200 employees, while the United States considers SMEs to include firms with fewer than 500 employees (Ochieng et al., 2018).

Assumptions, Limitations, and Delimitations

In this section, I describe the assumptions considered, the limitations of the research, and its delimitations. I considered the research setting, oil and gas refinery companies, and the study participants, about whom I established research assumptions. The limitations relate to weaknesses in a research study and delimitations constitute research boundaries.

Assumptions

Vogt and Johnson (2015) defined an assumption as a statement presumed to be true that is used temporarily for a specific goal. In this research study, I used four assumptions in the study. The first assumption was that all or most chosen participants would volunteer to take part in the research study. The second assumption was that

individuals who signed the letter of consent would provide responses to answer the research question on operations strategies leaders of oil and gas refineries in Nigeria use for business sustainability. The third assumption was that the information I gathered would be representative of practices in the OGI. I also assumed participants would give truthful and accurate answers to the interview questions. Finally, I assumed the geographical area was large enough to provide good data for the study.

Limitations

The first limitation was the existence of potential bias because I work in the OGI as a director. My duties require the implementation of operational efficiency in the sector. The second limitation was related to access to information. I conducted the research using phone interviews because the organization whose employees I targeted for participation are currently working from home due to the COVID-19 pandemic, and I complied with social distancing recommendations. This lack of face-to-face interaction might have reduced participants' eagerness to share data. The last limitation was the lack of experience in conducting qualitative case studies research. According to Yin (2018), one of the key success factors in qualitative case study research is the researcher's training and ability to apply the research method. This research was my first qualitative case study research making the lack of experience a limitation.

Delimitations

Delimitations are factors in a study that can limit its scope and define its boundaries (Simon & Goes, 2011). Delimitations result from specific choices made by a researcher such as choice of research questions, theoretical framework, and participants.

In this study, the study participants possessed at least 5 years of working experience and training on operating refineries in Nigeria.

Significance of the Study

Contribution to Business Practice

The study may be significant to Nigerian government officials and practitioners operating refineries to achieve operational sustainability. Of the 25 refineries licensed in Nigeria, four are working at full capacity, while 21 are operating inadequately (Ochieng et al., 2018). The findings of this study may contribute to improved operational strategies to enable refineries to operate at full capacity. The federal government of Nigeria, the state governments and the local governments, the operators of the Nigeria National Petroleum Corporation (NNPC), and all investors in the OGI in Nigeria may benefit from this study finding by developing or improving their strategies to improve refineries' performance.

Implications for Social Change

The implication of positive social change in this study is that if the current problem is solved as a result of the study findings, government revenues as personal income tax may increase because the employment levels may increase, the standard of living may improve, and community development may be facilitated. The study may be significant to promote income equality and employment in the regions where the refineries are located. Also, the crime rates currently occurring in the Niger-Delta region may be reduced because the increase in employment may bring about a decrease in unemployed youth who engage in social vices in Nigeria.

A Review of the Professional and Academic Literature

The purpose of the qualitative exploratory case study was to explore operations strategies that leaders of oil and gas refineries in Nigeria use for business sustainability. The target population was five senior leaders in the refineries in Nigeria who have had 5 years of working experience and training on operating refineries in Nigeria. I used semistructured interviews with the Zoom videoconferencing application, field notes, and document review and tools for data collection. In conducting the literature review, I used the following databases to search for relevant research studies: ABI/INFORM Complete, Business Source Complete, EBSCO Host, Emerald Management, Google Scholar, ProQuest Central, ProQuest Dissertations & Theses, Sage Premier, ScienceDirect, and the World Bank Open Knowledge Repository. I used the following keywords when conducting my searches: *performance management, Nigerian oil and gas industry, Ulrich model of competency, resources and capabilities, operational performance, operational strategies, and competitive advantage.*

Organization of the Review

I organized the review into five significant topic categories: (a) published relevant conceptual and empirical works, (b) critical analysis and synthesis of the conceptual frameworks, (c) analysis of supporting and contrasting theories, (d) critical analysis and synthesis of the literature themes, and (e) a description of the relationship of the study to previous research and findings.

Literature Search Strategy

I commenced the literature search with an inquiry of operational strategies, reviewing literature on the topic published within the last 5 years (2016-2021). Next, I conducted a similar review but with a longer date range, starting with Ulrich model of competency developed by Ulrich in 1997. The additional searches included seminal scholarly work, articles, and presented papers to explore my topic and the following research question:

RQ: What operations strategies do leaders of oil and gas refineries in Nigeria use for business sustainability?

I reviewed articles, government and nongovernmental data regarding policies, and data on Nigerian oil and gas management, the Nigerian economy, and the oil and gas sector. I limited my search to scholarly, peer-reviewed journals as well as current materials published within the past 5 years. I reviewed a few older but relevant and frequently cited seminal works as well as some pertinent but non-peer-reviewed material. I reviewed articles, with 85% published within 5 years of this study.

Conceptual Framework

The conceptual framework I used was the Ulrich model developed by Ulrich in 1997. Ulrich explained the required strategies and practices to remain profitable and sustainable, thereby avoiding business failure. Ulrich contended that a business professional has to play different roles in a business environment. The functions of a business professional include strategic formulation partner, administrative expert, employee advocate, and change agent. The role of the strategic partner in an organization

requires business professionals to participate in the organizations' strategic decision making. The expert administrative role requires business professionals to engage in fixing broken processes in an organization's value chain. The employee advocate role means business professionals represent employees, become their voice, and act in the best interest of employees in the organization (Ulrich, 1997). Finally, the role of a change agent requires business professionals to help employees adapt to change and to foster innovation in the workplace.

According to Ulrich (1997), business leaders using the Ulrich model may increase organizational performance, resulting in business continuity and long-term sustainability. Ulrich's (1998) model was suitable for my study, as Ulrich claimed business professionals must think and behave in a manner that brings about significant changes including, in the case of this study, the use of strategies to decrease the failure rate of refineries in Nigeria. Applying the Ulrich model may enable business leaders in Nigeria, to act as a managing partner, become an employee advocate, acquire knowledge to become an administrative expert, and, most importantly, become the change agent, which may require challenging the status quo. Leaders in the refineries business in Nigeria need to ensure business professionals have the tools, information, and processes to execute assigned tasks.

Performance Management for Oil and Gas Refineries

Performance monitoring of offshore platforms is often sectorial, focusing mainly on specific aspects of process safety such as failure of critical safety elements composing hardware and control system on the platforms. Effective safety performance

measurement relies on good safety indicators. Good safety indicators should comprise both leading indicators measuring the inputs or efforts made in maintaining and promoting safety, as well as lagging indicators measuring the outcomes. It is common to have a large pool of indicators to measure a particular safety aspect but not all indicators are capable of painting a clear and concise picture of what is being measured. A potential problem with compliance determination is the reliance on experts' judgement. Experts' judgement may not always yield consistent results, hence consistent compliance status of a system. In addition, availability of experts is crucial in such practice and absence of experts or expertise often paralyzes a safety performance evaluation system. Adoption of a fuzzy expert system enables rules and experts' opinions to be captured in decision-making. It therefore enables ambiguous or imprecise information to be processed, giving rise to a more reliable performance system and warning signal for the offshore oil and gas installations (Matthias & Brown, 2016).

Despite being a subset of safety, unlike risk assessment, safety performance evaluation focuses on continuously monitoring and assessing the safety performance of a system using a set of relevant criteria called key indicators with risk assessment often being one of the key indicators (Matthias & Brown, 2016). When wired technology is deemed to be prohibitive in terms of production costs, technically unfeasible, and lacking sufficient reliability and flexibility, the OGI moves towards the wireless technology. Wireless sensor network technology has provided significant opportunities to the oil and gas exploration and production companies for enhancing productivity, efficiency, and profitability. Wireless sensor networks are increasingly being deployed to operate in the

most inhospitable, hazardous, and inaccessible environments of OGI (Aalsalem et al., 2018).

Operations strategy is not just about what it contains but is also concerned about the process of its development and implementation. Thus, for example, operations strategy can be viewed as central to the implementation of an already devised business strategy. In this approach, operations' role is important in providing strategic fit in focusing efforts and resources, so operations strategy is consistent with, and helps to support, the already devised wider strategy from above (Matthias & Brown, 2016). The term operations strategy developed from the term *manufacturing strategy* and was established as a core topic in operations management by major contributions from U.S. academics led by Skinner in 1969 along with Hayes and Wheelwright in 1984 (as cited in Matthias & Brown, 2016). Over time the term has been adopted to reflect the increasingly service-dominant nature of most economies, shifting focus from manufacture of goods to the provision of services (Matthias & Brown, 2016).

The first dimension of evaluating efficiency is the cost. Cost is related to all areas of the company, but most product or service costs are generated in the production area (Sansone et al., 2020). Company leaders who emphasize the cost dimension usually focus on achieving or maintaining the lowest possible production, raw material, and labor costs. The second dimension is quality. The traditional observance of this dimension reflects a focus on providing high performance and reliable products. The third dimension is time. Time-based strategy requires companies to compete by providing customers with products through fast delivery and by reducing time to market. In time-based strategies,

companies may not have the lowest cost or the highest quality product but are able to compete on the basis of rapid product delivery to the market. The fourth dimension is flexibility. Flexibility is a proactive dimension, which means companies adjust their resources to changing circumstances with a little negative impact on time and cost. The fifth dimension is innovation. Innovation is seen not only as an important dimension for ensuring a competitive edge but also as a necessity. Innovation is the creation of new combinations, which could, for example, lead to new products or services. The sixth dimension is sustainability. Sustainability alludes to the consumption of natural resources at a lower rate than their natural generation or to the consumption of substitutes to generate limited emissions and minimize damage to the ecosystem.

Performance Measurement for Leaders in Oil & Gas

The involvement of a plurality of actors, each with different knowledge and skills, is aimed, for example, at concretely building a city through their decisions, projects, and actions (Brorström et al., 2018). Language and information—through, for example, the written reports, numbers, and charts of the performance measurement—system play a key role in these networks (Brorström et al., 2018). A city is conceived as a system of information flows that can be controlled, modified, and optimized to reach efficiency goals in many areas, for example transportation, energy, and healthcare. Results of previous inquiries have offered several possible explanations for the lower representation of women in leadership roles of the sport industry (i.e., head coaching positions). Firstly, women's lower representation could be based on supply due to a lack of interest in coaching by women for various reasons, including work-home life balance. Secondly,

supply within the market can be affected by discrimination against women. This discrimination can come from employers. Gender stereotypes often dictate the roles to which men and women are assigned within the sport industry with little regard for productivity measurements. Previous research has further suggested gender stereotypes often contribute to access and treatment discrimination throughout the sport industry. In the case of this study, both access and treatment discrimination have been found to greatly influence the lack of women in leadership positions of energy organizations (Darvin et al., 2018).

Performance Sustainability

In the context of sustainability in OGI projects, a recent study was performed to incorporate sustainability elements and investigate opportunities and threats in an oil and gas company's settings (Mirkouei et al., 2016). Other studies have noted rising expenditure on activities related to sustainability matters such as environmental remediation and industrial energy management among petroleum firms located in the United States (Mirkouei et al., 2016). However, such increases in spending do not reflect a concerted effort to embrace sustainability, especially as new cost-effective methods of extracting unconventional reserves adversely impact the environment and have made renewable energy less competitive (Mirkouei et al., 2016). In recent years, OGI companies have been accused of “green-washing” in their marketing campaigns and corporate reports (Mirkouei, et al., 2016). OGI companies generally perceive that the incorporation of sustainability and long-term thinking into OGI operations would result in reducing their profitability. Perhaps the most important indicator category in

sustainability studies, which has been regarded as a core in previous studies, is the environmental indicator category. In particular, volatile organic compounds were investigated among other environmental concerns (Mirkouei et al., 2016). Another piece of work was carried out to investigate possibilities to reduce CO₂ emissions within the Swedish petroleum refining sector and to estimate the related costs (Mirkouei et al., 2016). Due to negative sustainability effects, in particular, environmental and human lifestyle impacts in the vicinity of the construction sites, as well as long-term economic problems due to safety and maintenance costs, OGI is intrinsically an unsustainable industry.

Human Resource Performance

Pamela et al. (2017) described forecasting manpower demand for OGI as the process of estimating the future numbers of people required and the likely skills and competencies they may need. The traditional approach of calculating demand is characterized by making use of ratios to devise strategy to confront opportunities and threats from the external environment (Pamela et al., 2017). A greater use of technology helps to analyze competitive forces that could reflect an increase or reduction in employees' levels. Forecasting manpower demand involves a practical level determination size of personnel and type of workers the company requires in the future. The demand for the organization's product or service is an integral part of the optimization. Therefore, it is imperative to project beforehand markets and sales figures. Pamela et al. (2017) mentioned other factors that influence forecasting demand for personnel, which include budget constraint, turnover due to resignations, contract

terminations, transfers and relocations, retirement, new technology in the field, decisions to upgrade the quality of services provided and minority hiring goals. Failure to anticipate future manpower needs leads to last minute decision making which is not always advisable for managers in organizations. It is proper for managers to take their time forecasting future manpower needs, which helps to save money and time in future. It is the responsibility of human resources (HR) executives to ensure their organizations' formal performance appraisal system is an effective one and, if it is found to be deficient, to take appropriate corrective action (Longenecker & Fink, 2017). Two factors frequently drive the review and/or redesign of an organization's existing appraisal process: a new organizational leadership regime or tensions or frustration with the existing process, frequently produced by some type of organizational catastrophe (e.g. a major lawsuit or loss of one or more key employees), making the need for change apparent to everyone. The authors have been studying all facets of the formal performance appraisal process for the past three decades and have conducted numerous focus groups and surveys with managers at all levels to identify the specific steps organizations can take to create value-added appraisal systems. Moreover, as the senior leader in the opening quote makes clear, it comes down to having an effective process and creating a management culture to support the process. The benefits of effective formal performance appraisals include more effective performance planning, better coaching and performance management, providing a platform to discuss and achieve performance improvement and employee development, and providing documentation useful for a wide variety of HR decisions. But when appraisals are ineffectual, they create a number of serious problems that negatively

impact individual performance and organizational outcomes, including (a) damaging the manager-subordinate working relationship, (b) demotivating and frustrating employees and their managers, (c) wasting people's critical time resources, (c) stifling employee development, (d) breeding negative attitudes, (e) creating inaccurate documentation of an employee's contribution, (f) damaging the link between employee performance and rewards, and (g) harming the overall credibility of an organization's HR function (Longenecker & Fink, 2017).

Performance Measurement

Corporate performance measurement was quite a new concept before the rise of balanced scorecards (BSCs) in the 90s (Rahdari, 2016). BSCs provided the tools for tracking the implementation of corporate strategies and helped to measure their success or failure. Nonetheless, traditional BSCs were confined to operational and financial performance evaluation. As a result of a spike in global social consciousness beginning in the 1960s with the civil right, consumer's and environmental movements and augmented in the information age, corporate performance measurement was reincarnated as a hypernym. Sustainability BSCs, which has been proposed as a viable model for the incorporation of environmental and social aspects into the main management system of a firm, became a widely used tool for evaluating financial and non-financial performance (Rahdari, 2016). Many other approaches for measuring corporate performance were also introduced in the past two decades (Wood, 2010). Today, corporate performance measurement entails many aspects encompassing economic, social, governance, ethical, and environmental aspects, usually referred to under the umbrella terms of 3P, ESG, and

EESG hat tracks corporate responsibility and sustainability strategies using CG scorecards, like German CG scorecard. There are many measurement approaches for evaluating social performance and the quality of CG (Rahdari, 2016). Sustainability BSCs, which has been proposed as a viable model for the incorporation of environmental and social aspects into the main management system of a firm, is a widely used tool for evaluating financial and non-financial performance (Rahdari, 2016). Qualitative data methods such as perceptual surveys of managers, stakeholders (Rahdari, 2016), and experts' panels, quantitative data methods such as statistical and operational research methods (Rahdari, 2016), third-party evaluations, and company's self-reports (Longo et al., 2005), the last of which is occasionally misused for enlightened self-interest and correcting negative publicity and company's reputation.

The Nigerian Oil and Gas Industry

Nigeria has natural resources, including oil, gas, and solid minerals in commercial quantities. Ekhaton and Anyiwe (2016) described Nigeria as Africa's primary oil producer in 2011 with the second largest oil reserve in the continent. In 2010, the petroleum sector accounted for approximately 25 % of the country's Gross Domestic Product (GDP), 95 % of its export earnings, and 80 % of the government's revenue (World Bank, 2010). Also, Foreign Direct Investment (FDI) inflows focused substantially on the oil industry. The United Nations Commission on Trade and Development (UNCTAD) reported US\$16 billion of the US\$26 billion increase in FDI investments to the West African region from 2007 to 2008 were exclusively the result of a rise in new projects in Nigeria's oil industry. There are over 600 oil fields, 5,284 on and offshore oil

wells, ten export terminals, 275 flow stations, four refineries and an LNG project in Nigeria (Saad & Mas'ud, 2020).

Despite these appealing statistics, oil production in Nigeria has not translated into meaningful development for the country. Das (2020) studied petroleum exploration and production and revealed that although the OGI has served as the mainstay of the country for over 50 years, only a microscopic proportion of the accruable profit is available to indigenous oil companies, especially SMEs. Ochieng et al. (2019) described the oil industry in Nigeria as a complex operating environment and has come to exemplify the “resource curse”. The vast financial investments made in the Nigerian upstream oil and gas sector has not resulted in significant benefits for most Nigerians. The oil resources in Nigeria are along the Niger-Delta coastline. Therefore, it is easy to find oil companies together with the oil service companies having operational bases in the area. Although most of the companies have their headquarters in Lagos and Abuja, cities like Warri, Yenagoa, and Port Harcourt define the oil hubs in Nigeria. SMEs are prone to flourish in the centers where they would have to access the companies quickly and easily.

The primary activities (e.g., exploration, drilling, production, well intervention, and service provision) remained controlled and managed by foreign multinational companies. Multinational and indigenous oil & gas companies appear to be on a high operating pedestal regarding operations, innovations, research and development, performance, and productivity. Consequently, SME owners in the sector may struggle to compete. Ochieng et al. (2019) asserted the oil industry opened up opportunities for SMEs to benefit from integrating into global value chains. SMEs are in some way,

insulated from the threat of larger multinational enterprises (MNEs) because they do not operate in the same market space or compete for the same customer base. However, this is not the case for oil and gas SMEs, as they tend to co-exist with the multinational companies. Ekhaton and Anyiwe (2016) suggested foreign oil companies dominate the private sphere of the Nigerian oil industry. Similarly, Das (2020) observed multinationals leaders carried out equipment manufacturing, maintenance, engineering, and design in their home countries because Nigerian companies did not have the capacity to domesticate these repairs, maintenance, and design. Ekhaton and Anyiwe (2016) concurred this situation necessitated the Nigerian government to enact the Nigerian Oil and Gas Industry Content Development Act, 2010 (NOGIC Act). The purpose of the NOGIC Act is to achieve indigenous participation and to ensure Nigerian's control, and operate all phases of its oil industry. Mas'ud et al. (2020) identified complexity, large budget, safety, security, and environmental concerns, budget and schedule overruns as characteristics of projects in the OGI. SMEs in the petroleum industry are more capital intensive than SMEs in other more labor-intensive sectors (Mas'ud et al., 2020). SME owners tend to be responsive and flexible, focusing on niches larger companies often disregard (Mas'ud et al., 2020). Direct participation and involvement of local contractors in these activities could serve as a boost to the local economy through the creation of employment, improved infrastructure in society and raise standard-of-living (Mas'ud et al., 2020). SME in the manufacturing industry appears to depend more on long-term finance and less on short-term debt (Mas'ud et al., 2020).

Upstream Operations

Upstream operations involve the exploration and extraction of oil and natural gas. This involves conducting geological, geophysical and seismic surveys to find deposits, perform exploration drilling to test for deposits and conduct appraisal to determine if afield contains commercially viable deposits of oil and gas for production. Midstream encompasses facilities and processes that function between upstream and downstream. It consists of: pipelines covering the network for moving crude oil and natural gas from exploration points on land and platforms in the ocean to refineries and continuing on to distribution terminals; crude tankers, logistics and maritime transportation and port operations supporting oil and gas water management; and storage terminals to hold oil, natural gas liquefaction, equipment and services. Downstream operations cover major refineries, which process crude oil, followed by marketing and transportation of the final products of the supply chain to service stations and retail outlets. This segment of the petroleum supply chain contacts consumers through sales of products such as gasoline or petrol, kerosene, jet fuel, diesel oil, heating oil, fuel oils, lubricants, waxes, asphalt, natural gas and liquefied petroleum gas, as well as hundreds of other petrochemicals. The overall discussions with executives and outsourcing providers indicate oil and gas companies are faced with operational, financial and regulatory processes which are far more complex in nature than most other industries; yet, outsourcing provides an opportunity to gain benefits in the entire supply chain.

Assurance of adequate energy supply has become a principal concern around the world, attracting attention among governments, market players, and the wider public. The

European Union (EU) has declared security of supply constitutes one of the three main pillars in its energy policy. As energy demand increases throughout Europe, no country-member could neglect the importance of securing a well-diversified and smooth energy supply through reliable energy corridors (Doukaset al., 2010). Moreover, EU members are becoming familiar with the need for energy sufficiency and uninterrupted supply to consumers, under reasonable price and acceptable environmental impacts, require the safeguard of energy sources availability, the development of required infrastructures (upstream and downstream) and a smooth operation of the energy market. In this respect, the identification of main corridors for primary and secondary energy carriers to EU member countries and the introduction of suitable parameters and indicators (including technical and socio-economical reliability) and cost components (investment, operation and maintenance, and externalities) could be proved facilitative for a global evaluation of supply options (origin of sources, energy vectors, corridors) and their impacts on economy, society, energy, and environment toward sustainability.

Technological Advancement in Oil and Gas

Oil is a strategic commodity in the world economy, and its production and use can foster strategic relationships (Ebneyamini & Bandarian, 2019). The OGI is one of the largest, most complex, and most important amongst global industries. The enormous economic contribution of this industry to many national economies secures its future of critical importance to the global economy (Ebneyamini & Bandarian, 2019). Major players of OGI have changed dramatically over time, but we consider international oil companies, national oil companies (NOCs) and oilfield service companies as the most

important players in this study as these player's decisions, actions and strategies can influence and change the competitive landscape in OGI. The global energy industry has been experiencing a variety of challenges in recent years: extreme price volatility, decline of "easy oil", commoditization of technologies, shortage of talent, pressure to reduce the carbon footprint, emergence of global NOCs such as China's CNOC and surge in petro nationalism (Ebneyamini & Bandarian, 2019) and is facing a disruptive change through emerging renewable and decentralized technologies (Ebneyamini & Bandarian, 2019). The transformation of energy majors' market environment from stability and continuity to uncertainty and turbulence also created a far more hostile environment (Ebneyamini & Bandarian, 2019).

These changes caused the players to rethink their strategies and business models to survive in this competitive landscape. Whenever a business is established, it either explicitly or implicitly employs a particular business model to describe the design or architecture of value creation, delivery, and capture mechanisms employed by the business enterprise (Ebneyamini & Bandarian, 2019). The business model concept is used to complement business strategy and connect the strategy to its operational implementation (Ebneyamini & Bandarian, 2019). The business model explains how a firm organizes itself to create and distribute value in a profitable manner (Ebneyamini & Bandarian, 2019). Business models emerged as an important means for firms to commercialize new ideas and technologies, and have four dimensions: (a) customer identification; (b) customer engagement; (c) value delivery; and, (d) monetization (Ebneyamini & Bandarian, 2019).

Risk Assessment in Oil and Gas

OGI faces major administrative and technical challenges (EITI, 2014; World Bank, 2015). According to Kassem et al. (2020), shipments of liquefied natural gas (LNG) from Yemen to South Korea and the United States originally intended to begin in December 2008 have been delayed until at least August 2009, resulting in costly penalties for the export company, Yemen LNG (YLNG), and more than US\$100m in lost revenue for the Republic of Yemen Government. Factors in the ongoing start-up delay include the Republic of Yemen Government's (ROYG) lag in providing adequate coastal defense for the liquefaction plant at Balhaf, a dispute with the upstream ROYG gas provider, tribal unrest during the pipeline construction phase and the Ministry of Oil's insistence YLNG employ unqualified local tribesmen to operate advanced machinery. These penalties may deter much-needed foreign investment in OGI.

Another instance, the construction project of the central production facilities (CPF) in the sector S2 of OMV oil company in Yemen failed to achieve objectives on time, which began in 2010 and was supposed to end in 2014, according to Kassem et al. (2020), while the project did not exceed 50% of the project progress until 2019 due to several risk factors. The identification of risk factors is an iterative process involving project team stakeholders, other managers affected by or who affect the project and outside expert individuals who can comment on the completeness of the risk identification on the basis of similar experiences (Kassem et al., 2020). Kassem et al. (2020) established the identifying risks at the early stage of planning a construction project or a tender to assess their relative importance.

Construction in oil and gas projects poses a challenge and increases the risk because the majority of construction projects in third world countries, such as Yemen, are surrounded by risks in many ways. If the professional management of these risks is absent, then these projects will likely fail and incur excess losses in a specific cost and time. Kassem et al. (2020) confirmed construction projects always have risks, and such risks can be controlled, managed, minimized, shared and reallocated, transferred or accepted, but they cannot be neglected.

Human Resource Efficiency

It is the responsibility of HR executives to ensure their organizations' formal performance appraisal system is an effective one and, if it is found to be deficient, to take appropriate corrective action (Longenecker & Fink, 2017). Two factors frequently drive the review and/or re-design of an organization's existing appraisal process: a new organizational leadership regime; or, tensions or frustration with the existing process, frequently produced by some type of organizational catastrophe (e.g., a major lawsuit or loss of one or more key employees), making the need for change apparent to everyone. The authors have been studying all facets of the formal performance appraisal process for the past three decades, and have conducted countless focus groups and surveys with managers at all levels to identify the specific steps organizations can take to create value-added appraisal systems. Moreover, as the senior leader in the opening quote makes clear, it comes down to having an effective process and creating a management culture to support the process. The benefits of effective formal performance appraisals include more effective performance planning, better coaching and performance management, providing

a platform to discuss and achieve performance improvement an employee development and providing documentation useful for a variety of HR decisions. However, when appraisals are ineffectual, a number of serious problems may result to negatively impact individual performance and organizational outcomes, including damaging the manager-subordinate working relationship; de-motivating and frustrating employees and their managers; wasting people's critical time resources; stifling employee development; breeding negative attitudes; creating inaccurate documentation of an employee's contribution; damaging the link between employee performance and rewards; and harming the overall credibility of an organization's HR function (Longenecker & Fink, 2017).

Human Resource in Alternative Energy

Rasaki and Abioye (2019) revealed organizational personnel's human, conceptual and technical skills significantly determine preservation management in such organizations. Koh et al. (2016) justified material productivity to be the key driver for observed improvements in integrated resource efficiency view (IREV) over time. The index is a robust macro-level methodology for assessing resource efficiency and sustainability, with implications for production operations in global supply chains.

In processing the solar energy delivery, the human resource requires includes skilled personnel to install the solar panel to individuals and companies requiring installation. The material resources would be the product itself, the parts, office facilities, office for operations, vehicles for logistics, adequate filing system, good health and safety facilities, the batteries, the solar panels (Koh et al., 2016).

The strategies to effectively manage the HR are adequate workers' motivation, proper utilization of staff and training of staff, adequate human resource inventory, effective communication, and good succession planning. The strategies for effective management of the material resources include the adequate provision of administrative and maintenance, proper facility inventory, better office management, better file management and record-keeping, and good maintenance culture (Koh et al., 2016).

Upstream Activities

Upstream operations involve the exploration and extraction of oil and natural gas. This involves conducting geological, geophysical and seismic surveys to find deposits, perform exploration drilling to test for deposits and conduct appraisal to determine if afield contains commercially viable deposits of oil and gas for production (Nyameboame & Haddud, 2018). Midstream encompasses facilities and processes functioning between upstream and downstream. It consists of pipelines to support the network for moving crude oil and natural gas from exploration points on land and platforms in the ocean to refineries and continuing on to distribution terminals; crude tankers, logistics and maritime transportation and port operations supporting all aspects of oil and gas water management; and storage terminals to hold oil, natural gas liquefaction, equipment and services (Nyameboame & Haddud, 2018). Downstream operations cover major refineries, which process crude oil, followed by marketing and transportation of the final products of the supply chain to service stations and retail outlets. This segment of the petroleum supply chain contacts consumers through sales of products such as gasoline or petrol, kerosene, jet fuel, diesel oil, heating oil, fuel oils, lubricants, waxes, asphalt, natural gas

and liquefied petroleum gas, as well as hundreds of other petrochemicals. The overall discussions with executives and outsourcing providers indicate oil and gas companies are faced with operational, financial and regulatory processes which are far more complex in nature than most other industries; yet, outsourcing provides an opportunity to gain benefits in the entire supply chain (Nyameboame & Haddud, 2018).

Operational Strategies for Oil and Gas

The strategy is at the root of the very existence of every organization. Business strategy is the outcome of decisions made to guide an organization on the environment, structure and processes to influence organizational performance (Nyameboame & Haddud, 2018). Popa and Miricescu (2015) observed very few companies could survive without a strategy because strategies contain purposeful goals and functioning to organizations. The idea of studying the strategic actions within leaders arose from the need to determine strategic behavior related to business growth and performance. Popa and Miricescu (2015) therefore suggested the introduction of strategic management in small business activity has become a necessity because of the dynamic economic environment in which they operate. For the OGI in Nigeria, strategy formulation and implementation are important to achieving and maintaining competitiveness.

Hartmann et al. (2020) viewed strategy from the RBV perspective as a critical business owner's ability when translated into a unique resource, may help the owners acquire a competitive advantage. Hartmann et al. contended business strategy is a strategically valuable resource if it is hard to duplicate. Rivals cannot copy resources if the resources are physically unique. There are varied other resources, the most important

being the financial and material resources, while human, and information resources are vital to the development of strategies these two resources may impede the owner's strategy development progress. Similarly, Jagoda and Wojcik (2019) supported the notion business owners require both business and technical assistance for successful strategy development and sustainable business growth. Business owners can attain this growth through appropriate acquisition and application of specific resources and capabilities. Jagoda and Wojcik (2019) also suggested company specific resources might be required to implement a strategy successfully, suggesting business owners achieve sustainable competitive advantage by managing the contexts of resource selection.

Although findings from the study of Popa and Miricescu (2015) do not oppose those of Jang (2013), they place emphasis on policy and strategy development within the oil and gas sector. According to Popa and Miricescu (2015), when oil and gas owners focus on environmental hazards and opportunities by formulating and implementing strategies, then they become aware of their strengths and weaknesses. Thus, leaders of oil and gas can identify solutions to trigger positive effects for increasing performance and efficient development. The Sebestova and Nowakova (2014) model of a sustainable strategy for small and medium-sized businesses is in line with Popa and Miricescu's study. Among other things, Sebestova and Nowakova (2014) highlight the influence of the external environment (Porter's five forces) to balance resources (RBV) for strategy success. Porter's (2003) three approaches to competitive strategy include low-cost leadership strategy, differentiation strategy and focus strategy.

Differentiation

Al-Qubaisi and Ajmal (2019), and Ciravegna (2014) described differentiation strategy as positioning a brand in such a way as to differentiate it from the competition and establish a unique image. Differentiation strategy, also called segmentation strategy builds up a competitive advantage by offering unique products characterized by valuable features, such as quality, innovation, and customer service and may include an increase in prices (Krishnan et al., 2020). Krishnan et al. (2020) noted differentiation selects attributes buyers in an industry perceive as important and positions itself to meet those needs. Porter (2003) identified unusual features, responsive customer service, rapid product innovations and technological leadership, perceived prestige and status, market approach, different tastes, and engineering design and performance are examples of approaches to differentiation. Firms that succeed in a differentiation strategy often have access to leading scientific research, skilled and creative personnel, and a strong sales team. Porter (2003) noted this strategy erects competitive barriers to entry, provides higher margins and reduces the power of buyers who feel they lack acceptable substitute products. Differentiation reduces competitiveness and the fight for scarce resources, thereby improving performance.

Cost Leadership

Cost leadership strategy seeks to achieve above-average returns over competitors through low prices by driving all components of activities towards reducing costs (Sweis et al., 2020). To achieve a low-cost advantage, an organization must have a low-cost leadership strategy, low-cost manufacturing, and a workforce committed to the low-cost

strategy. Sweis et al. (2020) suggested low-cost leadership strategy requires aggressive use of efficient-scale facilities, vigorous pursuit of cost reduction from experience, reengineering, tight cost and overhead control, and cost minimization. A company's cost structure can improve its competitiveness by lowering production and marketing cost, therefore, increasing profitability and market share. For a business strategy based on cost leadership to be effective, capabilities should focus on cost reduction. Porter (2003) concluded the position of the low cost provides protection against all five of the competitive forces: rivalry among existing firms, consumer power, the power of suppliers, new entrants to the market and confronting the substitution of products or services. Thus, the low-cost strategy may provide leaders of OGI with a defense against powerful subcontractors and suppliers by fostering long term contracts or partnership relationships. Sweis et al. (2020) observed the challenge of this strategy is to earn a suitable profit for the company, rather than operating at a loss and draining profitability from all market players. For an effective cost leadership strategy, a firm must have a large market share (Sweis et al., 2020). There are many areas to achieve cost leadership such as mass production, mass distribution, economies of scale, technology, product design, input cost, capacity utilization of resources, and access to raw materials.

Focus Strategy

Focus strategy aims at growing market share through operating in a niche market or in markets either not attractive to, or overlooked by larger competitors (Kyengo et al., 2016). These niches arise from some factors including geography, buyer characteristics, and product specifications or requirements. According to Kyengo et al. (2016), a

successful focus strategy depends on upon an industry segment large enough to have good growth potential but not of key importance to other major competitors. Kyengo et al. (2016) recommended companies could choose to concentrate on a product range, market segment, geographical area or service lines. Focus strategy hinges on the premise companies can achieve their narrow strategic targets more effectively than their counterparts who are competing broadly. Alsoboa, S. (2015) viewed the strategic focus is a combination of differentiation and cost leadership strategies and leading the organization's efforts to focus on a particular sector (niche) market instead of focusing on the market sector as a whole. Uchegbulam et al. (2015) studied competitive strategy and performance of selected leaders in Nigeria from an RBV and Porter's five forces perspective. Uchegbulam et al. (2015) found competitive business strategies such as product features, customization, better quality products, and added-value had been adopted by oil and gas leaders in Nigeria to enhance their customer base, sales growth, returns on investment and revenue growth. Similarly, Nnamseh and Akpan's (2015) research on Nigerian oil and gas leaders showed diversification, market development, product development, and market penetration in the order of usage are top strategies for growth. Business strategies for leaders in the oil industry are similar to leaders in other industries in Nigeria. Nnamseh and Akpan (2015) advocated for cost reduction, copying, diversification & innovation strategies for oil and gas leaders using the Aberdeen oil complex as a case study. Similarly, Sweis et al. (2020) recommended interactions, collaboration, as competitive strategies for leaders in the industry. Sweis et al. study further demonstrated collaboration with competitors, suppliers, consulting firms,

financial institutions, and trade associations can open up new market opportunities for leaders of oil and gas.

Performance Measurement for Alternative Energy

Solar power systems convert sunshine into usable power. Solar energy has limitless potential, and making it the most promising of all renewable sources. Energy radiation from the sun is about 3.8×10^{23} kW/sec (Babatunde et al., 2020). Most of this energy transmission is in the form of electromagnetic radiation, and it is found at the boundary of the atmosphere at about 1.5 kW/m². Solar energy has been confirmed to be viable for practical use as it was revealed Nigeria receives approximately 5.08×10^{12} kWh of energy from the sun on a daily basis. It is worth noting solar energy is available only for about 26% of the day (Babatunde et al., 2020).

The technology behind processing solar energy can either be solar-thermal or solar photovoltaic (Babatunde et al., 2020; Uyanga et al., 2018). Solar thermal applications cover solar energy as electromagnetic waves to heat energy either directly as heat or transformed to cold, electrical or mechanical forms of energy. These can be found in drying, heating distillation, cooking, heating, cooling and refrigeration, or electricity generation in thermal power plants (Babatunde et al., 2020). A typical example of solar-thermal energy is the concentrated solar power technologies (CSP) which use mirrors to reflect sunlight onto receivers to collect the solar energy, converting it to heat. This converted heat energy is used to produce electricity through a steam turbine heat engine to drive a generator (Uyanga et al., 2018).

Despite the abundant renewable energy potential in Nigeria, power-sector stakeholders have not explored the prospect of natural resources consumption reduction when properly harnessed (Abdullahi et al., 2021). In Nigeria, a negligible percentage of the population has invested in solar photovoltaics (PVs) for a home solution; the initiative was only made public commercialized under the public-private partnership (PPP) and the objectives of the Power Sector Reform Act. 2005 (Abdullahi et al., 2021). Some of the barriers to implementing solar energy in Nigeria are based on technology, financial, political and social related.

Oil and Gas Refineries Efficiency in Foreign Countries

The Indian oil and gas sector is one of the eight core industries in India. It has a considerable impact on the decision making of all other important sections of the economy (Vikas & Bansal, 2019). The Indian oil and gas sector consists of the companies operated by the government and private operators. In the recent years, the fluctuations in crude oil prices and other political changes have reshaped the environment for these companies. The regular efficiency evaluation of the companies has become indispensable for financial managers as well as other stakeholders (Vikas & Bansal, 2019). The improved productivity in the oil and gas sector may have a snowball effect on other sectors of the economy. The energy sector has a major role to play in developing economy like India. The outputs of the oil and gas companies are used by households and as inputs in other sectors. The efficient oil and gas companies are expected to competitively price their products and pass on the benefits of reduced costs and increased productivity to their customers (Vikas & Bansal, 2019).

The satisfactory and consistent performance of oil and gas companies yields a positive return on the huge investment made and ultimately benefits the shareholders. However, the inefficiency of such companies is an indication of improper utilization of the tax-payers' money and would need more attention of the managers and policy makers (Vikas & Bansal, 2019). Vikas and Bansal (2019) analyzed the productive efficiencies of 45 US oil and gas firms for the year 1980–1986 using data envelopment analysis (DEA) methods. The DEA and assurance reason (AR) evaluation exhibited falling technical efficiency (TE) of the industry from period 1980–1982 to 1983–1986. Vikas and Bansal (2019) measured the corporate environmental performance using *GScore* framework which consisted of five categories such as (a) general environmental management, (b) input (c), process, (d) output and outcome, and (e) the impact of such performance on the efficiency of ten petroleum firms in the Fortune 500 list in 1999 using DEA. Assets and the number of employees representing capital and labor, respectively, were taken as the input variables while three years' average profit and GScore were incorporated as output variables (Vikas & Bansal, 2019). Only four out of 10 firms were found efficient. The relative efficiency of firms was found to be considerably influenced in the order of number of employees, then GScore, profits and assets in sequence (Vikas & Bansal, 2019).

Challenges of Oil and Gas Refineries in Nigeria

Poor governance. Ogbuigwe (2018) recognized the problem of poor governance as a key factor affecting the performance of the refineries. The refineries are 100% owned by the Nigerian government and have no independent control of or access to their

funds (Ogbuigwe, 2018). Refinery staff requests for funds to carry out maintenance, are subject to multilayer bureaucratic processes. Approvals for any meaningful maintenance are subjected to considerations first by the refinery management committee, thereafter by the corporate refineries' directorate, then by the corporate management committee, followed by the corporate board and finally by the National Federal Executive Committee chaired by the President of the Nation, depending on the amounts required (Ogbuigwe, 2018). This practice of seeking approval has resulted to poor governance of the oil and gas activities.

Lack of Routine Maintenance

Ogbuigwe (2018) evaluated a best practice as when a refinery is designed and built to produce defined quantities, quality, and specifications of each of these products operating in a continuous manner without interruption for 24–36 months based on proper maintenance culture, before it is systematically shut down for a period, to carry out Turn around maintenance (TAM). When TAM is unduly delayed, performance of the refinery declines. No major turnaround maintenance has been carried out in any of these refineries since 2008 (Ogbuigwe, 2018). The last TAM in Port Harcourt Refinery (PHRC) was carried out in 2000 (Ogbuigwe, 2018). This should be viewed against the established best practice worldwide that TAM should be conducted by refineries every two or maximum 3 years (Ogbuigwe, 2018).

Pipeline Vandalism

Pipelines supplying crude oil to the refineries, and those conveying products from them are routinely vandalized. This leads to massive loss of revenue and worsens the

problem of under-recovery of crude cost (Ogbuigwe, 2018). Vandalization of crude and product pipelines commenced in the late 1990s. Some scholarly works have sought to elucidate the reasons for this development. Two major reasons have been attributed are (a) the agitation for resource control and the attendant rise of militancy in the Niger Delta region and (b) outright theft of crude oil and petroleum products. This is a result of the perceived injustice felt by the people because while the region has not significantly benefited from the oil wealth, it has borne the brunt of resultant environmental degradation and pollution (Ogbuigwe, 2018).

In 2017, PWC analyzed the oil and gas productivity and performance of Nigeria's refining sector, concluding the sector can be improved considerably through policies geared towards the construction of scalable or modular refineries as well as the effective refurbishment of existing ones (Iheukwumere et al., 2020). After the construction of Nigeria's premier oil refinery in 1965 by a consortium of Shell-BP, the government took up the challenge to build more refineries when it became clear the first refinery was inadequate to cater for the country's growing domestic fuel demands (Iheukwumere et al., 2020). Hence, within eleven years from 1978 to 1989, three refineries with capacities ranging from 100,000 -150,000 barrels per day (bpd) were completed (Iheukwumere et al., 2020). Unfortunately, the current trend of increasing demand for petroleum products which far outstrips local supply has failed to produce a similar drive for refinery construction similar to activity in the 1970s and 1980s (Iheukwumere et al., 2020).

Transition and Summary

Section 1 began with a discussion of the foundation of the study, background of the problem, problem statement, purpose statement, and the nature of the study. Section 1 also included the (a) interview questions, (b) conceptual framework, (c) assumptions, (d) limitations, (e) delimitations of the study (f) the significance of the study and (g) review of the professional and academic literature. The literature review included a focus on previous research categories, Ulrich model of competency, resources and capabilities, operational performance, operational strategies, the Nigerian OGI. Section 2 began with a review of the purpose of the research and the role of the researcher, then continues with a discussion of the participants, a detailed description of the research methodology and design, the population and sampling, and ethical research. Section 2 included a discussion of data collection instruments, data organization technique, data analysis, and reliability and validity.

Section 2: The Project

The Nigerian OGI has flourished since the discovery of crude oil in 1956, but indigenous business leaders began to venture into the industry in the 1990s (Odeleye, 2014). Developments such as the divesting of assets by the integrated oil companies, granting of pioneer status incentives to indigenous exploration companies, and selling off of marginal fields by the Nigerian government were opportunities for increased SME participation in the sector (Ochieng et al., 2018). This section begins with the purpose statement and includes additional details concerning the role of the researcher, participants, research method and design, population and sampling, ethical research, data collection, data analysis, and reliability and validity.

Purpose Statement

The purpose of this qualitative case study was to explore operations strategies leaders of oil and gas refineries in Nigeria require for business sustainability. The target population were five senior leaders in five refineries in Nigeria who have demonstrated success in using operational strategies for business sustainability in oil and gas refineries. The study implications for effecting positive social change include improved refinery industry sustainability resulting in job creation and improved community development where the refineries are located.

Role of the Researcher

In a qualitative study, the researcher is the instrument for interacting and collaborating with participants to collect data (Condie, 2012). As a researcher, my role included the selection of the appropriate research method and design, recruitment of

participants for the study, and collection and analysis of the data. I have over 31 years of cognate experience within the OGI. In the course of my career, I have held positions as President of Nigerian Association of Petroleum Explorationists (NAPE), and President of American Association of Petroleum Geologists (AAPG), have served on professional associations boards and advisory committees, and several industry and government joint committees tasked with reviewing some of the best practices within the upstream sector.

Though refinery activities are within the midstream sector of the OGI, it is however interconnected with the upstream sector. The research setting was in the oil and gas sector, and the growing trend amongst Nigerian oil and gas companies is local utilization of the produced hydrocarbon. The recent OPEC reduction in output has further reinforced the need to explore refinery capacities locally. Schlumberger, the organization for whom I work provides midstream and upstream services to the oil and gas sector. I collected data as an insider researcher as described by Xu and Storr (2012). I have had direct access to some leaders in oil and gas companies, government and regulatory agencies, and to SME professionals (e.g., business owners, contractors, suppliers, and consultants) in the industry. I have built a network of people within the industry and maintained close social and professional contact with industry players through conference participation, social media, and telephone contact.

Unluer (2012) identified three key advantages of being an insider researcher as (a) having a greater understanding of the culture, (b) not altering the flow of social interaction unnaturally, and (c) having an established intimacy to promote both telling and judging of truth. Unluer also identified disadvantages associated with being an

insider including the loss of objectivity from familiarity and wrong assumptions about the research process based on the researcher's prior knowledge. To mitigate bias, I maintained the highest standards of transparency. I did not have any personal or professional connections, potential conflicts of interest, or other circumstances that may lead to misrepresentation with the study participants. Another way I mitigated bias was through the use of member checking. Member checking is sharing data and interpretations with participants to verify the acceptability of interpretations of the participants' narratives (Marshall & Rossman, 2016).

Member checking allowed me to communicate the summary of the emerging themes and ask for feedback from the participants. Member checking also helped the participants' validation of the findings as many times as possible until there was no need for further review. I identified and reflected on my assumptions and preconceptions to mitigate my bias as a researcher while using a bracketing technique as recommended by Tufford and Newman (2012). Bracketing involves a researcher maintaining a journal to increase clarity and engagement with participants' experiences by unearthing forgotten personal experiences (Tufford & Newman, 2012). Tufford and Newman (2012) recognized the reflexive journal as a valuable tool through which the researcher can acknowledge any biases that may affect data interpretation and so allow the reader to consider the results of the study within its context. Yin (2018) indicated a researcher must strive to uphold the highest ethical standards in the conduct of the research activities. Ethics in research required I protect the dignity and privacy of subjects. The *Belmont Report* identified the basic principles of conduct when research includes human subjects

(National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979).

The report's key guiding principles are (a) respect for persons, especially those who are vulnerable; (b) beneficence, or an obligation not to harm, especially to avoid any deception of the participant; and (c) justice, treating all participants fairly. Throughout this study, I enhanced each interview session by using an interview protocol containing procedures to conduct interviews with the research participants (See Appendix).

According to Jacob and Furgerson (2012), an interview protocol is a procedural guide for directing a qualitative researcher through the interview process. The interview protocol is useful to the researcher in planning the interview questions and increases the reliability of findings.

Participants

This study included a purposeful sample of five successful leaders in the Nigerian OGI. Yin (2018) assumed a researcher could compare two or more cases of a phenomenon to study for common experiences among the cases. In qualitative multiple case study research, a researcher must ensure each participant has experienced the phenomenon (Marshall & Rossman, 2016; Yin, 2018). The following include the criteria I used for selecting participants: (a) the participants were owners of the oil and gas refineries; (b) the leaders must have had at least an ongoing contract with a major oil and gas company; and (c) the leaders' oil and gas area of operation must be in Niger Delta region, Nigeria. I obtained approval from the Walden Institutional Review Board (IRB) to ensure I followed proper ethical procedures and avoided human rights violations. I

contacted participants after the study received IRB approval. I selected participants who had the most knowledge and experience to address the research question. The leaders in oil and gas selected are listed on the Nigerian Petroleum Exchange (NiPEX) with ongoing contracts in the OGI. The participants were leaders in OGI with whom I had gained familiarity while working in the oil industry. Business owners are often gatekeepers of information and potential sources of rich data for researchers (Belso-Martínez et al., 2013; Drew, 2014). I selected five established and reputable oil and gas leaders in the Niger-Delta area who could provide answers to the interview questions and who met the inclusion criteria. The research question for this study was:

RQ: What operations strategies do leaders of oil and gas refineries in Nigeria use for business sustainability?

After I completed the selection of participants, I called each participant before sending the letter of invitation. The letter of invitation contained an explanation of the intent of the study and included the participant consent form. The participants reviewed the email containing the letter and participant consent form and acknowledged consent by replying to the email with the words “I consent.” After the participants had consented to participate in the study, I scheduled interview times and dates through phone conversations and emails. I choose only dates convenient for the participants. I reminded participants of participation in the study being voluntary and that they may withdraw from the study at any time. I shared details regarding the participant confidentiality and privacy, and I offered to sign any nondisclosure or confidentiality agreement the participant may need to gain comfort. Yin (2018) emphasized the importance of

relationship building and noted researchers should establish a working relationship with participants to facilitate open and meaningful discussions during their interviews. My strategy for establishing a working relationship with my participants was through trust. Researchers should establish trust and be honest with the participants regarding the intended purpose and outcome of the study (Lauckner et al., 2012). I utilized the participant's consent form, confidentiality, and anonymity clause to secure participants' trust and strengthen our working relationship.

Research Method and Design

I used qualitative research to explore a phenomenon through an activity (see Marshall & Rossman, 2016). The selected research method and design can help the researcher identify the most effective ways of achieving the goals of the study and answering the research question. In this study, I explored operations strategies leaders of oil and gas refineries in Nigeria use for business sustainability. I used a qualitative multiple case study design to understand the strategies used by five leaders in the oil and gas sector. Multiple case studies allow comparisons in diverse settings (Houghton et al., 2013)

Research Method

The three research methods are qualitative, quantitative, and mixed methods (Yin, 2018). I chose the qualitative research method for this study. Qualitative research facilitates description and analysis of social processes, practices, and phenomena, as well as understandings of how participants view those processes, practices, and phenomena in the contexts of their lives and social environments (Koch et al., 2014). Qualitative

researchers explore all problems and social situations, offer detailed accounts of data sources and analysis, and cannot simply reference well-known data sets and statistical tests as is often done in quantitative research (Yin, 2018). Qualitative researchers collect data by observing behaviors, exploring documents, and interviewing participants to record their perceptions (Marshall & Rossman, 2016). The purpose of this study was to explore operations strategies leaders of oil and gas refineries in Nigeria use for business sustainability. Qualitative methodology is appropriate for obtaining the meaning of the participants' perspectives and collecting data through participant dialogue (Denzin & Lincoln, 2011). A mixed methods approach combining both the exploratory characteristics of a qualitative study with analytical techniques found in quantitative studies was another option. Mixed methods is appropriate when neither a quantitative nor a qualitative approach is sufficient by itself to comprehend the research topic (Hayes et al., 2013). Quantitative researchers use scientific methods, conduct experiments, and control phenomenon under investigation by altering the variables to achieve objective results (Arghode, 2012). The quantitative method is appropriate when the research intent is to begin with a theory or hypothesis and test for confirmation or disconfirmation of the hypothesis (Arghode, 2012). However, this study did not require evaluating data or comparing variables, so a quantitative or mixed methods approach was not appropriate.

In preparing for the study, I considered three research methods: qualitative, quantitative, and mixed methods. Qualitative studies require the pursuit of research related to understanding the motive, whereas the quantitative method requires intellectual pursuits of understanding causes and reasons by examining hypotheses for examining

variables' characteristics or relationships (Gammelgaard, 2017). Quantitative research is inappropriate for this study because researchers use the quantitative method to investigate relationships, cause-effect phenomena, and conditions (Gammelgaard, 2017). The quantitative method is not appropriate because testing hypotheses about variable characteristics or relationships is not aligned with the purpose of the study. Mixed method studies involve the exploration of the research question through both qualitative and quantitative methods (McManamny et al., 2015). Mixed methods was not suitable for this study because there is a quantitative component in mixed methods. When a researcher's intention is to explore phenomena in-depth, the qualitative research method is preferable to the quantitative research method (Gammelgaard, 2017). Therefore, I concluded the qualitative method was most appropriate for this study for understanding refineries' successful operations strategies.

Research Design

For the purpose of this study, I considered the following qualitative designs: (a) case study, (b) phenomenological, (c) narrative, (d) ethnography, and (e) grounded theory. I used a multiple case study to conduct interviews with knowledgeable participants who may provide details on the phenomenon within a specified time and space. I used multiple case study instead of single case because the participants represented multiple refineries in Nigeria. Stake (2006) recommended 4-10 cases be studied when using a multiple case study because 2-3 cases may not show sufficient interactivity between the rigor for qualitative generalization. A multiple case study is

more appropriate than a single case study because the analytic benefits are much greater, and if conclusions are similar, generalizability is more likely (Yin, 2018).

Phenomenological design is used to explore the personal meanings of lived experience of participants, therefore, phenomenology was not suitable for my study. Researchers use ethnography to understand the culture of participants (Yin, 2018), therefore, an ethnographic design was not suitable for the proposed study. Researchers use narrative designs to engage in participants' story telling as a means of data collection (Strauss & Corbin, 1998), the narrative design was not suitable for this study. Researchers use grounded theory develop a theory for explaining observed phenomenon from the data to be collected (Strauss & Corbin, 1998), therefore, grounded theory was not suitable for this study, and I am proposing to use a qualitative multiple case design.

Population and Sampling

The population selected for this qualitative study was five refinery leaders who used operational strategies to achieve business sustainability in OGI in Niger-Delta states, Nigeria. I used purposeful sampling method as it is appropriate for qualitative research and case studies as described by Walker (2012). Purposeful sampling allows a researcher to obtain participants who may enrich the study by providing in-depth knowledge of the phenomenon and allows researchers use their judgment to select participants based on the study criteria (Suri, 2011). The purpose of this qualitative case study was to explore operations strategies leaders of oil and gas refineries in Nigeria use for business sustainability. I used criterion strategy of purposeful sampling because it involves selection of cases meeting predetermined criterion of importance. The predetermined

criteria for selecting participants were (a) the participants were the leaders of an oil and gas company; (b) the leaders must have had at least an ongoing contract with a major oil and gas company; and (c) the leaders' area of operation must be in Niger-Delta states, Nigeria.

The use of a multiple case study design by a qualitative researcher may raise the question of whether the number of cases in a sample is sufficient (Yin, 2018). Malterud (2012) suggested the selected sample should be sufficiently large and varied to achieve the study objectives. Malterud (2012) further clarified a larger sample size can add depth to the study but the goal of the sample size should be to provide the whole of the story, not just to define a set of numbers or quantity of events. Yin (2018) suggested multiple case studies should be a selection of two or more cases with exemplary outcomes about the research question. For this case study, a sample size of five participants was sufficient to achieve data saturation. Dworkin (2012) suggested an appropriate number of participants required to achieve data saturation in a qualitative study could range from five to 50. An overly large sample size could result in repetitive information; on the other hand, a minuscule sample size might not provide enough data to form any consensus or triangulation in results. However, a small sample size might achieve saturation quicker depending upon the researcher's goal in the study (Mason, 2010). Attaining data saturation is essential to the success of qualitative studies.

Dworkin (2012) asserted quality of interviews, scope of the study, experience of the participants, number of interviews per participant, sampling procedures, and researcher experience influence data saturation. Saturation is a useful tool for ensuring

quality and adequacy of the data collected may support the research study (Walker, 2012). There is a higher likelihood of reaching data saturation if the data collection is purposeful (Suri, 2011). The member checking process aids data saturation in qualitative research. The process I used involved conducting the initial interview, interpreting what the participant shared, and sharing the interpretation with the participant for validation as prescribed by Patton (2015), and Richardson et al. (2013). Participants were interviewed through the use of the Zoom videoconferencing application to comply with the social distance as a result of COVID-19. According to Stake (2013), and Yin (2018), an appropriate environment for conducting interviews is a place in which the participants are not restricted or uncomfortable. Using the Zoom videoconferencing application for the interviews ensured the process was quiet, private, and free from interruptions, which may further enhance the quality of the interaction.

Ethical Research

Ethical research relates to the day-to-day ethical issues occurring while conducting research (Wallace & Sheldon, 2015). Specific processes and procedures are necessary to ensure an ethical execution of the study. I commenced data collection only after the IRB approved my research proposal and I received my IRB approval number (07-23-21-1020624). The IRB approval ensures the researcher adheres to ethical values regarding human research participants in the study. I followed the three basic principles relevant to the ethics of research: (a) respect for persons, (b) beneficence, and (c) justice (Belmont Report, 1979).

After I have completed the selection of participants, I called each participant to explain the intent of the study and obtain the participants' consent. The participants may review the email containing the letter and participant consent form and acknowledged consent by replying to the email with the words *I consent*. Furthermore, I informed participants participation in the study is voluntary and they have the right to stop the study at any time for any reason. As prescribed by Wallace and Sheldon (2015), I informed the participants I am not offering incentives as it might compromise the ethical consideration of voluntary consent. Head (2009) suggested instead of monetary compensation, a copy of the final study to participants as an incentive and an offer to discuss the results further is acceptable.

The participants may acknowledge their consent to participate in the study by replying the email containing the consent form with the words "I consent." I remained courteous and professional at all times with participants through email and telephone contact. Yin (2018) urged researchers to protect the rights of the participants, preserve their privacy and ensure paramount care during data gathering, data storage, and data analysis.

I retained consent forms, along with all recordings, transcripts, and documentation for 5 years, in a locked safe. After the 5 years, I will destroy all consent forms, interviews recording, and transcribed data. To guarantee confidentiality and privacy protection of participants, I did not use names of participants and did not use their official documents in the study. Rather, I assigned participants information a coded label (PP1-PP5). The

assigned label for each participant's audio recordings, transcripts, and documents ensured anonymity and privacy.

Data Collection Instruments

In this qualitative multiple case study, I am the data collection instrument. Data collection took place using Zoom videoconferencing interviews, field notes and relevant company documentation (e.g., annual business plans, strategy documents, and other financial records) as sources of evidence as defined by Yin (2018). I followed an interview protocol (Appendix) outlining procedures to conduct interviews with the research participants. An interview protocol is a procedural guide for directing a qualitative researcher through the interview process (Jacob & Furgerson, 2012). For this study, I used the interview protocol (see Appendix) as a guide to ensure I gather all necessary information in a consistent and organized manner.

Semistructured Zoom videoconferencing interviews with the leaders of oil and gas companies took place as mutually scheduled by the participant and me. By providing a neutral setting, participants may be in an environment conducive to open conversations (Yin, 2018). Englander (2012) prescribed steps contained suggestions for researchers to record each interview and maintain a journal with observations and notes made during the interviews. The semistructured Zoom videoconferencing interviews may involve following a prepared questioning guided in a consistent and systematic manner (see Appendix). Semistructured interviews promote interaction with informants in an interview situation, to foster goal-oriented thinking, and utilize social negotiation and coproduction of knowledge (Mojtahed et al., 2014). Along with semistructured Zoom

videoconferencing interviews, I gathered formal documentation of leaders in the OGI on specific operational strategy for achieving business sustainability. The information was required in the form of leaders' annual reports and strategy documents contained in their business plans. These documents were useful in understanding and validating whether processes are in place and consistent with the oral responses of the participants. Member checking is important in a qualitative study, because it enhances the reliability of the research (Harper & Cole, 2015). Member checking was used to allow participants to review their responses and respond to initial interpretations. Houghton et al. (2013) noted member checking allows the participants to have a voice and engagement within the research process. I reviewed options for member checking with participants during the initial interviews to alleviate concerns about expectations and time commitments. Within 5 days of the interview, I provided copies of the transcripts to each participant through email to request validation of information as described by Thomas and Magilvy (2011). I asked the participants to review the transcribed interviews to look for any errors or missing information. I also asked the participants to review the transcript and provide comments validating, correcting, or clarifying the original interview. I provided the summary of my interpretations to each participant and ask if the summary of responses accurately reflected their responses, and if they could provide more clarity or give additional information. Providing an opportunity for study participants to review the accuracy of the interview responses can enhance the quality of the data collected (Harper & Cole, 2012).

Data Collection Technique

I used interviews with the Zoom videoconferencing application, field notes, and review of relevant company documents such as business plans and annual reports as additional data sources for this study. Interviews are useful to qualitative researchers to understanding opinions, attitudes, experiences, processes, behaviors or predictions of the subject matter of interest (Rowley, 2012). Mojtahed et al. (2014) recognized varieties of interview styles such as structured, unstructured semistructured interview, group interview and focus group interview. For this study, I used semistructured interviews with the Zoom videoconferencing application as my interviewing tool. I used the interview protocol as described in the Appendix to maintain the focus of the interview and provide consistency for my interview with each participant. According to Jacob and Furgerson (2012), the interview protocol assists researchers to solicit consistency by asking same interview questions to all the participants. The interview protocol was used to enhance the quality of information obtained from participants and help mitigate bias.

Semistructured interviews allow a researcher to introduce additional questions to a fixed set of questions to explore the phenomenon. Semistructured interviews can provide reliable, comparable qualitative data and allows participants to express their viewpoints (Turner, 2010). Semistructured interviews are free from barriers and result in the gathering of rich data enabling an understanding of the processes, networks, and relationships (Drew, 2014). A potential disadvantage of a semistructured interview is less information collected during each interview when compared with information collected through unstructured interviews (Rowley, 2012). Rowley (2012) also recognized

semistructured interviews are labor intensive and may require interview sophistication (Rowley, 2012). The reduced amount of data collected during semistructured interviews makes the processing of data more feasible as the researcher is obliged to analyze all data collected (Rowley, 2012). I called the participant to confirm the interview date, and time before the scheduled interviews. During the interview session, the interview date, the time, demographics, and participant interactions with others was noted and hand-written in as field notes. Before commencing the interview, I allowed the participant to have received a copy of their Participant Consent Form. I proceeded with the interview and review of the documents until it become repetitive and no additional information is required as described by Walker (2012) for a case study design. Each of the interviews did not last longer than 60 minutes. I also asked the participants to scan some useful documents for review.

Harvey (2015) described member checking as a process of confirming the responses of members or participants to ensure the accuracy of data gathered, descriptions, and interpretations. Member checking involves the return of interpretative summaries to individual participants for verification and confirmation of their accuracy. Member checking involves the return of interpretative summaries to individual participants for verification and confirmation of their accuracy. I performed member checking, a process which involves conducting the initial interview, interpreting what the participant shared, and sharing the interpretation with the participant for validation as prescribed by Patton (2015), and Richardson et al. (2013). After transcribing the recorded interview answers, I asked the participants to read their responses for accuracy by

showing the participants the transcripts for their review of errors or discrepancies to enhance reliability as suggested by Stake (2010).

Data Organization Technique

I recorded the interview session by audio recording the participant using audio recorder software on my android mobile phone. I used a note pad to record and reflect my observations and responses throughout the research process as prescribed by Tufford and Newman (2012). I transcribed the interviews into text for ease of analysis. Then, I used the NVivo®11 tool, a computer-assisted qualitative data analysis software (CAQDAS) for data analysis (Hilal & Alabri, 2013). In addition to the interviews, I examined business documents (e.g., business plans, and annual reports) to ensure data alignment and relevance. I organized the information contained in the documentation by the case and compare them for similarities and differences in processes explained in the interviews as described by Hilal and Alabri (2013). Once the participant validated the transcribed interviews for accuracy and completeness, I entered the data received into the NVivo®11 software for coding the data into similar themes and analysis as advocated by Bloomberg and Volpe (2012). To protect the identity of the participants, I removed all identifying labels from the leaders of oil and gas documents and labeled them with unidentifiable alphanumeric codes. I used alphanumeric codes, PP1, PP2, PP3, PP4, and PP5 to represent the five participants. I also matched each participant to their company's documents, under the same codes. I placed all documents and recordings in a password protected external hard drive. I safely secured the password protected external hard drive and all copies of documentation received from participants, which I have kept in a

locked, safe for the required period of 5 years. After 5 years of completion of the study, I will destroy all the collected electronic and written data.

Data Analysis

Data analysis involves making sense of relevant research data to identify and correlate themes from the literature and conceptual framework using computer software. As outlined by Carlson (2010), my data analysis included (a) an audit trail of all recordings, notes, and transcripts, (b) reflexivity by the researcher' (c) thick and rich descriptions across each case study, and (d) member checking. I edited the transcriptions into a condensed form removing filler words, off-topic discussions, and repetitive phrases for easier processing and member checking. Researchers should perform member checking in person at the discretion of the participant (Carlson, 2010). Irwin (2013) recommended data gathering and analysis take place concurrently to identify errors and correct them before finalization into the data model. After the participants had validated the accuracy and completeness of the transcript, I used NVivo®11 software to identify themes. NVivo®11 software is a tool specific to compiling data for analysis of qualitative cases into particular words or phrases and arrange similarities to assist in segmenting the data into primary and secondary groups, depending on the number of categories identified during the collection process (Bloomberg & Volpe, 2012; Yin, 2018). I designed coding themes to coordinate with the research questions as suggested by Stuckey (2014). Prendergast and Maggie (2013) suggested researchers use identification themes based on significant or noteworthy statements and further divide them into textual or structural descriptions. Within the analysis process, I continued to consider the stages

of the interview process for context to reflect on the answers as recommended by Miles et al. (2013).

As part of methodological data triangulation, I reviewed various documents, including the participants' organizations' business plans and annual reports. The following are the list of the documents reviewed (a) annual reports providing financial and performance data; and (b) business plans including vision and mission statements, procedures, policies and strategies. Data analysis included the use of sorting, diagramming, and integrating different participant and documented processes into logical narratives. As suggested by Lauckner et al. (2012), my analysis involved a line-by-line coding followed by focused coding based on topics I identified from my interview questions and conceptual frameworks. The main categories may be wound the keywords such as operational strategies, business sustainability, and OGI factors. I outlined core categories for common themes across cases as well as analyzed each case separately. I separated case specific items from common themes held across cases as suggested by Lauckner et al. (2012). The primary task of qualitative inquiry is extracting knowledge from the interview process including subtle or contextually limited factors (Kapoulas & Mitic, 2012). I approached the interview data analysis with a cautious self-scrutiny as described by Hartman (2013) where I acknowledged my perspective and the research setting. I made every effort to reflect the expressions of reality as perceived by the participants.

Reliability and Validity

Validity and reliability are two factors qualitative researchers are concerned about while designing a study, analyzing results and judging the quality of a study (Street & Ward, 2012). Reliability is the ability of others to repeat a study and achieve similar results and enables researchers to replicate study results (Tracy, 2010). Validity involves the ability to confirm the credibility and trustworthiness of the research as presented in the study (Yin, 2018). Over time, both factors have helped to minimize bias or subjectivity and have become criteria to ensure the rigor of qualitative work (Barusch et al., 2011). Various researchers agree confirmability, credibility, transferability, and dependability are better criteria for evaluating qualitative research (Boesch et al., 2013; Goffin et al., 2012; Ithantola & Kihn, 2011). The strategy I adopted to ensure rigor of this research include prolonged engagement, methodological triangulation, member checking, reflexivity, and thick descriptions. Another way to achieve study reliability is to document fully and clarify case study boundaries, participants, locations, and processes, which might affect the ability to conduct case studies (Lauckner et al., 2012). Finally, I adopted the interview protocol for cohesion as well as to reinforce validity, consistency, and reliability.

Reliability

Yin (2018) identified reliability as the repetitive and consistent procedures used by the researcher during the case study. Tracy (2010) added the concept of meaningful coherence as a critical element of the research. Tracy (2010) noted balanced studies must meet four criteria. The criteria include (a) achieve the stated purpose; (b) accomplish

what the study was intended to be about; (c) comprise methods and representation practices aligning with espoused theories and paradigms; and (d) interconnect the literature reviewed with research focus, methods, and findings. I may achieve reliability by following Tracy's (2010) criteria of a coherent study. The use of Zoom videoconferencing interviews with semistructured interview questions, note taking, and the review of business documents for the study is to achieve the stated purpose of exploring operations strategies leaders of oil and gas refineries in Nigeria use for business sustainability. The multiple case study approach is congruent with the constructivism viewpoint of subjective and shared meanings, and the academic literature supporting the research method, design, and the framework.

Dependability refers to the integrity of qualitative studies (Rodrigues et al., 2012). The concept of dependability also aligns with reliability (Marshall & Rossman, 2014). Denzin (2012) reported qualitative researchers establish the trustworthiness of their research through a focus on dependability rather than reliability. I used the interview protocol (Appendix) to demonstrate dependability to minimize the effect of prejudice and misunderstandings as recommended by Yin (2018). I performed member checking by interpreting the interview data and having the participant verify my interpretation. As suggested by Thomas and Magilvy (2011), I may achieve dependability through the articulation of a clear purpose, description of the selection of participants, specification of details in the data collection processes, utilization of a clear and unbiased data analysis system, and demarcation of in-depth discussion results.

Validity

As Yin (2018) noted, a case study analysis meets the criteria of validity if the results match significantly to the predicted outcomes of the study. The goal is to convey an in-depth understanding and encompass the element of explanation. Tracy (2010) noted the importance of credibility through rich description, precise detail, triangulation, and member reflection. The member checking function of allowing participants to review my interpretation of their transcripts to confirm accurate reporting of their contributions to the study achieves creditability, similar to validity (Harper & Cole 2012). Transferability is a determination of the degree to which research processes might apply to other settings or contexts (Houghton et al., 2013; Marshall & Rossman, 2014; Onwuegbuzie et al., 2012). I provided a complete detail for this study relating to the type of industry, geographic location, and the population to enhance transferability. As recommended by Houghton et al. (2013), a thick description strategy requires the researcher to be able to describe the context of the research rigorously so readers can make judgments as to similarities with other situations. Credibility is the opportunity for the researcher to review participant transcripts to verify the accuracy of the interpretation of the experiences (Thomas & Magilvy, 2011). I used member checking to aid accuracy and validation of participants' responses to look for discrepancies or errors and ensure credibility. It is a measure of objectivity within the research by keeping detailed records such as notes, journals, recordings, and transcripts (Bloomberg & Volpe, 2012). Enhancing credibility includes identifying strategies to improve trustworthiness such as prolonged engagement in the field, and use of multiple sources (Lauckner et al., 2012).

Dependability allows other researchers to follow the audit or decision trail of the researcher (Thomas & Magilvy, 2011). Thomas and Magilvy (2011) suggested six components to an audit trail. The components are (a) the purpose of the study, (b) the details of participant selection, (c) the details on data collection, (d) the data coding and analysis processes, (d) discussion of findings, and (e) techniques for establishing credibility. I addressed each of the listed components in the final study. Confirmability refers to whether others can confirm the findings to ensure the results reflect the understandings and experiences from observed participants, rather than the researcher's preferences (Bloomberg & Volpe, 2015; Houghton et al., 2013; & Thomas & Magilvy, 2011). Confirmability includes the reflection by the researcher on the study, noting bias, insights, and feelings about each interview (Houghton et al., 2013). The goal is to develop a sense of trust in the conduct of the overall study for the reader (Thomas & Magilvy, 2011). Qualitative researchers often use data saturation as a methodological concept for ensuring adequate and quality data collection to support the study (Walker, 2012). To achieve data saturation, I did the following: (a) interviewed 5 participants, (b) used the strategy of member checking, and (c) reviewed documents until no new data emerges. The achievement of data saturation requires the continual collection of data until no new data emerges (Walker, 2012). Member checking involves conducting the initial interview, interpreting participant responses and returning the interpretative summaries to individual participants for verification and confirmation of their responses as suggested by Harvey (2015).

To ensure data saturation, I asked participants in this study to expand on answers, and I asked probing follow-up questions to clarify meanings. Qualitative researchers frequently rely on member checking to ensure credibility by giving participants opportunities to correct errors, challenge interpretations, and assess results to confirm the information provided is accurate and complete (Patton 2015; Richardson et al., 2013). To achieve data saturation, my interviews involved member checking. Member checking involves conducting the initial interview and providing participants with a summary of their interview. After conducting the interview, I shared the interpretation with each participant for validation as prescribed by Patton (2015).

Transition and Summary

Section 2 consist of an explanation of the purpose of the planned study approach, including (a) role of the researcher, (b) the participants; (c) research method and design; (d) population and sampling; (e) ethical research; (f) data collection instruments, technique, and organization; and (g) data analysis techniques. Section 2 concluded with a discussion of the methods and techniques for assuring the reliability and validity of my study. Section 3 contains an introduction, the purpose statement, and the research question. Thereafter, I summarized the presentation of the study's findings. Section 3 include (a) application to professional practice, (b) implications for social change, (c) recommendations for action, (d) recommendation for further research, (e) researcher reflections, and (f) a conclusion.

Section 3: Application to Professional Practice and Implications for Change

Introduction

The purpose of this qualitative case study was to explore operations strategies leaders of oil and gas refineries in Nigeria require for business sustainability. Section 3 contains the findings from this study on strategies leaders of oil and gas in refinery business used for business sustainability. This section includes an overview of the study results, application of the study to professional practices, and the implication of the study for social change. This section also includes recommendations for actions based on the findings, suggestions for further study, and my reflections on the doctoral process and a conclusion.

The following were the criteria used for selecting participants: (a) the participants were owners of the oil and gas refineries; (b) the leaders must have had at least an ongoing contract with a major oil and gas company; and (c) the leaders' oil and gas area of operation must be in Niger Delta region, Nigeria. Walden IRB approval was obtained to ensure I followed proper ethical procedures and avoided human rights violations. I used the NVivo®11 tool, a computer-assisted qualitative data analysis software (CAQDAS) for data analysis (see Hilal & Alabri, 2013). In addition to the interviews, I examined business documents (e.g., business plans and annual reports) to ensure data alignment and relevance. I organized the information contained in the documentation by the case and, as described by Irwin (2013), compared them for similarities and differences in processes explained in the interviews. To achieve data saturation, I performed the following: (a) interviewed five participants, (b) used the strategy of

member checking, and (c) reviewed documents until no new data emerged. I identified nine themes from the data: (a) cost cutting and scaling up from smaller projects, (b) enforcing adequate operations and maintenance contracts; (c) guaranteeing consistent raw material supply, (d) exploring industry localization, (e) people-centric strategy, (f) establishment of effective management structure, (g) providing security architecture to local staff and foreigners, (h) creation of new revenue models, and (i) purpose-driven leadership. In this section, I present the findings, application of professional practice, implication for social change, recommendations from the research, reflections, and conclusions.

Presentation of the Findings

I used codes such as PP1-PP5 to represent participants 1-5 (Table 1). All five participants are Nigerians and all attained educational degrees from master's to PhD level. The central research question was:

RQ: What operations strategies do leaders of oil and gas refineries in Nigeria use for business sustainability?

Table 1*General and Demographic Information on the Refinery Operators*

Parameters	#1	#2	#3	#4	#5
Participant code	PP1	PP2	PP3	PP4	PP5
Nationality	Nigerian	Nigerian	Nigerian	Nigerian	Nigerian
Age	56	60	78	62	71
Highest education	Masters	Masters	PhD	Masters	PhD
Years of business experience	36	34	48	35	40

Table 2*Emergence of Themes and Number of Occurrences*

Emergent theme	Number of occurrence	Percentage of occurrence
Cost cutting and scaling up from starting small	5	100%
Enforcing Adequate Operations and Maintenance Contract	4	80%
Guaranteeing the Consistent Supply of Raw Materials: Crude Oil	5	100%
Exploring Localization of Industry	5	100%
People Centric Strategy Through Human Capital Community Sourcing	4	80%
Establishment of Effective Management Structure	5	100%
Providing Security Architecture to Local staff and Foreigners	5	100%
Creation of New Revenue Models: Sharing Financial Risk for Future Rewards	5	100%
Purpose-Driven Leadership Through Diversified Processing	4	80%

Theme 1: Cost Cutting and Scaling Up from Starting Small

The first theme that emerged from the analyzed data was cost cutting and scaling up from starting small. Five leaders of the oil and gas refineries, representing 100% of the participants, agreed that cost cutting and scaling up from starting small was a strategy they used as leaders of oil and gas in Nigeria for business sustainability. PP1 stated,

Nigeria should build more refineries, especially the private sector and should ensure they use world best practice. Run such refineries at cost minimization and make profit. The running of refinery in Nigeria is not similar with the rest of the world because of exchange rate. Run it efficiently as much as possible.

PP2 mentioned,

We started small and grew from there, we used value enhancement, built a 1000 barrel per day refinery which have maximum operations to reach its goals and we used local resources. I will say, start small, do it well, do it safely, be consistent, and grow from there.

PP3 stated,

To ensure we reduce cost of operations, we approached the central bank of Nigeria (CBN) to buy dollar at different windows and at different rates, we got NNPC to commit to provide crude oil in Naira and not in dollar; obtaining such consent help alleviate the challenges of lack of crude oil and at a reduced cost of production.

PP4 mentioned,

We ensure that the working capital at inception were money received at no additional interest. Reduction of cost was a primary goal at inception of the business. We ensured the overhead cost, general expenses, and personnel cost were all at minimal level.

PP5 mentioned, “Such strategies used for cost reduction were to obtain a 6-12 years’ maintenance warranty from the contractors who built the refinery. With this, we were able to focus on production and other activities that were income driven.” Theme 1 aligns with previous literature on start-ups scaling into a large organization (Dash, 2019).

Start-ups are basically entrepreneurial ventures with the intent to grow into large enterprises (Dash, 2019). The innovative idea, enormity of the problem being addressed, size of the market, product-market fit, and the availability of angel and venture capital investments are some of the facilitators of growth of these start-up ventures (Dash, 2019). Start-ups, by virtue of their lean structure, are positioned to innovate quickly, and they iterate fast enough to get the desired outputs in their innovation to market (Dash, 2019). Dash identified ways organizations can scale up from a small organization into a large organization that included product innovation, radical innovation, technological innovation.

Carpenter and Loveridge (2019) summarized four main justifications of the complexity of growth, as the indicators used to measure growth are not neutral with respect to empirical results. Firm growth is not only explained with traditional observable variables such as location, industry, size, age, or capital, but it is also associated with specific unobservable factors such as a firm’s managerial capital or the skills of its

workforce. The other justifications are that innovation performance differs between firms and its impact on firm growth varies in time and space and the differences in firms' profiles, location, market position, and public support (Carpenter & Loveridge, 2019). Although factors associated with small business survival at the establishment level to growth stage are well studied, less is known about operational strategies for Nigerian refineries business sustainability.

Theme 2: Enforcing Adequate Operations and Maintenance Contract

The second theme that emerged from the analyzed data was enforcing adequate operations and maintenance contract. Four leaders of the oil and gas refineries representing 80% of participants agreed that enforcement of adequate operational and maintenance contract was a strategy they used as leaders of oil and gas in Nigeria for business sustainability. PP5 stated,

I would say first of all that with the increasing pressure to meet the nation's growing refinery needs, has made a lot of refineries in Nigeria have now imbibed the culture of including at the onset of their operations, maintenance and turn around maintenance as an add up to the actual refinery projects. Just to reiterate, even the regulators and lenders insist on enforcement of adequate provisions for operations maintenance and turn around maintenance schedule as part of the scope of the refineries project.

PP4 stated,

And so I have to identify clearly who these operations maintenance partners are going to be. You have to be accepted by the people doing the contracting, that is,

people who you know are capable of running the refinery. You have to put together an operations philosophy; you know, sparing philosophy with a team that will run with it. You also have to be absolutely clear because of Nigeria contract, which can be ambiguous. How they are going to train people and also hand over to staff prerogatives. Last but not least is that technological change will happen over the life cycle of the refinery. You have to be able to ensure that whatever it is that is built and being operated must have the maintenance clause in the contract.

PP2 mentioned,

Absolutely critical! Now leading into all these, there's that commercial and economical part of this whole business and then going into the operations strategy itself. So, like I said, it's important to bring in the operations and maintenance contractor early enough and it's also important to engage them at a precommission state. This is what we made sure we did at a precommission state of the refinery to ensure that things that you can pick out at an early state could be corrected before starting.

PP1 mentioned,

Another thing is maintenance of the refinery, attendant impact or the lack of it and nonavailability of spare. There is no scheduled preemptive maintenance in the refinery and in the event something goes wrong, the whole refinery goes down. A needless waiting time and avoidable cost incurred. The government refineries in Nigeria are in excess of 40 years old, they really need to have an active level of maintenance and that again is also missing.

The second theme aligns with previous literature review on life-cycle process of maintenance activities (Kim et al., 2019). Kim et al. identified maintenance activities to include five objects in a refineries site which include equipment and material status identification, commissioning activities, replacement activities, on-site operation, and, and controlling activity.

In industries such as aerospace, manufacturing, transport and energy sectors, maintenance plays a significant role in improving the performance of safety critical equipment and facilities (Arjomandi et al., 2021). Maintenance activities also help industry leaders achieve the greatest possible efficiency, ensure workplace and environmental safety, and reduce unnecessary breakdowns and costs (Arjomandi et al., 2021). Therefore, it is crucial for industry leaders to adopt an optimal maintenance strategy for their critical systems and infrastructure (Arjomandi et al., 2021). Determining an optimal maintenance management strategy is one of the most important decision-making processes in industrial organizations (Arjomandi et al., 2021). Choosing the most suitable maintenance strategy among a set of available options for a piece of equipment involves numerous evaluation criteria, such as cost, safety, time, added-value, reliability (Arjomandi et al., 2021).

Theme 3: Guaranteeing the Consistent Supply of Raw Materials: Crude Oil

The third theme that emerged from the analyzed data was guaranteeing the consistent supply of raw materials, which is crude oil. Five leaders of the oil and gas refineries, representing 100% agreed that guaranteeing the consistent supply of raw

materials, was a strategy they used as leaders of oil and gas in Nigeria for business sustainability. PP1 stated,

In terms of specific examples, I would have to look at revenues that is earned by the refineries. If you look at the refinery business today, the biggest cost item in there is the crude oil. If the Nigeria government supply the crude oil and the 90% of the cost of refineries is crude oil, Nigeria is also the one selling the product, what you then have is a systematic failure when it will not pay for the crude oil on the one hand and secondly the revenue that comes in is maligned by operation cost which is inflated over and above what it should be. What then happen is that the refineries get into cost contract that are higher than normal cost. They should get into arrangements where they sell the refined products for less than what they should be, instead of market rate typically. And then the crude oil that is consumed by the refineries typically they don't pay upfront and over time, the cost of the crude oil is not paid for; this lead to a situation where the business itself will crumble.

PP2 mentioned,

Ensuring that crude field is not impaired and the access to export refine product shouldn't be impaired as well. Refinery business is very challenging, and it has a lot of rigor behind it. Also, then the operation issues of where the operators are, in other to get crude oil down the pipe line to the refinery that could also be an issue. I know for instance, one of the refinery, which is in Port Harcourt, the tanks are leaking, that's a disaster. A leakage is a disaster.

PP3 stated “ensuring the source of the crude oil is guaranteed is an important issue to consider. We have to partner with firms in developing crude oil production. Other questions to ask when starting a refinery are (a) what regulatory license do you need, (b) where do you get sustained supply of crude oil, and where will you have funds?” PP4 stated “the challenges that confronted our business were insufficient crude oil from NNPC, local crude is swap with NNPC from local supply and negotiating with government was difficult. Therefore, we had a seven years’ operations contract before taking over the operations from the promoters. We also had a growth plan that accommodated regular supply of crude oil”. PP5 mentioned “although collaboration is difficult in Nigeria, we had to ensure we bring people that will help us go further such as crude suppliers. One crucial thing you need for refinery is crude and getting a crude supplier to be on board was a major success factor”.

The availability of raw materials is influenced by supply and demand (Escudero et al., 2018). Supply and demand are dependent on developments in mining and processing industries, global economy, environmental impact and political situations (Escudero et al., 2018). Currently it has been determined that there is a sufficient supply of raw materials to meet the current demands in crude oil, but market conditions can result either in short term shortages of other factors of production such as land, labor or capital (Escudero et al., 2018). When there is a shortage of a raw material such as crude oil, both the supply and demand side generally react (Escudero et al., 2018). Factors to be considered when planning raw materials are the social and environmental impact on the availability of raw materials, the utilization of renewable energies during the processing

of the raw material, the available supply of secondary resources, and the technological advances, improving the supply of both primary and secondary resource (Escudero et al., 2018).

Supply of raw materials can be threatened by geological, technological, geopolitical, economic, environmental and social factors (Mancini et al., 2018). In the criticality assessments, the aspects that are commonly included are related to the raw material markets and economy which include market concentration, consumption and demand, technology such as recycling potential, substitutability, by-products, and geopolitical concerns such as governance and political stability of producing countries (Mancini et al., 2018). Resource security is described as access to resources based upon economic and geo-political reasons, resource availability for present and future generations (Mancini et al., 2018). Resource security is a central issue in the sustainability discourse and concerns the geological and physical occurrence of a resource in the Earth, together with technological capability of extracting it (Mancini et al., 2018). In life-cycle assessment (LCA), natural resources represent one of the areas of protection that is next to natural environment and human health (Mancini et al., 2018). The impact related to resource use is assessed through different methods in which limitations to the accessibility due to geopolitical reasons are usually not taken into account (Mancini et al., 2018). The need to take into account in LCA the economic and geopolitical aspects that can reduce resource availability has been acknowledged.

Theme 4: Exploring Localization of Industry

The fourth theme that emerged from the analyzed data was exploring localization of industry. Five leaders of the oil and gas refineries, representing 100% agreed that exploring localization of industry was a strategy they used in Nigeria for business sustainability. PP1 mentioned “The other thing is the location of the refinery especially in the south-south ends has to be close enough to the source of each stock so you’re not a long way from pipe line to terrain that could be prone to vandalism, so you have to do it very close to each stock” PP2 stated,

In addition to that fact that most of the small companies building refineries do not have their own pipeline network. They have to rely on pipeline network of big refineries, and that is a significant cost. But by going close to the refineries and situating it close to the stock of fit stock in the off stream business that is the integration I’m talking about. You’ll find out that you can save on all those losses you might have incurred from shutdown from pipeline outages. Also significant low admin charges that those major companies offer. So when you combine them together you’ll find out that the off stream business has its’ benefits by not having to pay out all these crude charges and all these crude loses. And the refinery business has the benefits that it can actually get the crude at a logistically discounted rate and I use the word logistically discounted because usually assumed to a logistical discount.

PP3 mentioned,

You have to site the refinery close to existing refinery or close to crude oil. We started as novice, and our partners supervised the construction and building. Co-location was one strategy that helped us to gain some traction. We had minimum staff with experience in refinery business and market.

PP4 stated,

Through localization with other refineries, we could jointly manage access to good road, access to power, technology, and management of security. The cost of supplies is also reduced as the suppliers easily locate our plant without extra cost for supplying just one company. However, we are developing our own production line to ensure we remain in production, using young mind human resources.

PP5 mentioned,

Aside bring locations closer to other refineries for obvious advantages such as security and value chain, international joint venture (IJV) can possibly work except for the challenge that of the positions. The only issue is the government share but leave the decisions for the private investors. The decisions are to bring progress to the refineries. Am not sure they will be able to do this. IJV will work in a more commercial environment on a one hand, but with traditional things like procurement to be govern by supply chain management processes which should be transparent and not hidden. And also, you get the best of class in any area of business you can think off. An IJV is good, but who will be the CEO, who will be the CFO, and who will be the COO as look as the government don't have sort of power to dominate the management, then I think this model could be successful.

Through outsourcing, organizations engage external suppliers or service providers to accomplish noncore and some core activities (Etokudoh et al., 2017). Outsourcing involves such steps as third-party supplier selection and managing relationships (Etokudoh et al., 2017). Benefits of outsourcing include resource optimization, competitive advantage, investment and growth opportunities, and risk management (Etokudoh et al., 2017).

One benefit can be pulled together in localization of industries such as production potential, by demonstrating the provision of industry enterprises with basic production assets and production infrastructure. Human resource potentials include the demographic and social characteristics of the economically active population working at industry enterprises in the region (Serbuloy & Shaliapina, 2020). Financial potential is a collection of financial resources that can be attracted for the implementation of inter-cluster projects (Serbuloy & Shaliapina, 2020). Information potential is represented by a set of information resources that provide connections between the participants in inter-cluster interaction (Serbuloy & Shaliapina, 2020). Innovation potential is characterized by a set of all types of resources and conditions for the creation and practical development of the results of scientific research and development. Investment potential is determined by the volume of investments aimed at modernizing and developing the industry in the region (Serbuloy & Shaliapina, 2020).

Theme 5: People-Centric Strategy Through Human Capital Community Sourcing

The fifth theme that emerged from the analyzed data was people-centric strategy through human capital community sourcing. Four leaders of the oil and gas refineries,

representing 100% agreed that people-centric strategy through human capital community sourcing was a strategy they used as leaders of oil and gas in Nigeria for business sustainability. PP1 mentioned,

The second thing is that the government should take its hands off refinery business; let it be run by professionals, people who understand how to implement proper operations, schedule maintenance, risk management around having all the mitigants in place or whatever protection of risk that can be. Ensuring that crude field is not impaired and the access to export refine product shouldn't be impaired as well. Refinery business is very challenging, and it has a lot of rigor behind it.

PP2 stated,

Vandalism in Nigeria is quite unfortunate. This is something that the country has been battling with for many years but to ban anything, you have to have a very robust engagement program, there is a wide accountability, responsibility to community. It should be such that the community itself is embraced to be contributive and be part of the workforce. Things like engaging them as part of the workforce, helping them to have a feel that they are part of the process. Give them the feel that the refineries are good for their environment and for the country and therefore, they should protect the assets

PP3 mentioned,

Community engagement will take care of pipeline protection while lack of it may lead to vandalism. One key strategy should be for government to put in place a legislation to encourage businesses to build more refineries in the country. We

should aim to have more than 100 refineries in Nigeria. The legislation should be such that it encourages the following: Commercial independent, assurances of crude feed, world class operational measures to ensure they don't operate at a loss, subsidy or some form of financial. community engagement, some form of incentives subsidy, tax holidays, buy crude oil, pay 3 months later.

PP4 mentioned,

Have a strong community support, have an MOU with your community, partner with your community such as power supply by supplying community free power. Connect with the people, by creating a sense of ownership among the employees. Policies should have a human face, and ensure you value the inputs of everyone in the organization by acting the talk.

PP5 stated:

Develop an effective feedback system, develop a 360-degree assessment and feedback, create a policy that encourage ideas and questioning the status quo, new ideas, and new ways of working. The senior management should be more visible to junior staff and use reward system to motivate and compensate employees.

The world is facing a paucity of essential resources in this COVID-19 period.

Human and industrial activities are causing devastating effects on the environment, with environmental issues including, deforestation, increasing carbon emission, and global warming (Atiku & Lawal, 2021). To curtail these problems, the global policymakers have been championing the campaign for a more sustainable global economy through sustainable development goals (Atiku & Lawal, 2021). Human capital development

consists of those activities geared towards improving knowledge, sharpening the skills, instilling values, and encouraging the behaviour necessary to actualize the potentials of staff of the organization (Atiku & Lawal, 2021). Strategically, human capital development interventions must be adequately aligned with sustainable development goals for effective transition into a sustainable economy. Hence, there is a need to put in place human capital development strategies for a sustainable economy.

Theme 6: Establishment of Effective Management Structure

The sixth theme that emerged from the analyzed data was establishment of effective management structure. Five leaders of the oil and gas refineries, representing 100% agreed that the establishment of effective management structure was a strategy they used as leaders of oil and gas in Nigeria for business sustainability. PP1 stated “Develop a well-grounded structure with logistics, internal management and all members of your ecosystem for effective operations of the refinery” PP2 stated “because the leadership which comprise the top management and board were in harmony with respect to the objectives of the organization, as soon as I presented the facts to the board, there was this buy-in with the board to give a go-ahead. The management structure was such that help out” PP3 stated “ensure all the top management members learn the business that they are involved in. Despite the departmental role such as human resources, operations, information security, it is important that the structure is such that support the success of the business”. PP4 mentioned “Inefficient management structure can affect the business. For instance, due to insufficient capacity to supply the product in Nigeria, they try to cut corners. They find it difficult to short down to maintain their equipment. This is primarily

because some of the top managements do not understand the structure and nature of refinery”. PP5 stated “some shareholders may have profit as a short-term objective of the organization while they organization itself require stability before making profit. An effective management structure can guarantee harmony at the top hierarchy of the organization”. Theme six confirmed the conceptual framework. Applying the Ulrich model may enable business leaders in Nigeria, to act as managing partners, become employee advocates, acquire knowledge to become administrative experts, and, most importantly, become effective change agents for challenging the status quo (Ulrich, 1997).

Theme 7: Providing Security Architecture to Local Staff and Foreigners

The seventh theme that emerged from the analyzed data was providing security architecture to local staff and foreigners. Five leaders of the oil and gas refineries, representing 100% agreed that providing security architecture to local staff and foreigners was a strategy they used as leaders of oil and gas in Nigeria for business sustainability. PP1 stated liaise with both community and state security outfit to provide both preventive and corrective security architectures to internal staff as well as the external staff. Your staff will have confidence when they realize that you take serious security issues especially when the assignment involves travelling by road”. PP2 mentioned

that the first set of foreigners that visited my refinery in Nigeria could not remain in the country between 2013-2014 as there was increase in bomb blast in the country. What we did was to take some staff to travel abroad to under-study the

foreigners on maintenance and set up of refineries. The major challenge was the cost of embarking on such a huge project.

PP3 stated, “Understanding the situation of insecurity in the country is a concern that must be dealt with effectively before sending local staff on trips or requesting foreigners to visit Nigeria for some quick fix.” PP4 described the experience of having to wait for four hours on a trip with foreigners to the South-South as the road was blocked by bandits and no car was allowed to move forward. “It took the intervention of the security men to clear the road after four good hours”. PP5 mentioned during his responses that

forecasting and planning an effective security architecture cannot be undermine in the planning process and operations of the refineries. The value chain is much; you have the suppliers, the staff, expatriates, customers, regulators, competitors, communities, all these need your protection and security because in the first instance, you are contributing to their exposures.

The seventh theme confirms previous literature. Nielsen and McCarthy (2021) evaluated individuals and organizations should begin to understating their security environment, and establishing a framework for what to protect, how, and to what end. Threat modeling can help practitioners understand local risks and dangers, and like other security thinking, should “derive from a sound analysis of the context, vulnerabilities, threat levels (Nielsen & McCarthy, 2021).

Theme 8: Creation of New Revenue Models: Sharing Financial Risk for Future Rewards

The eight theme that emerged from the analyzed data was creation of new revenue models: sharing risk for future rewards. Five leaders of the oil and gas refineries, representing 100% agreed that creation of new revenue models through sharing financial risk for future rewards was a strategy they used as leaders of oil and gas in Nigeria for business sustainability. PP1 mentioned “we created other sources of revenue driven channels such as diesel, kerosene, and other by-products we could achieve from crude oil. This strategy gave us some stability when products were scares in the market”. PP2 and PP3 mentioned how the investment into other finished products such as kerosene saved the business during a turbulence period. Immediate rewards were postponed for the survival of the business. PP4 also reaffirm how sharing financial risk by investing in human resource development for future rewards helped the business to take advantage of the future. Such investment lowered the risk of high staff turnover and created a committed workforce that build the company to resist any immediate trying times in the market. PP5 in alignment with the rest participants mentioned that diversification is a significant factor in ensuring sustainability in the refinery business. The eight theme confirmed previous literature. Alamäki et al. (2018) confirmed that data, a valuable form of capital, may enable new businesses and promote value creation for companies. In collaborative networks, actors are interacting with each other for co-creating value, and they have different and supporting roles in value-creation processes (Alamäki et al., 2018). Thus, new ways to co-create value in collaborative networks create novel business

opportunities for some companies to sell their data to other actors (Alamäki et al., 2018).

The research of inter-organizational value creation shows that companies are more dependent than ever on the effective knowledge management as it forms basics for new knowledge creation in collaborative networks (Alamäki et al., 2018).

Theme 9: Purpose-Driven Leadership Through Diversified Processing

The ninth theme that emerged from the analyzed data was purpose-driven leadership through diversified processing. Four leaders of the oil and gas refineries, representing 80% agreed that purpose-driven leadership through diversified processing was the strategy they used as leaders of oil and gas in Nigeria for business sustainability. PP1 mentioned “a purpose-driven leadership will ensure all elements for operations are provided, ensuring that crude field is not impaired and the access to export refine product shouldn’t be impaired as well. Refinery business is very challenging, and it has a lot of rigors behind it”. PP2 mentioned that leader should expand the scope of operations beyond financial rewards. Leaders should also explore social and environmental sustainability in the refinery business. PP3 and PP4 jointly mentioned how they have focused on sustainability amidst challenges in local and international energy market. They also stated how using the triple bottom line paradigm, such as economic gains, social and environmental gains have been their bedrock in remaining in business for the past 5 years and more. The ninth theme confirmed previous literature. Zu (2019) described the terms of purpose, corporate social responsibility (CSR), sustainability, stakeholders, and the like as common sentiments expressed in many business circles. CSR is a branch of stakeholder-related theory, and it befits a stakeholder view of the role

of business in society (Zu, 2019). CSR means promoting environmental integrity, economic development and social justice as part of the firm's overall strategy to gain competitive advantage (Zu, 2019). Companies have been increasingly demanded by stakeholders to do more than to provide good products, good services, good prospects, and good profits, but to do something meaningful to employees, customers, environment and society (Zu, 2019).

Applications to Professional Practice

The business implications of revealing operational strategies for Nigerian refineries' business sustainability are numerous. I conducted a qualitative case study to explore operations strategies leaders of oil and gas refineries in Nigeria require for business sustainability. The target population was five senior leaders in five refineries in Nigeria who have demonstrated success in using operational strategies for business sustainability in oil and gas refineries. Some of the application to professional practice as derived from the findings include the ability for practitioners to start from small refineries and grow into large organizations, ensuring a maintenance culture is inbuilt into the operational philosophy of both existing and new refineries in Nigeria, proximity to feedstock as well as ensuring that raw materials which crude oil play a significant role is available all the time, ensuring that the location is close to other refineries to take advantage of localization of industry and ensure that the local community human capital are developed to have a gainful employment in the refineries sited in their villages and localities.

Sinha et al. (2020) described sustainability is the process of living within the limits of available physical, natural and social resources in ways that allow living systems in which humans are embedded to thrive in perpetuity. Looking to the oil and gas sector, operating costs of refineries are correspondingly further reliant on the processing of fuel costs. In today's globalized economy, the diminished requirement of energy consequences in interruption of best possible energy network through sluggish capacity (Sinha et al., 2020). Dentoni et al. (2020) mentioned that greater emphasis has been placed on the need for good corporate social responsibility (CSR) practices that have the capacity to advance community development. Stakeholders have also placed a demand on corporations to develop policies and engage in projects that will improve the conditions of the communities in which they function (Dentoni et al., 2020). CSR has no generally acceptable definition (Nwoke, 2019). CSR is described as the responsibility of enterprises for their impacts on society (Nwoke, 2019).

Implications for Social Change

The study implications for effecting positive social change include improved refinery industry sustainability, resulting in job creation, and improved communities' development within the locations where the refineries are located. The communities need infrastructure to be in place in order to be livable, and throughout history, human societies have been striving to develop (Olusa, 2021). At different times, communities have sought to improve their lot through self-help efforts otherwise known as community development activities, which constitutes part of the development strategy (Olusa, 2021). Olusa (2021) observed that Nigeria is confronted with many developmental challenges,

particularly the rural communities where poverty, diseases, unemployment, inadequate social amenities are features of most of the communities. Against this background, governments and non-governmental organizations embarked on policies and strategies to mitigate the situation in their societies. Over 80% of the population of developing countries resides in the rural community. For this reason, community development efforts ought to be geared towards improving the living standard of the mass of the low-income population residing in rural areas and making the process of their development self-sustaining (Olusa, 2021).

Recommendations for Action

Nigeria is consistently confronted with shortage of petrol used by families, vehicle owners, aviation sector, organizations, religious bodies, and government. The recommendation for action include a five pillars approach which include (a) introducing tailored teaching curriculum on the operational strategies for refineries in Nigerian universities, (b) granting of tax holidays in the first two years of operations for new refineries in Nigeria, (c) zoning of refineries using the six geo-political zones in Nigeria, (d) deregulating the operations of refineries to private operators, (e) allowing foreign investors to participate in refineries in Nigeria, and (f) having a grounded regulatory framework around the operations of refineries in Nigeria.

Mwangi et al. (2019) described tax holiday as a relaxation of the normal tax rules aimed at availing an attractive environment for investment. lowering level of revenue collection from business entities offers space for investors to save. To attract investments, governments can come up with various forms of tax incentives (Mwangi et al., 2019).

These forms can include but not limited to, tax holidays, reduction of tax rate on profits and reduced tariffs on imported products, equipment and raw materials (Mwangi et al., 2019). Mwangi et al. indicated that a tax holiday is not a lasting solution and there are significant dangers to repeating a plan that was only ever meant to be a one-time occurrence.

Recommendations for Further Research

In this study, the purpose of the qualitative case study was to explore operations strategies leaders of oil and gas refineries in Nigeria require for business sustainability. The target population was five senior leaders in five refineries in Nigeria who have demonstrated success in using operational strategies for business sustainability in oil and gas refineries. For further research I recommend for two areas which include the expansion in the number of participants, and a change in the research design and methodology. In this study, I interviewed five participants, however, my recommendation is that in future study, the number of participants should be increased so as to have a more robust insight on their views. Also, participants who are actively involved in the daily running of the refineries may have a different perspective that may be useful for study than those shared by experienced participants. In this study, I used multiple study to explore operations strategies leaders of oil and gas refineries in Nigeria require for business sustainability. My recommendation is that other qualitative design such as phenomenological design, ethnography, narrative, or grounded theory is used to compare results. In addition, the use of quantitative method may make the findings more generalized.

Reflections

I enrolled for a DBA program with the underlying desire to harness the learnings and research discoveries towards unravelling how operational strategies for Nigerian refineries' business sustainability can be improved. Although glad that I took the decision to develop intellectually, it wasn't always smooth sailing at the beginning. It was a mix of setbacks and successes. Also, the perennial shortages of refined petroleum persist within the country despite the abundance of crude oil and impact of the global changing energy mix. I initially had self-doubts about the choice of enrolling for a doctoral study, however, with constant guidance and support from my supervisors, mentors, and peers alike, I am on the journey to complete my Doctoral study in record time. There were several intense stages, one of such was the SPSS stage, developing annotated bibliography and the writing phase. I am grateful for the professional development opportunities I came across such as workshops, seminars, and APA manual in my DBA journey.

Another area of concern for me during my doctoral journey was the frequent travel to see my family in the United Kingdom and the regional work travels while Nigeria remains my work location. This frequent trip even got more challenging in the year 2020 when the COVID-19 became a global pandemic. A major thrust for the pace of the doctoral journey was the well-developed annotated bibliographies from the mentoring sessions for they eventually proved to be good reference repositories for my study interest. My study interest was influenced by the desire to play a critical contributory role in the quest to address the irregularities in the refineries' ecosystem in Nigeria as well as

my career journey. As a onetime president on Nigerian Association of Petroleum Explorationists (NAPE), and a past President of the American Association of Petroleum Geologists, (AAPG), African Region, I want to leave a landmark in the solution to the rehabilitation and rejuvenation of the refineries from its current limbo.

Conclusion

The challenges confronting the operations of refineries in Nigeria are mainly the inability of the operators to understand the strategies for success in such a volatile, uncertain, complex, and ambiguous (VUCA) environment such as Nigeria. No previous literature had focus on the operational strategies required for managing a refinery business in Nigeria. The finding had revealed that with cost reduction, small refineries could scale up from starting small to becoming large, ensure adequate operations and maintenance of equipment, ensure consistent supply of raw material, ensure localization of industry benefits are maximized, ensure the local community benefit from the business in the form of gainful employments, ensure effective succession plan are in place for the refineries, ensure adequate security for lives and properties, ensure the business is diversified, and ensure a purpose-driven leadership in all identified elements of the business. Both government and the citizens should ensure operations are guided with relevant strategies without recourse to practices that have led the sector to its past despairs.

References

- Aalsalem, M. Y., Khan, W. Z., Gharibi, W., Khan, M. K., & Arshad, Q. (2018). Wireless sensor networks in oil and gas industry: Recent advances, taxonomy, requirements, and open challenges. *Journal of Network and Computer Applications*, 113, 87-97. <https://doi.org/10.1016/j.jnca.2018.04.004>
- Abdullahi, D., Suresh, S., Renukappa, S., & Oloke, D. (2017). Key barriers to the implementation of solar energy in Nigeria. A critical analysis. *IOP Conference Series: Earth & Environmental Science*, 83, 2-8. <https://doi.org/10.1088/1755-1315/83/1/012015>
- Abdulkabir, A. N., Sidique, F. S., Rahman, A. A., & Hook, L.S. (2015). Relationship among local content policy, indigenous oil firms' participation and job creation in Nigeria: A theoretical concept. *The Journal of Developing Areas*, 49(4), 425-437. <https://doi.org/10.1353/jda.2015.0129>
- Adeosun, O. & Oluleye A. (2017) *Nigeria's refining revolution*. Price Waterhouse Cooper. <https://www.pwc.com/ng/en/assets/pdf/nigerias-refining-revolution.pdf>
- Agusti, M., Galan, J. L., & Acedo, F. J. (2020). Saving for the bad times. Slack resources during an economic downturn. *Journal of Business Strategy*, 5, 81-101. <https://doi.org/10.1108/JBS-05-2020-0099>
- Alamäki, A., Rantala, T., Valkokari, K., & Palomäki, K. (2018, September). Business roles in creating value from data in collaborative networks. In L. M. Camarinha-Matos, H. Afsarmanesh, & Y. Rezgui (Eds.), *Collaborative networks of cognitive systems: Proceedings of the 19th IFIP WG 5.5 Working Conference on Virtual*

Enterprises, PRO-VE 2018, Cardiff, UK, September 17–19 (pp. 612-622).

Springer. https://doi.org/10.1007/978-3-319-99127-6_53

Alda, E., & Dammert, L. (2020). Weathering the storm. The effects of the external environment on police efficiency in Peru. *Policing International Journal*, 42(6), 1124-1140. <https://doi.org/10.1108/PIJPSM-03-2019-0033>

Al-Qubaisi, S. S., & Ajmal, M. (2019). Determinants of operational efficiency in the oil and gas sector. *Benchmarking. International Journal*, 25(9), 3357-3385.

<https://doi.org/10.1108/BIJ-04-2017-0079>

Alsoboa, S. (2015). The external orientation of strategic management accounting:

Customer accounting, business strategies, and customer performance. *Research Journal of Finance and Accounting*, 6(18), 94-105.

https://www.researchgate.net/publication/284092343_the_external_orientation_of_strategic_management_accounting_customer_accounting_business_strategies_and_customer_performance

Arghode, V. (2012). Qualitative and quantitative research: Paradigmatic differences.

Global Education Journal, 4, 153-164.

Arjomandi, M. A., Dinmohammandi, B. M., & Shafiee, M. (2021). A fuzzy DMATEL-ANP-VIKOR analytical model for maintenance strategy selection of safety critical assets. *Advances in Mechanical Engineering*, 13(4), 1-21.

<https://doi.org.10.1177/1687814021994965>

Atiku, S. O., & Lawal, I. O. (2021). Human capital development strategy for a sustainable economy. In S. O. Atiku & T. Fapohunda (Eds.), *Human resource*

management practices for promoting sustainability (pp. 116-133). IGI Global.

<https://orcid.org/0000-0001-9364-3774>

Ayoola, T. J., & Olanmi O. O. (2013). Business case for integrated reporting in the Nigerian oil and gas sector. *Issues in Social & Environmental Accounting*, 7(1), 30- 54. <https://doi.org/10.22164/isea.v7i1.74>

Babatunde, O. M., Munda, J. L., & Hamam, Y. (2020). How can low-income household procure small-scale hybrid renewable energy system? *International Journal of Energy Sector Management*, 13(4), 1149-1172. <https://doi.org/10.1108/IJESM-03-2019-0003>

Belso-Martínez, J. A., Xavier Molina-Morales, F., & Mas-Verdu, F. (2013). Perceived usefulness of innovation programs for high-tech and low-tech firms. *Management Decision*, 51(6), 1190-1206. <https://doi.org/10.1108/MD-04-2012-0314>

Bozkurt, Ö. C. & Kalkan, A. (2014). Business strategies of SME's, innovation types and factors influencing their innovation. *Ege Academic Review*, 14, 189-198. <http://www.econpapers.repec.org/>

Brorström, S., Argento, D., Grossi, G., Thomasson, A., & Almqvist, R. (2018). Translating sustainable and smart city strategies into performance measurement systems. *Public Money & Management*, 38(3), 193-202. <https://doi.org/10.1080/09540962.2018.1434339>

Carpenter, C. W., & Loveridge, S. (2019). Business, owner, and regional characteristics in Latino-owned business growth. Empirical analysis using confidential census

microdata. *International Regional Science Review*, 43(3), 254-285.

<https://doi.org.10.1177/0160017619826278>

Condie, J. (2012). Beyond rationalisations: Improving interview data quality. *Qualitative Research in Accounting & Management*, 9(2), 168-193.

<https://doi.org/10.1108/11766091211240379>

Creswell, J. W., & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches*. Sage.

Das, V. (2020). De-escalation strategies for kleptocracy in Nigeria oil sector. *Journal of Finance Crime*, 27(3), 821-834. <https://doi.org/10.1108/JFC-03-2020-0036>

Darvin, L., Pegoraro, A., & Berri, D. (2018). Are men better leaders? An investigation of head coaches' gender and individual players' performance in amateur and professional women's basketball. *Sex Roles*, 78(7-8), 455-466.

<https://doi.org/10.1007/s11199-017-0815-2>

Dash, A. (2019). Scaling the innovativeness of start-ups in India. *SEDME (Small Enterprises Development, Management & Extension Journal)*, 46(3), 196-204.

<https://doi.org.10.1177/0970846419863874>

Dentoni, D., Pinkse, J., & Lubberink, R. (2020). Linking sustainable business models to socio-ecological resilience through cross-sector partnerships. A complex adaptive systems view. *Business & Society*, 60(5), 1216-1252.

<https://doi.org.10.1177/0007650320935015>

Denzin, N. K., & Lincoln, Y. S. (Eds.). (2011). *The SAGE handbook of qualitative research*. Sage.

- Doukas, H., Flamos, A., Karakosta, C., Flouri, M., & Psarras, J. (2010), Web tool for the quantification of oil and gas corridors socio-economic risk. *International Journal of Energy Sector Management*, 4(2), 213-235.
<https://doi.org/10.1108/17506221011058704>
- Drew H. (2014). Overcoming barriers: Qualitative interviews with German elites. *The Electronic Journal of Business Research Methods*, 12(2), 77-86.
<http://www.ejbrm.com>
- Dworkin, S. L. (2012). Sample size policy for qualitative studies using in-depth interviews. *Archives of sexual behavior*, 41, 1319-1320.
<https://doi.org/10.1007/s10508-012-0016-6>
- Ebneyamini, S., & Bandarian, R. (2019). Explaining the role of technology in the dynamics of the players' business models in the global oil playground. *International Journal of Energy Sector Management*, 13(3), 556-572.
<https://doi.org/10.1108/IJESM-09-2018-0004>
- Ekhator, E. O., & Anyiwe, L. (2016). Foreign direct investment and the law in Nigeria. A legal assessment. *International Journal of Law and Management*, 58, 126-146.
<https://doi.org/10.1108/IJLMA-08-2014-0049>
- Etokudoh, E. P., Boolaky, M., & Gungaphul, M. (2017). Third party logistics outsourcing. Exploratory study of the oil and gas industry in Nigeria. *Sage Open*, 12(2), 1-19. <https://doi.org/10.1177/2158244017735566>
- Escudero, L. F., Monge, J. F., & Morales, D. R. (2018). On the time-consistent stochastic dominance risk averse measure for tactical supply chain planning under

uncertainty. *Computers & Operations Research*, 100, 270-286.

<https://doi.org/10.1016/j.cor.2017.07.011>

Gammelgaard, B. (2017). The qualitative case study. *The International Journal of Logistics Management*, 28(4), 910-913. <https://doi.org/10.1108/IJLM-09-2017-0231>

Geo, P., Zhang, J., Gong, Y., & Li, H. (2020). Effects of technical IT capabilities on organizational agility. *Industrial Management & Data Systems*, 120(5), 941-961. <https://doi.org/10.1108/IMDS-08-2019-0433>

Gill, S. (2020). Strategic entrepreneurship and performance. An institutional perspective on Indian family businesses. *Journal of Entrepreneurship in Emerging Economies*, 13(5), 22-44. <https://doi.org/10.1108/JEEE-01-2020-0013>

Hartmann, J., Inkpen, A., & Ramaswamy, K. (2020). The oil and gas industry. Finding the right stance in the energy transition sweepstakes, *Journal of Global Operations and Strategic Sourcing*, 5, 111-114. <https://doi.org/10.1108/JBS-07-2020-0156>

Hayes, B., Bonner, A., & Douglas, C. (2013). An introduction to mixed methods research for nephrology nurses. *Renal Society of Australasia Journal*, 9, 8-14. <http://www.renalsociety.org/RSAJ/>

Hilal, A. H., & Alabri, S. S. (2013). Using NVivo for data analysis in qualitative research. *International interdisciplinary journal of education*, 2(2), 181-186.

- Houghton, C., Casey, D., Shaw, D., & Murphy, K. (2013). Rigour in qualitative case study research. *Nurse Researcher*, 20(4), 12-17.
<https://doi.org/10.7748/nr2013.03.20.4.12.e326>
- Jacob, S. A., & Furgerson, S. (2012). Writing interview protocols and conducting interviews: Tips for students new to the field of qualitative research. *Qualitative Report*, 17(42), 1-10. <https://doi.org/10.46743/2160-3715/2012.1718>
- Jagoda, K., & Wojcik, P. (2019). Implementation of risk management and corporate sustainability in the Canadian oil and gas industry. *Accounting, Research Journal*, 32, 381-398. <https://doi.org/10.1108/ARJ-05-2016-0053>
- Iheukwumere, O. E., Moore, D., & Omotayo, T. (2020). Investigating the challenges of refinery construction in Nigeria: A snapshot across two-timeframes over the past 55 years. *International journal of construction supply chain management*, 10(1), 46-72. <https://doi.org/10.14424/ijcscm100120-46-72>
- Kassem, M. A., Khoiry, M. A., & Hamzah, N. (2020). Theoretical review on critical risk factors in oil and gas construction projects in Yemen. *Engineering Construction and Architectural Management*, 16, 1-35. <https://doi.org/10.1108/ECAM-03-2019-0123>
- Kim, B. C., Kim, B., Park, S., Teiggeler, H., & Mun, D. (2019). ISO-15926-based integration of process plant life-cycle information including maintenance activity. *Concurrent Engineering Research and Applications*, 28(1), 58-71.
<https://doi.org/10.1177/1063293X19894041>

- Khodabakhshi, M., & Ahmadi, M. (2021). An approach to cost-benefit analysis by competitive advantages with stochastic data. *Journal of Modelling in Management*, 17, 52-71. <https://doi.org/10.1108/JM2-07-2020-0185>
- Koch, L. C., Niesz, T., & McCarthy, H. (2014). Understanding and reporting qualitative research: An analytical review and recommendations for submitting authors. *Rehabilitation Counseling Bulletin* 57(3), 131 –143. <https://doi.org/10.1177/0034355213502549>
- Koh, S. C., Morris, J., Ebrahimi, S.M., & Obayi, R. (2016). Integrated resource efficiency. Measurement and management. *International Journal of Operations & Production Management*, 36(11), 1576-1600. <https://doi.org/10.1108/IJOPM-05-2015-0266>
- Krishnan, D., Islam, R., & Sarif, S. M. (2020). A hierarchical model to enhance financial and strategic performance of an oil and gas company in Malaysia. *International Journal of Energy Sector Management*, 14(2), 482-503. <https://doi.org/10.1108/IJESM-01-2019-0001>
- Kyengo, J. W., Ombui, K., & Iravo, M. A. (2016). Influence of competitive strategies on the performance of telecommunication companies in Kenya. *International Academic Journal of Human Resource and Business Administration*, 2(1), 1-16.
- Lauckner, H., Paterson, M., & Krupa, T. (2012). Using constructivist case study methodology to understand community development processes: Proposed methodological questions to guide the research process. *The Qualitative Report*, 17(13), 1-22. <https://doi.org/10.46743/2160-3715/2012.1790>

- Longenecker, C., & Fink, L. (2017). Lessons for improving your formal performance appraisal process. *Strategic HR Review*, 16(1), 32-38.
<https://doi.org/10.1108/SHR-11-2016-0096>
- Malterud, K. (2012). Systematic text condensation: A strategy for qualitative analysis. *Scandinavian Journal of Public Health*, 40(8), 795-805.
<https://doi.org/10.1177/1403494812465030>
- Mancini, L., Benini, L., & Sala, S. (2018). Characterization of raw materials based on supply risk indicators for Europe. *The International Journal of Life Cycle Assessment*, 23(3), 726-738. <https://doi.org/10.1007/s11367-016-1137-2>
- Matthias, O., & Brown, S. (2016). Implementing operations strategy through processes within health care. *International Journal of Operations & Production Management*, 36(11), 1435-1457. <https://doi.org/10.1108/IJOPM-04-2015-0194>
- Marodin, G. A., Frank, A. G., Tortorella, G. L., & Fetterman, D. C. (2019). Lean production and operational performance in the Brazilian automotive supply chain. *Total Quality Management & Business Excellence*, 30(3-4), 370-385.
<https://doi.org/10.1080/14783363.2017.1308221>
- Marshall, C. & Rossman, G. B. (2016). *Designing qualitative research* (5th ed.). Sage.
- Mason, M. (2010). Sample size and saturation in PhD studies using qualitative interviews. *Forum: Qualitative Social Research*, 11, 1-14. <http://www.qualitative-research.net>
- Mas'ud, A., Yusuf, R., Udin, N. M., & Al-Dhamari, R. (2020). Enforce environmental tax compliance model for the oil and gas industry. *International Journal of*

Energy Sector Management, 14(6), 1073-1088. <https://doi.org/10.1108/IJESM-11-2019-0005>

McManamny, T., Sheen, J., Boyd, L., & Jennings, P. A. (2015). Mixed methods and its application in prehospital research: A systematic review. *Journal of Mixed Methods Research*, 9(3), 214-231. <https://doi.org/10.1177/1558689813520408>

Mirkouei, A., Mirzaie, P., Haapala, K. R., Sessions, J., & Murthy, G. S. (2016). Reducing the cost and environmental impact of integrated fixed and mobile bio-oil refinery supply chains. *Journal of Cleaner Production*, 113, 495-507. <https://doi.org/10.1016/j.jclepro.2015.11.023>

Modarress, B., Ansari, A., & Thies, E. (2016). Outsourcing in the Persian Gulf petroleum supply chain. *Strategic Outsourcing. International Journal*, 9, 2-21. <https://doi.org/10.1108/SO-08-2015-0019>

Mwangi, M., Macharia, I., & Kibet, Y. (2019). Effect of tax holiday on tax revenue collection among export processing zone companies in Kenya: (A case study of Export Processing Zone Athi River). *Journal of Finance and Accounting*, 3(4), 57-65. <https://doi.org.10.1177/0009145124112>

National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. (1979). *The Belmont report: Ethical principles and guidelines for the protection of human subjects of research*. U.S. Department of Health and Human Services.

- Nielsen, P., & McCarthy, D. (2021). *Risks, dangers, and threat models: Evaluating security analysis for conflict practitioners*. The Jimmy and Rosalynn Carter School for Peace and Conflict Resolution.
- Nnamseh, M., & Akpan, S. S. (2015). Revitalizing small business growth strategies: Exploring the risk-benefit of strategic management approaches. *International Business Research*, 8, 87-101. <https://doi.org/10.5539/ibr.v8n7p87>
- Nwoke, U. (2019). Ineffective business responsibility engagements in areas of limited statehood. Nigeria's oil sector as a case study. *Business & Society*, 60(7), 1606-1642. <https://doi.org/10.1177/0007650319869672>
- Nyameboame, J., & Haddud, A. (2018). Exploring the impact of outsourcing on organizational performance. *Journal of Global Operations and Strategic Sourcing*, 10(3), 362-387. <https://doi.org/10.1108/JGOSS-01-2017-0001>
- Ochieng, E. G., Ovbagbedia, O. O., Zuofa, T., Abdullahi, R., Matipa, W., Ruan, X., & Oledinma, A. (2018). Utilizing a systematic knowledge management-based system to optimizing project management operations in oil and gas organizations. *Information Technology & People*, 31(2), 527-556. <https://doi.org/10.1108/ITP-08-2016-0198>
- Odeleye, A. T. (2014). Corporate financing and efficiency of indigenous energy firms in Nigeria: A literature review. *International Journal of Energy Economics and Policy*, 4, 53-64. <http://www.econjournals.com>

- Ogbon, N. O., Otanocha, O. B., & Rim-Rukeh, A. (2018). An assessment of the economic viability and competitiveness of modular refinery in Nigeria. *Nigerian Journal of Technology*, 37(4), 1015-1025. <https://doi.org/10.4314/njt.v37i4.22>
- Ogbuigwe, A. (2018). Refining in Nigeria: History, challenges and prospects. *Applied Petrochemical Research*, 8(4), 181-192. <https://doi.org/10.1007/s13203-018-0211-z>
- Olusa, A. O. (2021). Impact of community social development projects on community improvement. Case of Ibude-Soro community, Ondo, state, Nigeria. *Journal of Infrastructure Development*, 13(1), 7-20. <https://doi.org.10.1177/09749306211023615>
- Pamela, A. C. J., Umoh, G. I., & Worlu, G. (2017). Human resource planning and organizational performance in oil and gas firms in Port Harcourt. *Human Resource Planning*, 3(9). <https://doi.org/10.1007/s41247-018-0035-6>
- Popa, D., & Miricescu, D. (2015). Identification of strategic actions and types of strategies adopted by SMEs in Sibiu county. *Review of Management and Economic Engineering*, 14, 279-296. <http://www.rmee.org/>
- Porter, M. (2003, January). The five competitive forces that shape strategy. *Harvard Business Review*, 78-94. <http://www.hbr.org>
- Rahdari, A. H. (2016). Developing a fuzzy corporate performance rating system: a petrochemical industry case study. *Journal of Cleaner Production*, 131, 421-434. <https://doi.org/10.1016/j.jclepro.2016.05.007>

- Rasaki, E. O., & Abioye, A. (2019). Human, conceptual and technical skills as determinants of preservation management in university libraries in Southern Nigeria. *Global Knowledge, Memory & Communication*, 67, 34-51.
<https://doi.org/10.1108/GKMC-08-2016-0063>
- Richardson, A., Davey, M. P., & Swint, P. A. (2013). Female adoptees' experiences balancing relationships with biological and adoptive mothers post- unification. *Journal of Marital and Family Therapy*, 39, 358-372.
<https://doi.org/10.1111/j.1752-0606.2012.00321.x>
- Saad, A. Y., & Mas'ud, A. (2020). Validating oil and gas royalty rate measurement scale. Evidence from Nigeria. *International Journal of Energy Sector Management*, 14(3), 653-666. <https://doi.org/10.1108/IJESM-09-2019-0010>
- Sansone, C., Hilletoft, P., & Eriksson, D. (2020). Evaluation of critical operations capabilities for competitive manufacturing in a high-cost environment. *Journal of Global Operations & Strategic Sourcing*, 13(3), 229-250.
<https://doi.org/10.1108/JGOSS-10-2019-0055>
- Sebestová, J., & Nowáková, K. (2014). Dynamic strategy for sustainable business development: mania or hazard? *Amfiteatru Economic*, 15, 442.
http://www.amfiteatruconomic.ro/Home_EN.aspx
- Serbulov, A., & Shaliapina, M. (2020). Role of industrial cooperation and inter-cluster interaction in the development of localization of production in shipbuilding. *SHS Web of Conferences*, 89(1), 1411-1484.
<https://doi.org/10.1051/shsconf/20208907007>

- Simon, M. K. & Goes, J. (2013). Assumption, limitations, delimitations, and scope of the study. In *Dissertation and scholarly research: Recipes for success*. Dissertation Success LLC. <http://www.dissertationrecipes.com/wp-content/uploads/2011/04/>
- Sinha, B., Roy, S., & Bhagat, M. (2020). Sustainable green policy by managing flare gas recovery. A case with middle east oil and gas industry. *Vision*, 24(1), 35-46. <https://doi.org.10.1177/0972262919862410>
- Stake, R. E. (2006). *Multiple case study analysis*. Guilford Press.
- Strauss, A., & Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (2nd ed.). Sage.
- Suri, H. (2011). Purposeful sampling in qualitative research synthesis. *Qualitative Research Journal*, 11, 63-75. <https://doi.org/10.3316/QRJ1102063>
- Sweis, R., Moareti, S., & Saleh, R. (2020). Causes of delay in Iranian oil and gas projects. A root cause analysis. *International Journal of Energy Sector Management*, 13, 630-650. <https://doi.org/10.1108/IJESM-04-2018-0014>
- Tang, K. H. D., Dawal, S. Z. M., & Olugu, E. U. (2018). Integrating fuzzy expert system and scoring system for safety performance evaluation of offshore oil and gas platforms in Malaysia. *Journal of Loss Prevention in the Process Industries*, 56, 32-45. <https://doi.org/10.1016/j.jlp.2018.08.005>
- Tufford, L., & Newman, P. (2012). Bracketing in qualitative research. *Qualitative Social Work*, 11(1), 80-96. <https://doi.org/10.1177/1473325010368316>
- Uchegbulam, P., & Akinyele, S. T. (2015). Competitive strategy and performance of selected SMEs in Nigeria. *International Conference on African Development*

Issues (CIJ-ICA DI): Social and Economic Models for Development Track, 2,
326-333. <http://covenantuniversity.edu.ng>

- Unluer, S. (2012). Being an insider researcher while conducting case study research. *Qualitative Report, 17*(29), 58. <https://doi.org/10.46743/2160-3715/2012.1752>
- Ugoeze, N. (2020, September 17). Modular refineries will stop fuel importation, reduce price, says FG. *The Guardian*. <https://guardian.ng/news/modular-refineries-will-stop-fuel-importation-reduce-price-says-fg/>
- Ulrich, D. (1997). *Human resource champions –The next agenda for adding value and delivering results*. Harvard Business School Press.
- Ulrich, D. (1998). A new mandate for human resources. *Harvard Business Review, 76*(1), 124-135. <https://hbr.org/1998/01/a-new-mandate-for-human-resources>
- Uyanga, K.A.M., Okwu, M.O., Adeoye, A.O. and Ogbeide, S.E. (2018). Production and characterization of organic solar cells. *World Journal of Engineering, 15*(4),540-548. <https://doi.org/10.1108/WJE-06-2017-0136>
- Vikas, V., Bansal, R. (2019). Efficiency evaluation of India oil and gas sector. Data envelopment analysis. *International Journal of Emerging Markets, 14*, 362-378. <https://doi.org/10.1108/IJoEM-01-2018-0016>
- Vogt, K., Johnson, F., Fraser, V., Koh, J. C., McQueen, K., Thornhill, J., & Verbowski, V. (2015). An innovative, strengths-based, peer mentoring approach to professional development for registered dietitians. *Canadian Journal of Dietetic Practice and Research, 76*(4), 185-189. <https://doi.org/10.3148/cjdpr-2015-027>

Walker, J. L. (2012). Research column: The use of saturation in qualitative research.

Canadian Journal of Cardiovascular Nursing, 22(2), 37-41.

Xu, M. A., & Storr, G. B. (2012). Learning the concept of researcher as instrument in qualitative research. *The Qualitative Report*, 17(21), 1-18.

<http://www.nova.edu/ssss/QR/QR17/storr.pdf>

Yin, R. K. (2018). *Case study research: Design and methods* (5th Ed.). Sage.

Zu, L. (2019). Purpose-driven leadership for sustainable business: From the perspective of Taoism. *International Journal of Corporate Social Responsibility*, 4(1), 1-31.

<https://doi.org/10.1186/s40991-019-0041-z>

Appendix: Interview Protocol

Participant Code: _____ Date of Interview: _____

Interview Mode: Face-to-face _____ Video conferencing _____

Telephone _____ Others (please specify) _____

Guidance notes:

- Explain the purpose of the study to the participant.
- Retrieve signed informed consent forms
- Write the label assigned to the participant on top of the interview sheet to ensure confidentiality.
- Audiotape the interview and assign same label to identify the data.
- Watch for non-verbal queues
- Ask follow-up probing questions to get more in-depth information
- Wrap up interview thanking participant

Interview Questions

1. What operations strategies have you used to achieve business sustainability for your organization's refineries in the last 5 years in Nigeria?
2. What are some specific examples of operations strategies you used as leader of your organization's refineries in Nigeria for business sustainability?
3. What are the key challenges you faced to implement operations strategies for business sustainability?
4. How did you address the key challenges to implementing the strategies for business sustainability?

5. How did you promote policies and values that align with operations strategies used to achieve business sustainability in your organization?
6. What role has leadership played in the implementation of successful operations strategies used to increase rate of success in the refineries in Nigeria?
7. What other information would you like to share about operations strategies in your organization in Nigeria that has helped achieve your refineries' business sustainability?