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Human Resource Local Content in Ghana's Upstream Petroleum Industry

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Abstract

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Abstract

Enactment of Ghana's Petroleum (Local Content and Local Participation) Regulations, 2013 (L.I. 2204) was intended to regulate the percentage of local products, personnel, financing, and goods and services rendered within Ghana's upstream petroleum industry value chain. Five years after the inception of Ghana's upstream oil and gas industry, a gap is evident between the requirements of L.I. 2204 and professional practice. Drawing on Lewin's change theory, a cross-sectional study was conducted to examine the extent of differences between the prevailing human resource local content and the requirements of L.I. 2204 in Ghana's upstream petroleum industry. The extent to which training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevalent local content in its upstream petroleum industry was also examined. Survey data were collected from 97 management, technical, and other staff in 2 multinational petroleum companies whose oil and gas development plans have been approved by the Petroleum Commission of Ghana. To answer the research questions and test their hypotheses, one-way ANOVA was performed with staff category (management, technical, and other) as the independent variable and prevalent local content as the dependent variable. Results indicated that prevailing local content in Ghana's upstream petroleum industry meets the requirements of L.I. 2204. Further, training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevalent local content in its offshore petroleum industry. Findings may encourage leaders within multinational oil companies and the Petroleum Commission of Ghana to organize educational seminars that equip indigenous Ghanaians with specialized skills for working in Ghana's upstream petroleum industry.

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Dedication

This dissertation is dedicated to my mother, Grace Benin, and to my daughter, Adjoah Benin. They have both been a great source of strength and motivation for me. It is also dedicated to my siblings, Ekua Benin-Prah and Jojo Benin, who challenged my thinking throughout the dissertation writing process. Lastly, this study is dedicated to my father, Frank Benin, and to my wife, Dr. Amma Benin, for their constant encouragement that enabled me to successfully complete my doctoral study.

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Chapter 1: Introduction to the Study

Amin (2011) observed that the inception of Ghana's upstream oil and gas industry in late 2010 raised the expectation of job creation within the petroleum industry to reduce the level of unemployment among indigenous Ghanaians. When Ghana started producing oil in 2011, the Government of Ghana (GoG) sponsored hundreds of students to undertake oil and gas courses abroad to enable them to acquire jobs within Ghana's upstream oil and gas sector. On July 5, 2013, the GoG enacted into law Ghana's Petroleum (Local Content and Local Participation) Regulations, 2013, also known as L.I. 2204. The percentages of locally produced materials, personnel, financing, and goods and services rendered within Ghana's upstream petroleum industry value chain are regulated under L.I. 2204. A survey conducted to investigate the prevalent human resource local content in Ghana's upstream petroleum industry could address the existing gap between the requirements of L.I. 2204 and professional practice.

My aim in conducting this quantitative cross-sectional study was to determine the extent of differences between the prevailing human resource local content and the requirements of L.I. 2204 in Ghana's upstream petroleum industry. I also aimed to determine the extent to which the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevailing local content in its upstream petroleum industry. The findings of the study may facilitate efforts by the Petroleum Commission of Ghana to bridge the gap between the human resource local content requirements of L.I. 2204 and professional practice. Lewin's (1947) change theory constituted the theoretical

framework of the study. Confirmation of existing variance between the human resource local content requirements of L.I. 2204 and professional practice in Ghana's offshore petroleum sector could result in the implementation of necessary strategies to change the status quo by the Petroleum Commission of Ghana. The prospective implications of this study for bringing about positive social change include the possible organization of seminars by multinational oil companies aimed at informing indigenous Ghanaians about the various skills required to take up jobs in Ghana's upstream petroleum industry. In this chapter, I present the problem statement, purpose, research questions, theoretical foundation, and nature of the study.

Background of the Study

Ugwushi, Olabowale, Eloji, and Ajayi (2011) investigated the efficacy of Nigeria's oil and gas industry local content policy (LCP), with a particular focus on how the policy has boosted commercial activities and served to resolve some of Nigeria's socioeconomic challenges. Participants reported some level of indifference regarding LCPs, and the results indicated that an insignificant level of entrepreneurial follow-up had occurred. Moreover, the efficiency of LCPs revealed that creating business prospects and job opportunities, and establishing special quota arrangements to benefit indigenes in oil-producing countries, were critical considerations (Ugwushi et al., 2011).

Based on a study of the Nigerian local content bill, Atsegbua (2012) affirmed that this regulation has contributed significantly to the domestication of the oil and gas sector through home-grown value addition within the Nigerian economy. Atsegbua found that

approximately 90% of goods and services within Nigeria's petroleum industry were procured from overseas, thereby accounting for the absence of indigenous players within this sector. Atsegbua emphasized that local content law was aimed at increasing local participation within Nigeria's petroleum industry through the establishment of minimum thresholds for the use of indigenous goods and services, as well as by prioritizing the employment of indigenes within this sector. Based on an analysis of the provisions of the Nigerian Local Content Act, Atsegbua argued that the Act's implementation has been critical for enhancing local participation within the vibrant Nigerian oil sector. Atsegbua concluded that Nigeria's local content regulation, like similar regulations in Kuwait, Venezuela, and Saudi Arabia, was aimed at empowering indigenous companies and aiding the development of indigene technical capacity for the Nigerian oil and gas sector.

Oluwafemi (2013) examined the predictive roles of contextual (procedural, distributive, and interactional justice) and dispositional (agreeableness, conscientiousness, and emotional stability) variables on turnover intention among employees within Nigeria's oil and gas industry. Using a cross-sectional survey design, Oluwafemi revealed that a significant negative relationship existed between contextual variables and turnover intention. In addition, Oluwafemi conjectured that a substantial negative correlation existed between dispositional variables and turnover intention. By controlling for tenure and age, Oluwafemi showed that contextual variables accounted for greater variance in turnover intention, justifying the assumption of a weak effect of dispositional traits under stable circumstances. These findings support those of Atsegbua

(2012) on the need to develop the technical capacities of indigenes in oil-producing countries.

Problem Statement

The general problem addressed in this study was the gap between knowledge and professional practice relating to local content in Ghana's upstream oil and gas industry. Atsegbua (2012) and Gray (2013), who studied LCPs in Nigeria and Brazil, respectively, emphasized the need to investigate the local content aspect of oil production in developing countries. Within Ghana, the indigenous population has questioned the pragmatism of L.I. 2204. Plänitz and Kuzu (2014) reported that 67.1% of Ghanaian citizens who responded to a nationwide survey about the significance of oil in the country believed that politicians would not help to improve their lives. Despite the existence of a local content and local participation regulation in Ghana, there are growing concerns about the lack of available jobs for indigenous people in the country's upstream oil and gas fields. Based on a critical examination of livelihood capitals and the job situation, Ramos-Mrosovsky (2012) argued that jobs related to oil production that have been promised by the government are simply not available.

The specific problem addressed in this study was the lack of measurement of the prevailing human resource local content in Ghana's oil industry, which has not been matched to the requirements of L.I. 2204. Further, it has not been established whether the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevailing local content in its upstream petroleum industry. Regarding the human

resource component of local content, L.I. 2204 stipulates that 30% of employed management staff should be indigenous Ghanaians from the date of effectiveness of an issued petroleum license agreement. Further, according to this regulation, 5 and 10 years after the issue of an agreement, 50–60% and 70–80%, respectively, of the management staff are required to be indigenous. L.I. 2204 also stipulates that the indigenous component of core technical staff should be 20% at the inception, 50–60% in 5 years, and 70–80% in 10 years. Lastly, the indigenous component of other staff should be 80% at the inception and 90% and 100% after 5 and 10 years, respectively.

Purpose of the Study

The purpose of this quantitative cross-sectional survey-based study was to determine the extent of differences between the prevailing human resource local content and the requirements of L.I. 2204 in Ghana's upstream petroleum industry. A specific aim was to ascertain to what extent, if at all, the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affected the prevailing local content in its upstream petroleum industry. A cross-sectional survey design was adopted for the study. The unit of analysis was Ghana's upstream petroleum sector, focusing on two multinational petroleum companies whose oil and gas development plans have been approved by the Petroleum Commission of Ghana.

Research Questions (RQs) and Hypotheses

RQ1: To what extent, if at all, does the prevailing human resource local content differ from the requirements of Ghana's petroleum local content regulation in its upstream petroleum industry?

H1o: The prevailing human resource local content does not differ from the requirements of Ghana's petroleum local content regulation in its upstream petroleum industry.

$H1_1$: The prevailing human resource local content does differ from the requirements of Ghana's petroleum local content regulation in its upstream petroleum industry.

RQ2: To what extent, if at all, does the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affect the prevailing local content in its offshore petroleum industry?

$H2_0$: The training acquired by indigenous Ghanaians does affect prevailing local content in Ghana's upstream petroleum industry.

$H2_1$: The training acquired by indigenous Ghanaians does not affect prevailing local content in Ghana's upstream petroleum industry.

Theoretical Foundation

Lewin's (1947) change theory constituted the theoretical framework for this study. Lewin outlined three steps entailed in the process of change. The first is to unfreeze the status quo. The second is to reduce the restrictive forces that unfavorably

affect movement, directing it away from the prevailing equilibrium. The third step is to accomplish refreezing by stabilizing the new equilibrium brought about by the change as a result of harmonizing both the driving and restraining forces. Jensen and Tarr (2008) noted that during oil and gas field concession negotiations, the local content and local participatory aspect constituted an integral part of the negotiations. Though L.I. 2204 was enacted by the government to address the local participatory aspect of Ghana's oil production, the lack of jobs in the oil fields has caused frustration among indigenous Ghanaians. The Petroleum Commission of Ghana could institute necessary strategies for changing the status quo if variance of the prevailing human resource local content from the requirements of L.I. 2204 in Ghana's offshore petroleum industry is confirmed.

In support of Lewin's (1947) theory of change, Stone (2015) advocated Kaizen events, which are an effective approach used by leaders to enhance organizational systems through the application of action learning principles. Stone described the methodical process associated with this approach, which entails identifying waste, implementing solutions, measuring results, and standardizing work practices. Kaizen events entail a holistic approach for improving organizational performance through the elimination of waste within a system and the subsequent measurement of the prevailing key performance index (KPI) relating to the previous one prior to standardizing work practices. Any projected shortfall in the human resource local content of Ghana's offshore petroleum industry that is associated with the training of indigenous Ghanaians could be addressed through Kaizen events. Multinational oil and gas companies could

organize training programs to enable indigenous Ghanaians to acquire the specialized skills required to work in the offshore oil production industry. Through seminars organized by the Petroleum Commission of Ghana and the multinational petroleum companies, native Ghanaians would become well informed about the kind of training required to procure jobs within Ghana's oil and gas fields. Furthermore, the implementation of Kaizen events would result in the minimization of wastage of resources available through the Ghana Educational Trust Fund (GETFund), as scholarship funds would target useful oil and gas training programs.

Nature of the Study

In support of Howe's (1988) assertion that quantitative research methods center on positivism that entails deductive reasoning, this study was quantitative in nature. I measured and established the extent of differences between the prevailing human resource local content and the requirements of L.I. 2204 in Ghana's upstream petroleum industry. The selected quantitative method used for the study also enabled me to determine whether the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevalent local content in its offshore petroleum industry. The study necessitated the establishment of the prevailing human resource local content and its comparison with the requirements of L.I. 2204. Given that a quantitative research methodology focuses on classifying features, counting, and constructing statistical models to explain an observation (Borrego, Douglas, & Amelink, 2009), it was deemed appropriate for the study. This methodology was also appropriate because it enabled a

statistical comparison of the differences between the means of groups so that inferences could be made about the population means (Carpenter, Harding, Finelli, Montgomery, & Passow, 2006; Rutz et al., 2003; Webster & Haberstroh, 2002). Because the purpose of the study was to determine whether the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevailing local content in its upstream petroleum industry, the quantitative approach was considered appropriate.

I did not select a qualitative research method for the study on the grounds that such a research strategy is associated with investigations aimed at understanding the meanings that people ascribe to a societal or human problem (Koro-Ljungberg & Douglas, 2008). There is growing concern regarding the lack of available jobs for indigenous Ghanaians in Ghana's oil fields. Rather than exploring the meanings ascribed by indigenous Ghanaians to the reportedly low human resource local content of Ghana's offshore oil and gas industry, I compared the prevailing human resource local content within this industry with the requirements stipulated in L.I. 2204. A qualitative study entails inductive reasoning (Mangan, Lalwani, & Gardner, 2004). A researcher engaged in a qualitative study considers a phenomenon as a whole and observes the reality, subsequently recording data related to this reality rather than developing assumptions or hypotheses and testing them. Given that the purpose of the proposed study was to determine whether the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevalent local content in its offshore petroleum industry, a qualitative approach was not appropriate.

The use of a quantitative cross-sectional survey design supported the collection of data required for measuring and establishing the extent of differences between the prevailing human resource local content and the requirements of L.I. 2204 in Ghana's upstream petroleum industry. As noted by Randall, Nowicki, and Hawkins (2011), a cross-sectional survey design entails the collection of data to enable inferences about the target population at a particular point in time. The application of this research design was appropriate for ascertaining whether the prevailing human resource local content in Ghana's offshore petroleum industry matched the requirements of L.I. 2204. The design was also appropriate for establishing whether the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevalent local content in its offshore petroleum industry. I chose a survey methodology for collecting data because of the flexibility it offered regarding modes of data collection that can include structured recorded interviews and self-administered questionnaires. Moreover, the virtual nature of the working environment in the upstream oil and gas industry necessitated the deployment of web-based questionnaires.

Although I considered using a longitudinal panel survey, this method was not ideal for the study because follow-ups with survey participants over time were required. Moreover, a panel survey is typically carried out to measure a change within the population under investigation. As such, a panel survey did not correspond to the purpose of my study, which was to measure the prevailing human resource local content in Ghana's offshore petroleum industry and compare this measurement with the

requirements of L.I. 2204. Further, as noted by Hajducek and Lawless (2013), a longitudinal panel survey entails repetitive observations of a set of variables associated with a similar sample of units over a period of time by following the participants and collecting data through sequential interviews. The use of a panel survey was not appropriate for this study, the purpose of which was to establish whether the prevailing human resource local content in Ghana's offshore petroleum industry matches the requirements of L.I. 2204. The second aim of the study, which was to establish whether the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevalent local content in its offshore petroleum industry, was also not supported by the panel survey method.

Definitions

The following definitions are provided in Ghana's Petroleum (Local Content and Local Participation) Regulations, 2013 (L.I. 2204):

Cartelization: Business collection that regulates supplies through production and marketing activities by conspiring as a single unit and controlling prices for certain goods and services.

L.I. 2204: Ghana's Petroleum (Local Content and Local Participation) Regulations, 2013.

Licensee: An entity who has been granted a license to undertake petroleum activities under the Act.

Local content: The percentage or quantum of personnel, locally produced materials, financing, and goods and services rendered in the oil and gas industry value chain that can be measured in monetary terms.

Local content monitoring: Keeping track of or monitoring compliance with Ghana's Petroleum (Local Content and Local Participation) Regulations, 2013.

Long-term local content plan: A local content plan that covers a period of 5 years.

Management: The chief executive officer, general manager, managing director, in-country manager (ICM), president, and heads of departments.

Petroleum industry value chain: Processes involved in the petroleum industry such as exploration, development, production, transportation, processing, and marketing.

Petroleum operations: The exploration, development or production, transportation, and disposal of petroleum.

Prevalent local content: The extent to which the prevailing local content meets the requirements of Ghana's local content regulation, L.I. 2204 on a scale of 1 to 7.

Qualified: Technical competence and financial capability required to fulfil all obligations under a petroleum agreement or petroleum license.

Technical core staff: Engineers, technicians, and geoscientists.

Assumptions

Three assumptions underpinned this study. The first assumption was that the two selected multinational oil companies, whose licenses have been granted by the Petroleum Commission of Ghana, provided equal employment opportunities to indigenous

Ghanaians and expatriates. The second assumption was that the willingness of participants to voluntarily engage in this study did not generate any biases. The third assumption was that participants in this study objectively completed the survey as accurately as possible.

Scope and Delimitations

This study, entailing a quantitative cross-sectional survey design, focused on the human resource local content in Ghana's offshore petroleum industry. L.I. 2204 groups the human resource component of the local content into management staff, core technical staff, and other staff. The study was aimed at determining the extent of differences between the prevailing human resource local content and the requirements of L.I. 2204 in Ghana's upstream petroleum industry. A further aim was to determine to what extent, if at all, the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevalent local content in its offshore petroleum industry. The first delimitation of this study entailed narrowing its scope to two multinational petroleum companies whose oil and gas development plans had been approved by the Petroleum Commission of Ghana. There are other multinational oil and gas firms that employ a few indigenous Ghanaians, in accordance with the requirements of L.I. 2204, despite not having obtained approval of their oil and gas development plans. The second delimitation of the study entailed its confinement to the human resource component of L.I. 2204. The study did not include other components regulated by L.I. 2204 such as goods and services, materials and procurement, and fabrication and construction requirements.

Limitations

This study had some limitations. First, because of the confidential nature of administrative procedures within the upstream oil and gas industry, the selected multinational oil and gas companies were unwilling to release detailed financial information on their human resources that was required to determine the local content in monetary terms. A second limitation concerned the generalizability of this study as only two multinational oil companies were selected for the survey.

Significance of the Study

The findings of this study can make a unique contribution by addressing the gap between knowledge and professional practice relating to the prevailing human resource local content in Ghana's offshore oil and gas industry. Because of the capital intensiveness of the upstream petroleum sector, only a few highly skilled professionals acquire employment within this sector (Otoo, Osei-Boateng, & Asafu-Adjaye, 2009). Moreover, these highly skilled professionals are mostly foreign nationals. Up to now, no studies entailing a comparison of the prevailing human local content with the requirements of L.I 2204 appear to have been conducted. Consequently, the measurement and establishment of the prevailing human resource local content would provide indigenous Ghanaians with knowledge on the current local content compared with the requirements stipulated by L.I. 2204.

Significance for Theory

It is widely believed within the Ghanaian upstream petroleum sector that the local content policies initiated by Ghana's Petroleum Commission, aimed at providing equal employment opportunities to indigenous Ghanaians, have failed. Hossan (2015) found that approximately 70% of the change management programs that had been initiated failed in their efforts to promote change. These failures could be attributed to the lack of implementation of change strategies and the failure to conduct reviews for strategies that have been deployed. Marshak (2012) posited that in the process of conceptualizing change effort, the scientific worldview changes along with a shift in the management of a process from a current state to a desired future state. This shift occurs as a result of the application of planned interventions to overcome resistance, initiate necessary movement, and alter the status quo.

Significance for Practice

The findings of this study may be of significance to the Petroleum Commission of Ghana by contributing knowledge on the prevalent human resource local content in the upstream sector of Ghana's oil and gas industry. The Petroleum Commission of Ghana is mandated to regulate Ghana's upstream petroleum industry. Evidence on the prevailing human resource local content in Ghana's offshore petroleum industry is required before the Petroleum Commission can attempt to bridge the gap between the requirements of L.I. 2204 and professional practice.

This study has the potential to make a substantial contribution, as it may facilitate the acquisition of required skills by indigenous Ghanaians seeking to procure jobs in Ghana's oil and gas industry. When Ghana's oil production was initiated in December 2010, the GoG sponsored several students to take courses that would enable them to gain employment within the country's emerging oil and gas industry. However, most of these students, who studied abroad, did not procure jobs in Ghana's oil and gas industry when they returned. In June 2012, the GoG claimed to have created 812 jobs within the petroleum sector compared with an initial estimation of 10,000 jobs (Putsch, 2012). Once the expertise required by multinational oil companies becomes more widely known, indigenous Ghanaians could take the necessary steps to acquire the requisite specialized skills to reduce the job deficit. In addition, leaders of multinational oil companies and the Petroleum Commission of Ghana could institute accessible training programs to impart specialized skills required for the upstream oil and gas sector at an affordable price. Further, the GETFund may be well informed in granting scholarships for studies that are aligned with the skills required in the offshore oil and gas industry.

Significance for Social Change

The findings of this study may contribute to positive social change in the following ways. The first contribution is by encouraging leaders of multinational oil companies and the Petroleum Commission of Ghana to organize seminars aimed at informing indigenous Ghanaians about the specialized skills required to take up jobs within Ghana's upstream petroleum industry. Second, through the dissemination of the

study's findings, indigenous Ghanaians may better understand the prevalent local content in Ghana's upstream petroleum industry. Third, native Ghanaians may change their attitudes toward how the government is managing Ghana's oil and support the human resource LCP that has been initiated.

Summary and Transition

This study, entailing a quantitative cross-sectional survey design, addressed the extent of differences between the prevailing human resource local content and the requirements of L.I. 2204 in Ghana's offshore petroleum industry. I also ascertained the extent to which the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevalent local content in its offshore petroleum industry. In Chapter 1, I discussed the background, problem statement, and purpose of the study, and introduced LCPs in the oil and gas sector of developing countries. Chapter 2 includes a review of the literature on the local content and local participatory aspect of oil production in developing countries. I also identify gaps in the literature on local content in the petroleum sector of developing countries that produce oil and gas.

Chapter 2: Literature Review

Over the past 9 years, African governments have enacted laws aimed at improving the livelihoods of indigenous people by streamlining the employment of foreign nationals within extractive industries, thereby mitigating agitations around local unemployment. The pragmatism of these local content regulations governing the employment of foreigners within extractive industries is typically questionable. Egwaikhide and Omojolaibi (2014) claimed that the steady growth in extractive industries recorded for African countries has not provided the promised jobs, leading to local agitations. Thus, a survey conducted to investigate the prevailing human resource local content in Ghana's upstream petroleum industry could help to address the gap between the requirements of Ghana's L.I. 2204 regulation and professional practice. The purpose of this quantitative cross-sectional survey-based study was to determine the extent of differences between the prevalent human resource local content and the requirements of L.I. 2204 in Ghana's upstream oil and gas industry. A specific aim of the study was to ascertain to what extent, if at all, the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevalent local content in its upstream petroleum industry.

This literature review focuses on human resource local content laws regulating the oil and gas sector, with an emphasis on bridging the gap between the regulations and professional practice. In the first part of this chapter, I discuss the literature search strategy that I used, as well as the theoretical framework of Lewin's (1947) change

theory. I next present an overview of the local content and local participation regulation on Ghana's upstream petroleum sector. In the third section, I discuss the L.I. 2204 regulation and compare it with the oil and gas local content regulations of other developing countries. The fourth section comprises a literature review on the prevailing human resource local content in Ghana's upstream oil industry, as well as on the technical capabilities of indigenous Ghanaians relating to job requirements in the offshore petroleum industry. The literature review presented in the fifth section of the chapter focuses specifically on the capacity-building initiatives being implemented by the GETFund and Ghana's Enterprise Development Centre (EDC). The chapter concludes with a summary of traditional and contemporary knowledge related to oil and gas LCPs. I also describe how the study has addressed gaps in the literature and extended knowledge of oil and gas local content management.

Literature Search Strategy

A literature search scheme critically influences the findings of a study. Hinde and Spackman (2015) observed that a systematic review of the existing literature forms the backbone of any competent study. I retrieved relevant peer-reviewed articles through a search for literature on oil and gas local content at the Walden University Library. I carried out a simplified search using the following databases: ProQuest, Business Source Complete, Academic Search Complete, Political Science Complete, PsycARTICLES, the Emerald Management, EBSCOhost, and Sage Premier. Considering that Ghana's upstream petroleum sector has been active for only 5 years, I also used the Google

Scholar search engine, which provided leads to published articles relating to Ghana's offshore oil and gas industry and its associated local content regulations. For my search, I used the following keywords: *local content*, *oil and gas*, *offshore petroleum*, *local content regulations in extractive industry*, *Ghana's local content regulation*, *L.I. 2204*, and *African petroleum sector*. These key words yielded a substantial number of articles in the field of oil and gas local content management in Africa, the Middle East, South America, and Norway.

Theoretical Foundation

Lewin's Change Theory

Lewin's (1947) change theory formed the theoretical framework of this study. According to Zand and Sorensen (1975), within the field of management science, this theory underpins models of change within organizational systems. Zand and Sorensen's view is supported by Burnes (2004), who observed that Lewin's change theory has dominated the theory and practice of change management for over 40 years. Studies in the field of management science have shown that implementation of appropriate change management strategies is always required to improve organizational systems, resulting in less resistance to change within the workforce. According to Burnes, Lewin's focus over much of his life span was on the resolution of social conflict, with a particular emphasis on the problems of minority groups. Thus, the evolution of Lewin's change theory emanated from a pursuit of social justice, problem solving, and conflict resolution techniques, and an aspiration to improve social systems.

A widely held view within the Ghanaian upstream petroleum sector is that the policies initiated by Ghana's Petroleum Commission, aimed at providing equal employment opportunities for indigenous Ghanaians, have failed to a large extent. Hossan (2015) found that approximately 70% of the change management programs that had been initiated reported the failure of their efforts to promote change. These failures could be attributed to the lack of implementation of change strategies and the failure to conduct reviews for strategies that had been deployed. According to Marshak (2012), in the process of conceptualizing change efforts, a scientific worldview changes along with a shift in the management of a process from its current state to a desired future state. This shift occurs because of the application of planned interventions to overcome resistance, initiate necessary movement, and alter the status quo.

Lewin's Planned Approach to Change

McGarry, Cashin, and Fowler (2012) showed that Lewin's (1947) theory of change comprises multifaceted conceptual theories that are encompassed by an overarching umbrella concept of planned change. Lewin argued that the success of planned change entailed the intertwining of these multifaceted conceptual theories, including field theory, group dynamics, action research, and the three-step model of change as essential components of the change agenda. Understanding the roles of these theoretical subcomponents within a planned change process is critical for facilitating the resolution of organizational issues.

Field theory. An understanding of the status quo prior to the introduction of

initiatives to promote change is critical for improving an organizational system. Lewin (1947) argued that it was necessary to recognize the entirety of influences molded into a situation to fully comprehend a set of conditions (McGarry et al., 2012). Lewin observed that within an environment termed a *field*, group behavior consisted of unique interactions and forces. Lewin further postulated that any change in one component element within a field would result in a behavioral change of other components within the field. Moreover, Lewin contended that understanding and planning change at any level within a system emanates from identifying, mapping, and measuring the strength of the forces within that system. Extending Lewin's field theory, Livneh, Bishop, and Anctil (2014) argued that the behavior of an individual within any system is a function of that individual's personality and the environment in which he or she operates. As suggested by field theory, there is a need to develop a comprehensive understanding of prevailing forces and to counter the forces at play to establish a status quo, thereby enhancing the local content in Ghana's offshore petroleum industry.

Group dynamics theory. An understanding of the behavior of stakeholders within Ghana's upstream petroleum sector would aid in the establishment of a new local content status quo. Lewin (1947) contended that the constitution of a group was not determined by the similarity or dissimilarity of its members; rather it was the inter-dependency of their fates that led to their response as a group. Moreover, as noted by McGarry et al. (2012), a group acts independently as a complete entity that is not influenced by the individual characteristics of its members. Acquiring familiarity with the

nature of a group aids in the application of forces aimed at altering the status quo. Concurring with McGarry et al. (2012), Hossan, Dixon, and Brown (2013) defined group dynamics as internal forces within a group that shape the actions of its members. Lewin's group dynamic theory, according to these authors, addresses the traits of a particular group whose behavior is aligned with the forces within it, as well as how these forces could be altered to stimulate more desirable traits.

Action research. Lewin (1947) suggested that an effective change relating to an individual originates from the recognition of the entirety of the individual's situation. Recognizing a system's actuality through reflection conducted during the process of initiating change-promoting strategies leads to new ideas. McGarry et al. (2012) noted that action researchers draw on field theory to identify forces affecting the entirety of the group to which an individual belongs. Lewin further explained that action research progresses through spiraling steps that include a cycle of planning, action, and reviews of the results of the action. As Pajalic (2015) observed, Lewin considered action research a tool for bringing about changes in contexts of care and social welfare through constant reflection. Lewin further identified group dynamics within action research grounded in the recognition that effective change must be the result of participative and collaborative processes entailing the involvement of all stakeholders at the group level.

Three-Step Change Model

McGarry et al. (2012) argued that Lewin (1947) recognized the unsustainable nature of change that occurs through action research, viewed as a methodology for

creating changes in group dynamics. Lewin conceptualized the current level of activity of a system as entailing a dynamic equilibrium sustained by actively driving and resisting social forces. In pursuit of the aim to establish a new status quo after achieving a desired change, Lewin conceptualized a three-step model as the fourth element of planned change, along with field theory, group dynamics, and action research (McGarry et al., 2012). According to Lewin, the first step in the process of change was to destabilize the prevailing equilibrium. This step was followed by a second step to reduce the restrictive forces that directed movement away from equilibrium. The final step in this model of change was refreezing entailing stabilization of the new equilibrium resulting from the change by harmonizing both the driving and restraining forces. Lewin's three steps can be expounded as follows:

Step 1: unfreezing. There is a need to destabilize the quasistationary equilibrium observed in field theory prior to achieving successful change (McGarry et al., 2012). This destabilization of the quasistationary equilibrium is what Lewin (1947) referred to as *unfreezing*. Lewin suggested that for an organization to effectively manage the change process, there was a need to unfreeze the prevailing state to bring about a neutral position to facilitate the unlearning of old behaviors. Lewin contended that it was only after unfreezing of the status quo had taken place that a new behavior could be adopted. Applying the concept of unfreezing to Ghana's offshore petroleum industry, unfreezing of the status quo must first occur before its local content can be enhanced. If measurements reveal that the prevailing local content is low in comparison with the

requirements of L.I. 2204, this finding may be sufficient evidence to prompt Ghana's Petroleum Commission to unfreeze the status quo.

Step 2: moving (transitioning). Burnes (2004) reiterated Lewin's (1947) notion of unfreezing the status quo, noting that the complexity of forces involved in processes of change makes it difficult to predict and control the direction or outcome of planned change. This view was endorsed by McGarry et al. (2012), who argued that unfreezing alone does not create change; rather, it helps to create the necessary environment for learning new behaviors. Lewin argued that in a process of planned change, it was important for organizations to explore all available options by considering all of the forces at work and subsequently identifying and evaluating them on a trial and error basis. According to McGarry et al. (2012), action research unfolds through iterative and cyclical processes of trial and error. However, Lewin concluded that such a process would not ensure that the change was sustainable. Instead, it would enable change to occur on both the individual and group levels.

Step 3: refreezing. The final step in Lewin's (1947) three-step change model is refreezing. After a change has occurred, to ensure that new behaviors are reasonably secure and do not undergo a regression, refreezing, which is aimed at stabilizing the new quasistationary equilibrium, is required. Refreezing refers to the process of re-establishing or stabilizing the new quasistationary equilibrium (McGarry et al., 2012). If the findings of this study confirm that a gap exists between the human resource local content requirements under L.I. 2204 and professional practice, the Petroleum

Commission of Ghana could institute new procedures and policies aimed at refreezing the new status quo relating to upstream petroleum local content. Figure 1 illustrates Lewin's planned approach to change**.**

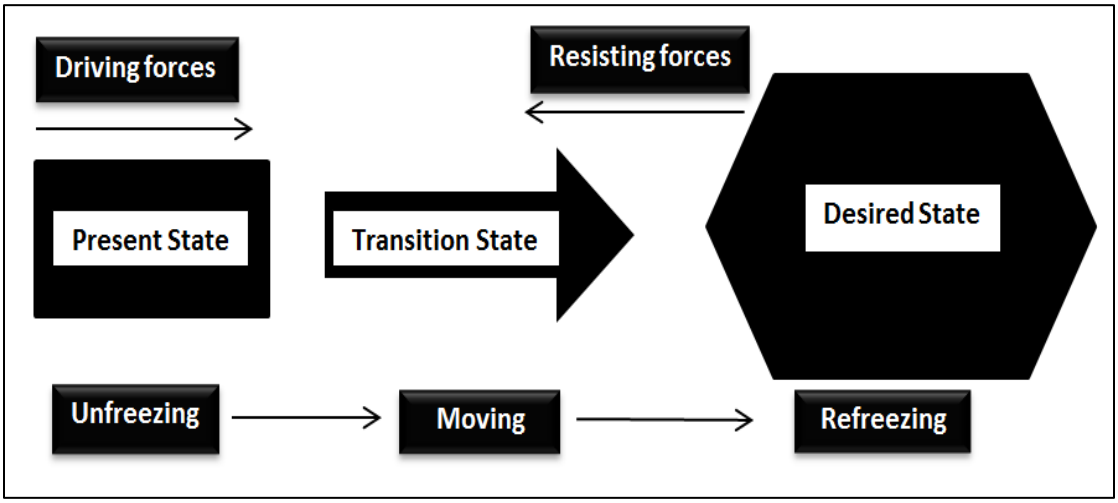

Figure 1. Lewin's (1947) planned change approach.

Scholarly Applications of Lewin's Change Theory

Wells, Manuel, and Cunning (2011) examined empowerment, perceptions of job satisfaction, and care effectiveness associated with a change from a team to a restructured total patient care delivery model. Applying Lewin's three-step theory and a longitudinal, descriptive, mixed-methods design, Wells et al. applied the principles of the unfreezing phase and requested nursing staff to identify components of a more suitable model of care. Based on the inputs received, Wells et al. found that the nursing staff had several suggestions as to what should be included in a new model of care. Based on a thorough review of the feedback, Wells et al. determined that total patient care appeared to be most consistent with the nurses' desire to improve client care as well as the inclination toward

specific client assignment. Wells et al. concluded that client care under total patient care would be more effective than that provided under the previous model.

Holloway Cripps (2013) explored how leaders of organizations deployed of art and architecture as the driving force for stimulating changes in perceptions of an organization's identity. Synthesizing Lewin's theory of change and force field analysis, Holloway Cripps carried out a literature review of organizational art and architecture as well as identity and change. Based on an examination and evaluation of choices made within organizations, Holloway Cripps proposed a conceptual model and demonstrated the use of art and architecture by leaders within organizations as the driving force prompting changes in perceptions of identity, and recommended further studies. By showing how art and architecture could be used to skillfully propel organizational change, this study has made a valuable contribution to the field of leadership and organizational change.

Literature Review

Overview of Ghana's Upstream Oil and Gas Industry

According to the Ghana National Petroleum Corporation (GNPC), there are four oil and gas sedimentary basins in Ghana. These basins are the Saltpond Basin, the inland Voltaian Basin, the Accra-Keta Basin, and the Tano Basin, which includes the Cape Three Points Sub-basin (GNPC, 2014). As depicted in Figures 2 and 3, these four basins are located both offshore and inland. The offshore basins cover approximately 60,000 square kilometers, while the Voltaian Basin, which is the only inland basin, occupies

103,600 square kilometers, constituting the biggest oil and gas sedimentary basin in Ghana (GNPC, 2014). Foreign petroleum companies operating within these offshore and onshore sedimentary basins have been allocated quotas to explore, develop, and produce oil and gas. These sedimentary basins have been subdivided into blocks that have been allocated to multinational petroleum companies for producing oil and gas (GNPC, 2014). While offshore sedimentary basins have been assigned to operators, the onshore Voltaian Basin is yet to be assigned to operators.

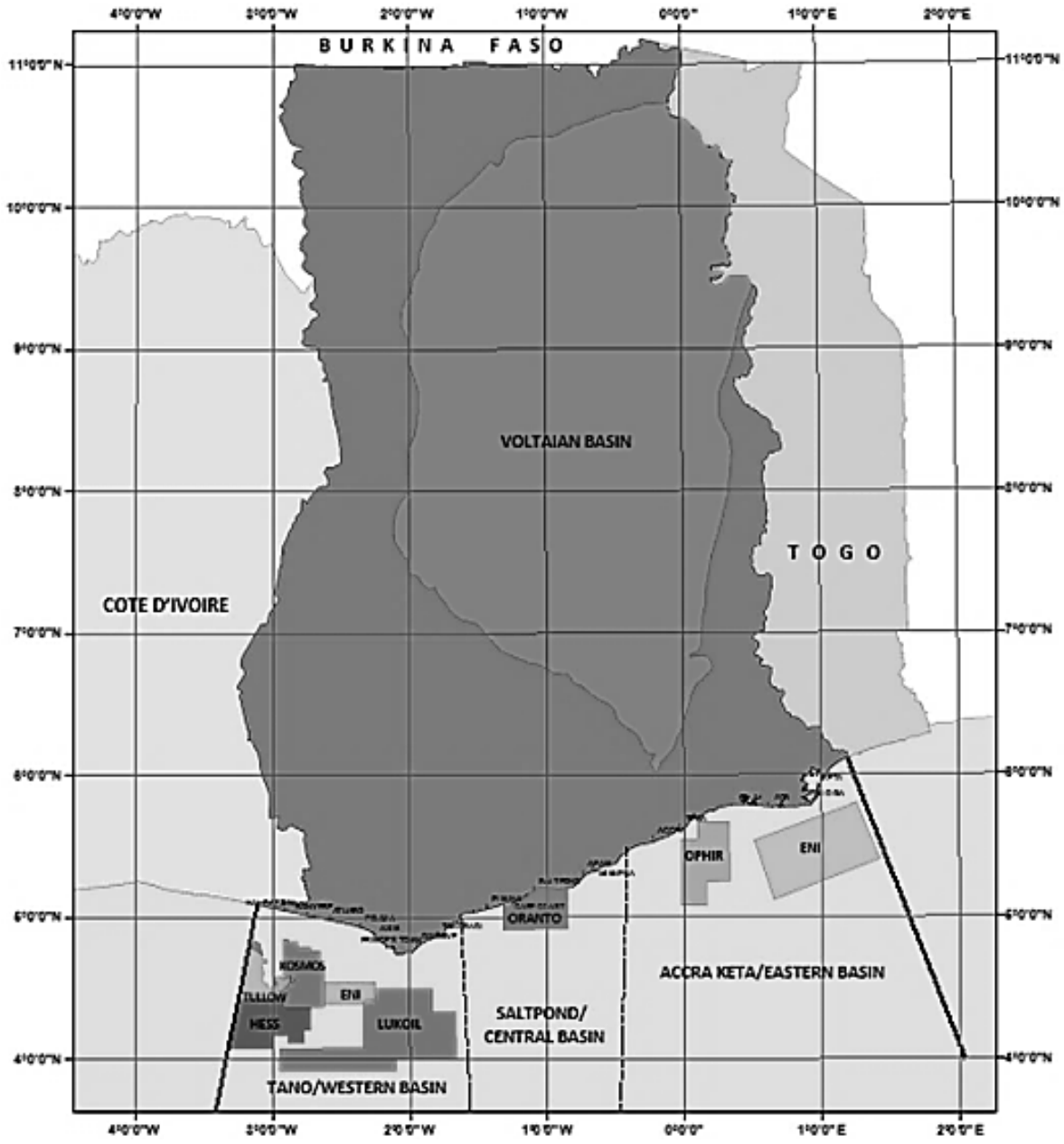

Figure 2. Sedimentary basins in Ghana (source: GNPC, 2014).

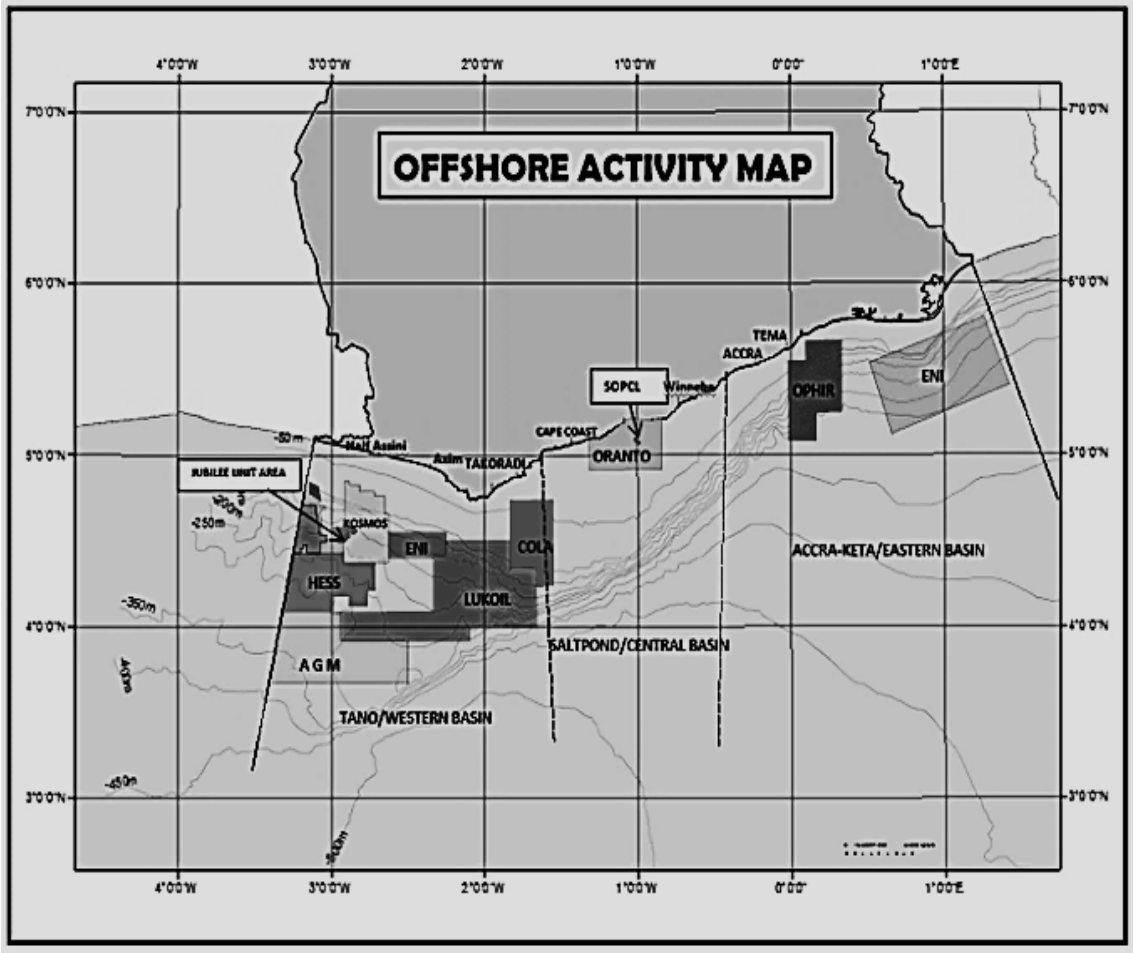

Figure 3. Offshore activity map indicating the locations of awarded oil and gas blocks (source: GNPC, 2014).

The emergence of Ghana's upstream petroleum sector dates back to 1896 when hydrocarbon exploration began in the western region of Ghana following the discovery by explorers of inland petroleum seepages. Between 1896 and 1957, shallow exploration wildcat drilling was conducted in 21 unproven areas. Of these areas, most of the shallow wells contained hydrocarbons (GNPC, 2014). Within the offshore environment, Ghana's first commercial well was drilled at Saltpond Basin in 1970. This well subsequently

yielded commercial quantities of oil and gas, peaking at 4,800 barrels of oil per day (bopd) in 1978 (GNPC, 2014). From 1978 up to 2007, when significant quantities of oil and gas were discovered, Ghana's upstream petroleum sector was quiescent. In 2007, the discovery of substantial deposits of oil and gas at the Jubilee field led to oil production that reached a significant scale in November 2010 (GNPC, 2014). The successful launching of oil extraction in the Jubilee field, which produces an average of 110,000 bopd, attracted other multinational petroleum companies to Ghana, resulting in a vibrant upstream oil and gas industry. To increase local participation in the upstream petroleum industry, L.I. 2204 was ratified in 2013.

Multinational petroleum companies operating in Ghana. The Petroleum Commission of Ghana is mandated to regulate petroleum activities in the country's upstream oil and gas sector. Table 1 shows the operators of blocks and the status of operations resulting from the allocation of oil and gas blocks (Petroleum Commission, 2015).

Table 1

Oil and Gas Concession Blocks and Their Operators

Operator	Block	Concession size (sq. km)	Year awarded	Location	Status of operations
Tullow Gh	Deepwater Tano	Jubilee Field = 61 TEN Field = 450 Wawa = 106	2006	Offshore Tano Cape Three Points Basin	1. Production from Jubilee Field 2. Development of TEN Field
Kosmos	West Cape Three Points	Jubilee = 48 MTA = 416	2004	Offshore Tano Cape Three Points Basin	1. Production from Jubilee Field 2. Pre-development of mahogany and teak discoveries 3. Appraisal of Akasa discovery
ENI	Offshore Cape Three Points	693	2008	Offshore Tano Cape Three Points Basin	Development of Sankofa and Gye Nyame Fields
Hess Ghana	Deepwater Tano-Cape Three Points	2010	2006	Offshore Tano Cape Three Points Basin	Appraisal
Saltpond Offshore Production Company Ltd.	Saltpond Field	12	2004	Offshore Saltpond Basin	Production
Camac Energy	Expanded Shallow Water Tano	1508	2014	Offshore Tano Cape Three Points Basin	Exploration
Amni Int. Petroleum	Central Tano	278	2014	Offshore Tano Cape Three Points Basin	Exploration
Sahara Energy Fields	Shallow Water Cape Three Points	1500	2014	Offshore Tano Cape Three Pointa Basin	Exploration
Britannia-U	South West Saltpond	2050	2014	Offshore Tano Cape Three Points Basin	Exploration
A-Z Petroleum	Deepwater Cape Three Points West	944	2014	Offshore Tano Cape Three Points Basin	Exploration

(table continues)

Operator	Block	Concession size (sq. km)	Year awarded	Location	Status of operations
Heritage Oil	East Keta Ultra Deep Water	2239	2014	Offshore Tano Cape Three Points Basin	Exploration
	Offshore South West Tano	175	2014	Offshore Tano Cape Three Points Basin	Exploration
UB Resources	South West Cape Three Points	755	2014	Offshore Tano Cape Three Points Basin	Exploration
AGM Petroleum	South Deepwater Tano	3482	2013	Offshore Tano Cape Three Points Basin	Exploration
Medea Development	East Cape Three Points	1565	2013	Straddles Offshore Tano Cape Three Points and Saltpond Basins	Exploration

Note. From Ghana's Petroleum Commission website (August 2015).

Tullow Oil Ghana Limited and ENI Ghana Exploration and Production Limited are currently the leading multinational petroleum companies in operation whose oil and gas development and production plans have been approved by the GoG. In compliance with L.I. 2204, both Tullow and ENI employ locals. In turn, the operators have employed foreign petroleum companies that are oil and gas product service line providers such as Halliburton, Baker Hughes, MODEC, and Schlumberger. An investigation of the percentage of locals employed by these multinational companies in comparison with the requirements of L.I. 2204 requires investigation.

Participation of Indigenous Ghanaians in Ghana's Offshore Petroleum Sector

The International Petroleum Industry Environmental Conservation Association (IPIECA) has defined local content as value added to a host nation through the training and employment of indigenous people, as well as development and procurement of supplies and services locally (IPIECA, 2011). Oil and Gas IQ (2015) has an alternative

definition of local content as the percentage of manpower and materials that are acquired indigenously, with the sole aim of fostering the development of a local skills base. Under Ghana's local content and local participatory regulation, L.I. 2204, local content is defined as the percentage or quantum of personnel, locally produced materials, financing, and goods and services rendered within the oil and gas industry value chain that can be measured in monetary terms. In the L.I. 2204 regulation, local participation specifically relates to the level of equity owned by local citizens in the oil and gas sector. Mwakali and Byaruhanga (2011) defined local content in the context of the Ugandan petroleum sector as the use of local materials and services as a means of adding value to Uganda. Based on an analysis of the above definitions, the sole aim of local content would seem to be to improve the livelihoods of the indigenes of a nation whose natural resources are being exploited by foreign companies extracting minerals. Local content is thus designed by the governments of countries richly endowed with natural resources to improve per capita incomes.

According to the Independent Oil and Gas Information Resource Center (IOGIRC) Ghana, multinational petroleum companies operating in the country's oil and gas fields have been asked by the Petroleum Commission of Ghana to comply with the requirements of L.I. 2204 or else face sanctions (IOGIRC, 2015). Tullow Oil Ghana Limited and ENI Ghana Exploration and Production Limited, as well as the multinational oil and gas companies that provide product line services to the operators, have evidently employed a substantial number of indigenous Ghanaians. Multinational petroleum

companies that persistently fail to comply with the requirements of L.I. 2204 could face consequences such as fines, revocation of licenses, and imprisonment (Petroleum Commission, 2015). Since the establishment of the Jubilee offshore oil and gas field in 2007, the Petroleum Commission of Ghana has not imposed sanctions on any of the multinational petroleum companies, including product service line providers. Multinational petroleum companies have shown laxity relating to their compliance with L.I. 2204, as operators require time to enable them to keep abreast of the regulation (Petroleum Commission, 2015). Thus, there is a need to ensure strict compliance with L.I. 2204 (Petroleum Commission of Ghana, 2015), for which the tasks of developing the technical capacities of indigenes to enable them to occupy technology-based positions, as well as formulating succession plans to replace expatriates with locals, are paramount.

The Petroleum Commission of Ghana has stated that there is a 75% participatory rate of indigenous Ghanaians in the upstream petroleum sector (IOGIRC, 2015). However, this statement is vague, because it does not specify which component of L.I. 2204 was measured. For example, L.I. 2204 stipulates that 5 years after a petroleum license has come into effect, the minimum local content levels for management staff and other staff within multinational petroleum companies should be 50% and 90%, respectively. There is, therefore, a need to determine the extent of differences between professional practice in the Ghanaian offshore oil and gas industry and the human resource requirements of L.I. 2204.

Overview of Ghana's Petroleum (Local Content and Local Participation) Regulations, 2013 (L.I. 2204)

Oil and gas production forms the backbone of the economies of developing countries that are endowed with natural resources. According to Tordo, Tracy and Arfaa (2011), exploitation of natural resources in developing countries plays a key role in maintaining the economic sustainability of these countries. To improve the livelihoods of the indigenes in petroleum producing countries, there is a need to empower locals to take charge of the petroleum sector. LCPs date back to the early 1970s when they were first introduced in the North Sea context as a means of restricting imports and enabling states to directly intervene in the petroleum sector (Tordo, Warner, Manzano, & Anouti, 2013). Over time, they have evolved in accordance with the benefits that governments seek to reap from the exploited mineral resources (Tordo et al., 2013). L.I. 2204, which was aimed at providing indigenous Ghanaians with control over the upstream petroleum sector, came into full effect on February 19, 2014 (IOGIRC, 2015). As stated by the Petroleum Commission of Ghana (2015), L.I. 2204 was formulated to promote job creation and maximize and retain value addition relating to goods and services, local expertise, and financing and business within the petroleum sector value chain in Ghana. In support of this aim, L.I. 2204 seeks to build local capacities within the Ghanaian oil and gas sector value chain through expertise development, skills and technology transfers, and active research and development programs (Enterprise Development Center Ghana, 2013). The objectives of the L.I. 2204 regulation include the following:

- To attain a minimum level of employment of indigenous Ghanaians, as well as in-country expenditure on goods and services within the oil and gas sector value chain.
- To improve the capability and global competitiveness of domestic businesses.
- To sustain economic development through the creation of petroleum and associated supportive industries.
- To achieve and sustain a certain degree of control by indigenous Ghanaians as stakeholders in petroleum development initiatives.

L.I. 2204 covers three main areas: human resources, procurement of goods and materials, and services provided by local companies. This study focused on the regulation of human resources under L.I. 2204.

Comparative Review of the Regulation of Human Resources by Petroleum Local Content Policies in Developing Countries

The African oil and gas industry is currently dominated by multinational oil and gas companies that end up employing a substantial number of foreigners and strengthening the profitability of operations within their host countries. Heum, Kasande, Ekern, and Nyombi (2011) found that these multinational petroleum companies ultimately improved the livelihoods of foreign nationals to the detriment of indigenous people. When LCPs are properly implemented, they improve per capita incomes in developing countries that are richly endowed with natural resources. According to Oil and Gas IQ (2015), when designed appropriately, LCPs reduce the implementing

countries' dependence on foreign aid and accelerate their economic growth. Countries rich in natural resources, especially oil and gas producing countries, aim to develop and implement LCPs that are directed at improving the livelihoods of their indigenes.

Waritimi (2012) found that in Nigeria's oil-producing Niger Delta region, local content and local participatory policies provided a solution for breaking out of the vicious loop of inequality that has led to local agitations. Though multinational petroleum companies undertake corporate social responsibility projects within deprived communities, it is becoming increasingly evident that prioritized implementation of LCPs leads to significant improvements in local livelihoods. A survey administered among local content professionals revealed that the majority of the participants (48%) felt that LCPs were most effective in Norway, with 30%, 14%, and 8% of the participants considering these policies to be effective in Brazil, Nigeria, and Ghana, respectively (Oil and Gas IQ, 2015). The survey results indicated the need for improvement of Ghana's LCPs.

In poor African communities where a substantial number of locals are employed by foreign petroleum companies, there is less resistance from indigenous people with regard to the well-being of the companies. Hackenbruch and Davis Pluess (2011) found that there were fewer reported cases entailing nontechnical issues related to oil and gas production in countries where multinational petroleum companies assisted indigenous people to develop their talents and acquire employable skills. For multinational petroleum companies operating in Africa to be sustainable, there is a need for the leaders of these

companies to take LCPs seriously. In developing countries where multinational companies have supported full integration of locals into the petroleum sector, indigenes have been equipped with vocational training and jobs that foster self-generating revenues, resulting in economic improvement (Oil and Gas IQ, 2015). A typical example of such initiatives is a welder training facility that has been established within the Regional Maritime University, Ghana, by MODEC, a multinational oil and gas service provider for Tullow Oil PLC in Ghana. This facility provides training for indigenous Ghanaians, as well as other West Africans, in welding and fabrication to enable them to acquire jobs in oil and gas fields.

Esteves, Coyne, and Moreno (2013) reported that contemporary governmental practices relating to LCPs entail f royalty and tax revenue maximization as well as local content maximization aimed at expanding the local industrial base. Whereas royalty and tax revenue maximization are aimed at providing governments with additional revenue for infrastructural development, local content maximization ensures that the employment of indigenes and local firms is given high priority (Esteves et al., 2013). An optimal blend for ensuring the effectiveness of LCPs implemented in developing countries that are richly endowed with natural resources entails both royalty and tax revenue maximization and the maximization of human resource local content.

Tordo et al. (2013) found that compliance with international trade regulations is a key issue relating to LCPs. Countries that adhere to the conventions of the World Trade Organization (WTO) exercise extreme caution when specifying local content

requirements, mainly because of trade liberalization. LCPs vary from country to country, because WTO members are technically bound through the national treatment obligation (NTO) clause (Esteves et al., 2013). The NTO clause stipulates that foreign goods and services should be treated the same as those that are locally produced. Under this clause, if a better alternative exists abroad, then foreign companies cannot be compelled to procure goods and services locally (Esteves et al., 2013). Thus, careful consideration must be given to the NTO clause in the design of LCPs. For example, while Tanzania's local content regulations do not include targets and penalties, those of Ghana specify that at least 10% of management staff in foreign petroleum companies must be Ghanaians from the onset of petroleum production activities, gradually increasing to 50% over a period of 5 years.

Types of Human Resource Local Content Policies

Tordo et al. (2013) noted that petroleum producing countries have adopted a variety of LCPs aimed at improving the number and quality of indigenes employed by foreign oil and gas companies. Esteves et al. (2013) further pointed out that WTO members categorized as least developed countries (LDCs) are permitted to introduce measures that deviate from the NTO clause for specified time periods in light of their institutional and administrative capabilities, financial or trade needs, or stages of development. Ghana and Angola are among the LDC WTO members for which the NTO clause has been waived in relation to local content requirements. Equatorial Guinea, Kazakhstan, Russia, Angola, Zimbabwe, South Africa, Indonesia, and Nigeria have

translated their local content requirements into regulations and legislation (Esteves et al., 2013). On February 19, 2014, Ghana also translated its local content and local participatory requirements into a regulation.

Tordo et al. (2013) identified three broad categories of LCPs that support the recruitment and development of indigenous people in oil producing countries. These categories are:

- *LCPs designed to increase the relative and/or absolute numbers of a nation's indigenes employed by a foreign company.* Angola, for example, has enacted Decree No. 5/95 mandating that foreign as well as national companies that employ more than five workers can only employ nonresident foreign workers if at least 70% of the workforce are Angolans (Tordo et al., 2013)
- *LCPs that promote managerial skills and the development of higher technical capabilities among indigenes.* For example, Ghana's local content and local participatory regulation, L.I. 2204, stipulates that local content plans should be annually submitted by foreign petroleum companies to the Petroleum Commission of Ghana for approval. Similar to Ghana's L.I. 2204, Article 6 of Azerbaijan's Petroleum Sharing Agreement for the Shah Deniz Prospective Area, signed by BP and the state oil company, stipulates that before the commencement of oil field development, 30–50 % of professionals and 70% of nonprofessionals are required to be indigenous employees. Moreover, Article 6 stipulates that 70% and 85% of indigenous professional and

nonprofessionals, respectively, are required to be employed upon commencement of oil and gas production (Tordo et al., 2013). Five years after oil and gas production has commenced, Article 6 stipulates that 90% and 95% of professionals and nonprofessionals, respectively, should be indigenous.

- *LCPs designed to restrict the number of foreign employees and their duration of employment.* According to Tordo et al. (2013), this category of LCP is designed to promote recruitment and career progression within an indigenous workforce. Angola's Decree No. 6/10 stipulates that recruitment of expatriate workers can only occur when it is confirmed that no indigenous Angolan personnel are available who are adequately qualified to perform the job (Tordo et al., 2013). Moreover, the same decree restricts the contracts of nonresident foreigners to 3 years and allows the issuance of temporary work permits to foreigners for less than three months upon obtaining the approval of the Angolan Labor Ministry Inspection Department.

Targets for the Proportion of the Indigenous Workforce in Foreign Petroleum Firms in Oil Producing Countries

The prevailing local content regulations vary in their scope and targets for different countries whose mineral resources are being exploited (Esteves et al., 2013). Thus, Ghana's Petroleum Local Content and Local Participatory Regulation, 2013 differs from the Nigerian Oil and Gas Industry Content Development Act, 2010. Moreover, whereas the local content bills of Ghana and Nigeria set targets for minimum

employment levels of indigenes, countries like Saudi Arabia and Oman prefer to give foreign petroleum companies the right to employ foreigners to make their operations efficient. On the other hand, the Ugandan Petroleum Exploration, Development, and Production Bill, 2012 stipulates that within one year of granting a petroleum license to a licensee, a detailed program for recruiting and training Ugandans should be annually submitted for approval (Tordo et al., 2013). As indicated in Table 2, there is a correlation between levels of local content in Ghana and the maturity of its petroleum exploration and production (E&P) sector. The human resource local content requirement in the petroleum sector is thus specific to the nation whose oil and gas resources are being exploited.

Table 2

Ghana's Human Resource Local Content Requirement Based on Head Counts

Item	Start	5 years	10 years
Management staff	30%	50–60%	70–80%
Technical core staff	20%	50–60%	70–80%
Other staff	80%	90%	100%

Note. Local content levels are to be attained from the date of effectiveness of a license or petroleum agreement. From Petroleum Commission (2014).

According to Tordo et al. (2013), the maturity of E&P within a country's petroleum sector is linked to the use of quotas and targets for the recruitment, training, and career advancement of indigenes within the human resource component of LCPs. Contrasting with such countries are frontier petroleum E&P markets such as Uganda, Mozambique, and Liberia that are yet to establish quantitative local content targets for their oil and gas sectors (Tordo et al., 2013). As shown in Table 3, Nigeria, Kazakhstan, and Angola also have quantitative human resource local content targets. To ensure greater participation of the indigenous people of petroleum-rich countries in this sector, it would be advantageous to set quantitative local content targets for recruitment and training, with compliance by foreign petroleum companies being mandatory.

Table 3

Comparison of Minimum Human Local Content Targets for Nigeria, Kazakhstan, and Angola

Country	Minimum target (%)	Metric	Regulation
Nigeria	95	Nigerian nationals in management positions by head count	Local Content Act 2010
	100	Nigeria nationals in junior and intermediate positions by head count	
Kazakhstan	70	Kazakh nationals in high level management positions by head count	Decree 45/12
	90	Kazakh technicians, specialists, and workers by head count	
Angola	70	Angolan citizens in the workforce by head count	Decree 5/95

Note. From World Bank (2013).

Monitoring and Reporting Requirements for Human Resource Local Content Regulations

Several of the petroleum producing countries lack mandatory local content reporting requirements, leaving foreign oil companies to report what they deem appropriate (Tordo et al., 2013). Section 44 of Ghana's L.I. 2204 stipulates that the Petroleum Commission of Ghana shall investigate and monitor the activities of foreign companies within the upstream petroleum sector to ensure compliance and achievement of the regulation's objectives. However, the Petroleum Commission of Ghana is yet to publish information on the prevailing human resource local content in Ghana's upstream petroleum sector. The Commission's assertion that there is a 75% rate of participation of indigenous Ghanaians in the upstream oil and gas sector (Petroleum Commission of

Ghana, 2015), as endorsed by IOGIRC (2015), is vague, as the measured component of L.I. 2204 has not been clearly specified. Based on a study of the LCPs of Trinidad and Tobago, Canada's Atlantic Provinces, Brazil, and Norway, Neff (2005) proposed the following measures for ensuring effective local content.

- Transparent and independent monitoring oversight by a regulatory authority.
- Relevant vocational training and support programs for indigenous small and medium-sized enterprises (SMEs).
- Preference for indigenous workers and companies while setting standards for commercial success sustainability.
- Joint ventures in which local staff work alongside international companies to ensure the transfer of skills and technology.
- The requirement for foreign companies to engage in research and development in host countries by building capacities among indigenous people and fostering the competitiveness of local companies.

Technical Capabilities of Indigenous Ghanaians in Relation to the Requirements of the Offshore Industry

The upstream petroleum industry requires employees with specialized job skills. However, Otoo et al. (2009) found that because of the capital intensiveness of the upstream oil and gas sector, only a few highly skilled professionals were able to procure employment. According to Esteves et al. (2013), lack of capacity building to enable indigenes to meet job requirements constitutes the main constraint to human resource

local content within the petroleum sector of developing countries. Therefore, at the outset of oil production in developing countries, there is a need to train indigenous people to enable them to occupy various positions within the upstream petroleum sector. The discovery in 2007 of substantial oil and gas stocks at the Jubilee field, and the significant oil production that commenced from November 2010, led to the sponsorship of a considerable number of indigenous Ghanaians to study courses related to oil and gas production through the GETFund.

The EDC was established by the ministries of power, petroleum, and trade and industry to enable indigenous SMEs to avail of numerous business opportunities within the Ghanaian upstream sector (EDC, 2013). Implementing capacity building programs for Ghana's upstream petroleum sector falls within the EDC's mandate. According to the EDC (2014), most SMEs and individuals seeking to participate in the Ghanaian upstream petroleum sector lack an understanding of activities related to oil and gas fields. This view is also supported by the finding of the Petroleum Commission that most indigenous companies, as well as individuals, are ignorant of the competencies required to meet demands within the Ghanaian upstream petroleum sector (Reporting Oil and Gas Project, 2014). Thus, there is the need to train individuals and SMEs wishing to participate in Ghana's upstream sector.

Within the L.I. 2204 regulation, technical staff are defined as engineers, technicians, and geoscientists. For over 40 years, Ghana's Kwame Nkrumah University of Science and Technology (KNUST) has been producing engineers and technicians in

the fields of electrical and instrumentation, mechanical, chemical, and civil engineering. To prepare indigenes for employment associated with Ghana's significant oil find in 2007, KNUST and the University of Ghana introduced academic programs in petroleum engineering and geoscience, respectively. The 10 regional polytechnics in Ghana also train electrical and mechanical technicians. Accredited private universities in Ghana, notably, Reagent, All Nations, and KAAF Universities produce engineers as well. Moreover, there are vocational training schools scattered across Ghana that equip indigenes with practical, mechanical, and electrical technical skills. Because the upstream petroleum sector is a specialized field, all of these locally trained engineers, technicians, and geoscientists require further practical training that is specific to engineering and construction in the oil and gas fields to enable them function effectively.

The Jubilee Training Centre (JTTC) is a US $6 million project established by Jubilee oil field partners to provide academic and practical training for indigenes in the areas of instrumentation, process, mechanical, and electrical engineering for the upstream petroleum sector (Ghana Exploration and Production [E&P] Forum, 2013). The Jubilee field partners are Tullow Oil PLC, Kosmos, Anadarko, Sabre Oil and Gas, and GNPC. Of these partners, GNPC is the only company that is indigenously owned. The hazardous environment of the offshore petroleum sector requires specialized training of personnel before they can commence working. According to the Ghana E&P Forum (2013), JTTC offers competency courses and certification in subjects that include abrasive wheels, basic hand tools, electrical and installation techniques, electrical safety, fitting for non-

fitting personnel, the theory and application of instrumentation techniques, measurement and control, the National Examination Board in Occupational Safety and Health (NEBOSH) the international general certificate, plant utilities, process safety, and NVQ Level II courses in process, mechanical, electrical, and instrumentation engineering. Thus, the establishment of JTTC has been a step in the right direction, as it builds the capacities of indigenous Ghanaians to take up jobs in the upstream petroleum sector.

To enable indigenous Ghanaians to develop technical skills in welding and fabrication, MODEC has established a US $1.6 million welder training center at Regional Maritime University to train, qualify, and certify welders for Ghana's upstream petroleum sector. This training school is the first of its kind in the West African sub-region. Its welding and fabrication courses will equip indigenous Ghanaians with the necessary skills and certifications required to take up relevant jobs in the oil and gas fields.

GETFund Sponsorship of Students to Undertake Oil and Gas Training Programs Abroad

To strengthen the labor force, the GoG awards scholarships to indigenes to study courses abroad that are not offered in Ghana. According to the Ghana Scholarship Secretariat (2013), after Ghana attained independence in 1957, the government decided to award scholarships to local students to develop the country's labor pool. The GETFund was established in 2000 with the sole aim of providing financial support for Ghana's educational sector. The Fund begun operations in 2001 after Act 581 received

presidential assent, leading to the establishment of GETFund on August 25, 2000 (GETFund, 2014). Part of GETFund's mandate is to provide Ghana's Scholarship Secretariat with supplementary funding for sponsoring indigenous Ghanaians to study abroad. When significant quantities of oil were discovered in Ghana in 2007, GETFund took the initiative of sponsoring many indigenous Ghanaians to undertake courses relevant to the oil and gas industry that would enable them to acquire jobs in Ghana's oil fields. It is widely believed that the majority of the students who secured GETFund sponsorship did not get jobs in Ghana's oil fields when they returned from their studies abroad.

Relevance of Training Courses Undertaken by Indigenous Ghanaian Students to the Skills Requirements in the Offshore Industry

The relevance of the sponsored courses to the advanced skills requirements in the oil and gas industry has been questioned by players within this industry. According to GETFund (2012), 86% of the selected indigenous Ghanaians were sponsored to undertake oil and gas management courses. Because the oil and gas sector is a highly specialized area, there is a widely held perception that these courses undertaken by indigenous Ghanaians are not relevant to the requirements of the various job positions available within the upstream petroleum sector. Thus, there is a need to establish the extent to which the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevalent local content in its offshore petroleum industry.

Capacity Building of Indigenous Ghanaians for the Oil and Gas Industry

According to the Ghana Oil Watch Strategy Review (2011), the upstream oil and gas industry is technical rather than labor intensive in nature. Its employees are specialists engaged in oil field exploration, development, and production who are proficient in the use of sophisticated and expensive technology. The GoG introduced capacity-building initiatives to equip indigenes with the skills required to meet the challenges entailed in the upstream petroleum sector. Tordo et al. (2011) argued that for indigenous companies to grow, governments need to increase the local skills base and develop capital markets and business know-how. The EDC was established by the GoG to assist indigenous SMEs to position themselves to take advantage of the numerous opportunities available within the growing Ghanaian upstream oil and gas sector. According to Hackenbruch and Davis Pleuss (2011), for multinational companies to be competitive and to maintain a thriving business, there is a need to develop local talent, build a base of competitive local suppliers, and deliver lasting socioeconomic benefits in the areas where they operate. To enhance indigenous human resource capital for Ghana's upstream oil and gas sector, GNPC sponsors its staff as well as selected indigenes to undertake courses in the field of oil and gas production. Operators within Ghana's oil and gas sector have also taken the initiative to train indigenes in various aspects of oil and gas production.

Multinational oil and gas companies contribute significantly to a host country's economy by developing and creating value added services that equip indigenes with skills that make them employable and able to meet international standards. According to Heum

et al. (2011), investments in capacity building have yielded significant results, bringing about industrial growth that profits both oil and gas companies as well as local communities. To improve local content, indigenous firms must take the necessary steps to expand, and foreign companies need to establish local facilities for manufacturing and service production (Heum et al., 2011). There is a need to enhance industrial development by increasing local content in upstream petroleum activities to ensure the success of policies such as Ghana's L.I. 2204.

Gbegi and Adebisi (2014) found that multinational oil companies in Nigeria's Delta region only trained and employed a handful of indigenes for menial jobs, choosing instead to recruit predominantly foreign workers. By contrast, the Petroleum Commission of Ghana is mandated to regulate the employment of foreign nationals within Ghana's upstream petroleum sector. As part of the requirements laid out in Ghana's LCP, multinational oil and gas companies must submit annual succession plans (Petroleum Commission, 2015). Measures being put in place by multinational petroleum companies in Ghana include provisions for imparting technical skills to indigenes to enable them to acquire jobs within the downstream petroleum sector.

Quantitative Design Methods for Assessing the Efficacy of Oil and Gas Local Content Policies in Developing Countries

Leedy and Ormrod (2005) noted that developing a research design entails planning a research study, with the sole aim of identifying the resources and procedures that will be followed to solve the stated research problem. There is evidently a need to

measure the prevailing local content in Ghana's upstream petroleum industry and, further, to determine the extent to which the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevalent local content in its offshore petroleum industry. Farrelly (2013) advocated the use of an effective quantitative research design to project the results of a study on to a larger population by obtaining evidence of a cause and effect relationship through hypothesis testing. Accordingly, a quantitative research design was deployed to establish whether the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevalent local content in its offshore petroleum industry.

Andrei and Irina (2013) examined the causality concept within a social science research framework, with an emphasis on the essential nature of the relationship between randomness and cause. An investigation of the relationship between the prevailing local content and petroleum courses undertaken by indigenous Ghanaians to enable them acquire jobs in the country's oil fields could establish the underlying reasons for the prevailing local content in Ghana's upstream petroleum sector. Andrei and Irina suggested that decision making is influenced by multiple random factors that necessitate the use of a quantitative research design to address the complexities of cause and effect relationships between the contributing factors. Supporting this view, Farrelly (2013) noted that a quantitative research design is deployed when a researcher aims to obtain unbiased results by performing a statistical analysis on collated data. Local content in the petroleum industry is essentially complex. An in depth understanding of the cause and

effect relationships existing between requirements and actual prevailing states requires a quantitative research design. Klaas (2008) argued that thorough planning of research studies is critical, because not only do researchers need to formulate practical research problems, but they must also consider what kind of data will be required for investigating their research problems.

Indicators, performance metrics, and formulae are pivotal to the government's formulation of local content regulation and petroleum companies' local content strategies, with the choice of metric ultimately driving the behavior of the regulator and companies (Tordo et al., 2013). The type of metric deployed plays a crucial role in the empowerment of indigenes in oil producing countries. Moreover, if the metric used for measuring human resource local content emphasizes head counts, then multinational petroleum companies could easily satisfy the specified requirements by ensuring that all semi-skilled and administrative positions within the workforce are occupied by indigenes (Tordo et al., 2013). On the other hand, if the human resource local content metric emphasizes the share of total gross salaries paid to indigenes, then multinational petroleum companies would be compelled to develop a comprehensive succession plan to ensure that indigenes are recruited and trained to take up higher paying management positions associated with more advanced skills (Tordo et al., 2013).

Measurement of Human Resource Local Content

Human resource local content is defined within L.I. 2204 as the percentage of indigenous personnel within the petroleum industry value chain that can be measured in

monetary terms. This definition reveals that Ghana's petroleum LCP does not specify the metric. As shown in Figure 4, there are various categories of metrics for measuring local content. Consequently, an appropriate metric was required to measure Ghana's petroleum human resource local content and to compare it to the requirements of L.I. 2204.

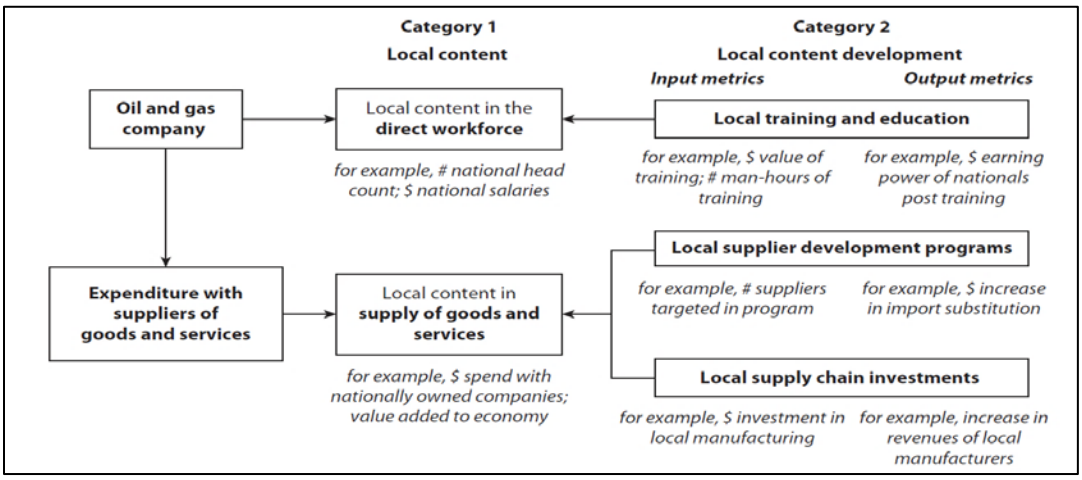

Figure 4. Local content categories of metrics in the oil and gas sector (source: World Bank, 2013).

As Table 4 shows, local content can be measured using different metrics. Tordo et al. (2013) identified two broad categories of measuring and performance reporting metrics for human resource local content. The first metric is the extent to which indigenous employees of an oil producing company can capture labor expenditure by petroleum companies. An example would be headcounts of local employees within a multinational petroleum company. The second metric is efforts made by a government to increase its share of the human resource local content in the petroleum industry over time by building indigenous skills through the provision of appropriate training and education.

Table 4

Sources of Required Data, Reporting Process, and the Confidence Level in the Reported Local Content

Metric	Key feature	Information source	Supply chain penetration	Stage of procurement	Expenditure category	Confidence in data	Simplicity to administer
# FTE national citizens employed as % of total	Head count	Human resources data	n.a	n.a	OPEX	Good	Simple
# FTE national citizens in senior, supervisory, and skilled positions (or other job or grade disaggregation)	Head count by job type	Human resources data	n.a	n.a	OPEX	Moderate	Simple
# man-hours of national labor per year	Man-hours		n.a	n.a	OPEX	Good	Simple
$ value of wages, benefits and social taxes paid to FTE national citizens employees as % of total	Wages	Human resources data	n.a	n.a	OPEX	Good	Moderate
$ value of wages, benefits and social taxes paid to FTE national citizens in senior, supervisory and skilled positions (or other job or grade disaggregation), as % of total	Wages by job type	Human resources data	n.a	n.a	OPEX	Moderate	Moderate
$ value of wages, benefits and social taxes paid to FTE national citizens employed and $ value of social taxes and expenses paid to expats, as % of total	National wages and expat expenses/ taxes	Human resources data	n.a	n.a	OPEX	Good	Moderate

Note. Metric for measuring local content. From the World Bank (2013).

Analysis of Variance

An analysis performed to ascertain the extent of variation between the prevailing human resource local content and the requirements of L.I. 2204 in Ghana's offshore petroleum industry could help to address the gap between requirements under this regulation and professional practice. Karagöz and Saraçbasi (2016), who tested the equality of population means, concluded that an ANOVA aids in the determination of significant differences between two or more groups. If the present study conducted on the unit of analysis indicates that the prevalent human resource local content varies from the requirements of L.I. 2204, then this finding could be applied to the entire Ghanaian upstream petroleum sector.

Konietschke, Bösiger, Brunner, and Hothorn (2013) suggested that the traditional statistical method of distinguishing specific significant differences among the effects of interest in a population and computing simultaneous confidence intervals consists of the following three steps. The first step entails using an appropriate procedure such as an ANOVA to test the null hypothesis. If the null hypothesis is rejected, then the second step entails testing individual hypotheses through multiple comparisons. The final step entails the computation of simultaneous confidence intervals for the treatment effects of interest. Knowledge of the extent to which the training acquired by indigenous Ghanaians for obtaining jobs in Ghana's oil fields affects the prevalent local content in its offshore petroleum industry could help prospective employees to identify and pursue appropriate training courses.

Gaps in the Literature

Tordo et al. (2013) found that many of the petroleum producing countries do not have mandatory local content reporting requirements, leaving foreign oil companies to report what they deem appropriate. Section 44 of Ghana's L.I. 2204 stipulates that the Petroleum Commission of Ghana shall investigate and monitor the activities of foreign companies in the upstream petroleum sector to ensure compliance and attainment of the objectives of the local content regulation. However, the Petroleum Commission of Ghana is yet to publish information on the prevailing human resource local content in Ghana's upstream petroleum sector. The Commission's assertion that there is a 75% participatory rate of indigenous Ghanaians in the upstream petroleum sector (Petroleum Commission, 2015), endorsed by IOGIRC (2015), is vague, as what is being measured in relation to L.I. 2204 is not clearly specified. Consequently, the key objective of this quantitative cross-sectional study was to determine the extent of variation between the prevalent human resource local content and the requirements of L.I. 2204 in Ghana's offshore petroleum industry.

Tordo et al. (2013) further indicated a need to measure cost and training inputs and the impacts of training programs in relation to local content management. In the context of the present study, as indicated in RQ2, my aim was to determine the extent to which the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevalent local content in its offshore petroleum industry.

Summary and Conclusions

The pragmatism of local content regulations governing the employment of foreigners within extractive industries is typically questionable. Egwaikhide and Omojolaibi (2014) found that the steady growth of extractive industries recorded over the past decade for African countries has not resulted in the promised jobs, leading to agitations among locals. Thus, an investigation of the prevailing human resource local content in Ghana's upstream petroleum industry could contribute to addressing the gap between the requirements of Ghana's Petroleum Local Content Regulation and professional practice.

Esteves et al. (2013) reported that contemporary governmental practices relating to LCPs entail the deployment of royalty and tax revenue maximization, as well as local content maximization aimed at expanding the national industrial base. Whereas royalty and tax revenue maximization are aimed at providing a government with additional income for infrastructural development, local content maximization is a strategy for ensuring that higher priority is given to the employment of indigenes and local firms (Esteves et al., 2013). An optimum blend of royalty and tax revenue maximization and human resource local content maximization ensures the success of LCPs for developing countries that are richly endowed with natural resources. However, as noted by Esteves et al., the main constraint to developing human resource local content within the petroleum sector in developing countries is the lack of capacity building of indigenes to meet job requirements.

Tordo et al. (2013) further pointed out that when formulating LCPs, the main issue of concern is that of compliance with international trade regulations. Mainly because of trade liberalization, countries that are committed to the conventions of the WTO exercise extreme caution when specifying local content requirements. Because members of the WTO are technically bound by its NTO clause, LCPs vary from country to country (Esteves et al., 2013). The NTO clause stipulates that foreign goods and services should be treated the same as those that are locally produced. Accordingly, if a better alternative exists abroad, foreign companies cannot be compelled to procure goods and services locally (Esteves et al., 2013).

The applied indicators, performance metrics, and formulae are pivotal in determining a government's local content regulation, and the local content strategies of petroleum companies, with the choice of metric ultimately driving the behavior of regulators and companies (Tordo et al., 2013). The type of metrics deployed plays a crucial role in empowering indigenes within oil producing countries. Moreover, if the metric used for measuring human resource local content emphasizes head counts, then multinational petroleum companies could easily satisfy the stipulated requirements by ensuring that all semi-skilled and administrative positions within the workforce are occupied by indigenes (Tordo et al., 2013). On the other hand, if the human resource local content metric emphasizes the share of total gross salaries paid to indigenes, then multinational petroleum companies would be compelled to establish a comprehensive succession plan to ensure that the indigenes are recruited and trained to take up higher paid management and other positions requiring more advanced skill levels (Tordo et al.,

2013). The most popular metric used to measure human resource local content within the direct workforce of a multinational petroleum company entails measuring the number of indigenous staff as a proportion of the total full-time equivalent (FTE) employees (Tordo et al., 2013). In Chapter 3, I elaborate on the methodology for this study, showing how the selected research design addressed a gap in the literature.

Chapter 3: Research Method

The purpose of this quantitative cross-sectional survey-based study was to determine the extent of differences between the prevalent human resource local content and the requirements of Ghana's petroleum local content regulation in its offshore petroleum industry. A specific aim of the study was to ascertain to what extent, if at all, the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevalent local content in its offshore petroleum industry. A quantitative research method was considered appropriate for the study, as this approach entails counting, classifying features, and constructing statistical models and figures to explain an observation (Borrego et al., 2009). The research problem addressed by this study concerned the gap between the human resource requirements under Ghana's Petroleum (Local Content and Local Participatory) Regulations, 2013 and professional practice. Two research questions, with associated hypotheses, were formulated to address the research problem and achieve the study's objectives. In this chapter, I discuss the research methodology and design, providing details on how the research purpose was achieved.

Specifically, I discuss the methodology, research design, rationale of the study, population sample, sampling procedures, data collection approach, and variable operationalization. In addition, I discuss evidence relating to instrument reliability as well as threats to validity, ethical considerations, and the data analysis procedure. Adequate details are included in this chapter to enable future researchers to replicate the exact sequential steps required to achieve the study's objectives.

Research Design and Rationale

The use of a quantitative cross-sectional survey design was supported by the collection of data required to determine the extent of differences between the prevalent human resource local content and the requirements of the L.I. 2204 in Ghana's offshore petroleum industry. According to Randall et al. (2011), a cross-sectional survey design enables inferences to be made about a desired population at a particular point in time through the collection of data. This research design was appropriate for ascertaining whether the prevailing human resource local content in Ghana's offshore petroleum industry matched the requirements of L.I. 2204. The design was also appropriate for ascertaining to what extent, if at all, the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevalent local content in its offshore petroleum industry.

Although I considered a longitudinal panel survey, this research tool was not appropriate for the study because it requires follow-ups with survey participants over time. As noted by Hajducek and Lawless (2013), a longitudinal panel survey entails repetitive observations of a set of variables for very similar sample units over a period of time by following the participants and collecting data through sequential interviews. These repetitive observations are required because a panel survey is typically carried out to measure a change in a population under investigation, which did not apply to this study. As such, the use of a panel survey did not match the study's objective, which was to measure the prevailing human resource local content in Ghana's offshore petroleum industry and to determine whether it matched the requirements of L.I. 2204. Moreover, a

panel survey did not support the study's objective of ascertaining the extent to which training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevalent local content in its offshore petroleum industry.

As noted by Mácka, Krejcí, Loucková, and Peterková (2011), a survey design aids in understanding significant differences that exist between groups within the population under study. I chose a survey as my data collection tool because of the flexibility that it offers regarding the mode of data collection that can include structured recorded interviews, self-administered questionnaires, and interviews. A survey is considered an essential component of research in the social sciences because it enables a researcher to collect extensive quantities of data on diverse subjects relevant to the research topic (Groves, 2011). The virtual nature of the working environment in the upstream oil and gas industry required the deployment of emailed questionnaires.

Survey-based research is widely used in the social sciences, as it entails the collection of data from adequate and representative samples, which can then be analyzed and generalized to an entire population. According to Groves (2011), the deployment of survey-based methodologies by researchers has led to the amassing of the current body of knowledge in social sciences. Implementation of a survey can aid in fostering understanding of the behavior of indigenous people and their employment trend in Ghana's upstream petroleum industry. As noted by Fowler (2013), when applying a survey research design, it is necessary to identify and mitigate errors in data collection and to measure the effect of these errors on the research findings.

Fowler (2013) identified two types of errors relating to survey research. The first type of error is associated with who answers the research questions, and the second type of error is associated with the research answers. Errors associated with who answers the research questions directly relate to the extent to which the selected sample mirrors the features of the entire population under study (Fowler, 2013). Concurring with Fowler, Mácka et al. (2011) suggested that errors associated with who answers the research questions result from the failure to assign correct weights to samples acquired from the population under study. As indicated by Fowler, a unit nonresponse error denotes the likelihood that not every individual in the sample would be responsive to the survey questionnaire. Consequently, a researcher's failure to assign correct weights to samples, as well as his or her inability to collect answers from all the study's subjects, could lead to misaligned responses (Fowler, 2013).

Mácka et al. (2011) suggested that there is a need to guard against measuring that which does not tally with the truth to avoid the second type of error associated with surveys, namely measurement errors or errors related to responses. In support of this point, Fowler (2013) emphasized the need to avoid errors associated with responses by fully understanding what is being measured and categorizing the responses appropriately and in an objective manner. Appropriate categorization facilitates the identification of errors in the responses (Fowler, 2013).

Fowler (2013) observed that data collated from surveys, aside being preferable to data from other sources, are also able to meet the requirement for data that are unavailable elsewhere. Fowler identified three main outcomes when surveys are

conducted appropriately. First, levels of accuracy and confidence in the collated data are enhanced when probability sampling is deployed (Fowler, 2013). Second, the use of standardized modes of measurement promotes consistency across all of the responses provided by survey participants. Third, the conduct of a special purpose survey ensures the availability of the particular data required for a specific type of analysis.

Measurement of the number of indigenous staff as a proportion of total FTE employees is the most popular metric used for measuring human resource local content within the direct workforce of a multinational petroleum company. Thus, a survey administered among two multinational petroleum companies whose oil and gas development plans have been approved by the Petroleum Commission of Ghana enabled the extent of differences between the prevalent human resource local content and the requirements of L.I. 2204 in Ghana's offshore petroleum industry to be determined. L.I. 2204 categorizes human resource local content into three categories: management, technical, and other staff. By surveying staff of the two selected multinational oil and gas companies, I was able to determine whether the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevalent local content in its offshore petroleum industry.

Analysis of Variance

The findings of an analysis of the extent of differences between the prevailing human resource local content and the requirements of L.I. 2204 in Ghana's offshore petroleum industry would contribute to addressing the gap between the requirements of L.I. 2204 and professional practice. Karagöz and Saraçbasi (2016), who tested the

equality of population means, found that application of an ANOVA enables significant differences between two or more groups to be determined. A finding of variance between the prevalent human resource local content and the requirements of Ghana's petroleum local content regulation for the unit of analysis of my study could be applied to the entire Ghanaian upstream sector.

According to Konietschke et al. (2013), the traditional statistical method of distinguishing specific significant differences among the effects of interest within a population, and computing simultaneous confidence intervals, includes three steps. First, an appropriate procedure like an ANOVA is applied to test the null hypothesis. Second, if the null hypothesis is rejected, individual hypotheses are tested through multiple comparisons. The final step entails computation of simultaneous confidence intervals for the treatment effects of interest. Determining the extent to which the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevalent local content in its offshore petroleum industry may help prospective employees to identify and pursue appropriate training courses.

Research Questions

RQ1: To what extent, if at all, does the prevailing human resource local content differ from the requirements of Ghana's petroleum local content regulation in its upstream petroleum industry?

H1o: The prevailing human resource local content does not differ from the requirements of Ghana's petroleum local content regulation in its upstream petroleum industry.

$H1_1$: The prevailing human resource local content does differ from the requirements of Ghana's petroleum local content regulation in its upstream petroleum industry.

RQ 2: To what extent, if at all, does the training acquired by indigenous Ghanaians seeking jobs in oil fields affect the prevailing local content in its offshore petroleum industry?

$H2_0$: The training acquired by indigenous Ghanaians does affect prevailing local content in Ghana's upstream petroleum industry.

$H2_1$: The training acquired by indigenous Ghanaians does not affect prevailing local content in Ghana's upstream petroleum industry.

Variables

Independent variable. Three subcategories of the independent variable were identified: (a) management staff, (b) technical staff, and (c) other staff.

Dependent variables. Dependent variables included prevalent local content, which was defined as the extent of differences of the prevailing local content from the requirements of Ghana's local content regulation on a scale of 1 to 7 (ranging from strongly disagree to strongly agree). Eleven items related to prevalent local content were identified as dependent variables. These items were (a) prevalent management staff local content, (b) prevalent technical staff local content, (c) prevalent other staff local content, (d) prevalent overall staff local content, (e) acquired management skills training effect on local content (f) acquired technical skills training effect on local content (g) acquired other skills training effect on local content (h) effective succession planning effect on

local content, (i) the Petroleum Commission's efforts to improve local content, (j) multinational petroleum companies' commitment to local content improvement, and (k) locals' acquired training effect on local content.

Scope of Research and Characteristics of the Unit of Analysis

In Ghana's oil and gas sector, the Petroleum Commission is mandated to regulate upstream petroleum activities. The unit of analysis in this study was the upstream petroleum sector of Ghana's oil and gas industry, with a particular focus on two multinational petroleum companies whose oil and gas development plans have been approved by the Petroleum Commission. The quantitative cross-sectional survey conducted for this study focused on the human resource local content in Ghana's upstream petroleum industry. L.I. 2204 groups the human resource component of local content into management staff, core technical staff, and other staff. Further, training courses undertaken by indigenous Ghanaians to enable them to acquire jobs in Ghana's oil fields are categorized into management, technical, and other courses.

Research Methodology

Viewing a research methodology as a procedural system that provides a systematic approach for conducting research, Barnham (2015) identified three critical roles that it plays in research. The first role entails facilitating communication between researchers. Second, it provides a rule for reasoning, thereby ensuring that a systematic rule and structure are in place, along with a logical way of drawing inferences. Last, a methodology provides acceptable criteria for determining and choosing various techniques for validating research findings. This study entailed a quantitative

methodology aimed at analyzing differences between the prevalent human resource local content and the requirements of Ghana's petroleum local content regulation in its upstream petroleum industry.

Howe (1988) noted that the quantitative research method revolves around positivism, which entails deductive reasoning. Accordingly, this study was quantitative in nature and was aimed at determining the extent of differences between human resource requirements of Ghana's local content regulation and professional practice in its offshore oil and gas industry. A second reason for selecting a quantitative method related to the study's purpose of establishing to what extent, if at all, the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevalent local content in its offshore petroleum industry. Consequently, it was necessary to establish the prevailing local content in Ghana's offshore petroleum industry and to subsequently ascertain whether the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields impacts the prevalent local content in its offshore petroleum industry. A quantitative research methodology was appropriate because this methodology entails statistical analyses aimed at determining whether significant differences exist between groups in relation to various indicators (Carpenter et al., 2006; Rutz et al., 2003; Webster & Haberstroh, 2002).

A qualitative research methodology was not chosen for the study on the grounds that inquiries entailing the use of this type of methodology tend to focus on investigating and understanding the meanings that people ascribe to societal or human problems (Koro-Ljungberg & Douglas, 2008). There is growing concern regarding the lack of available

jobs for indigenous Ghanaians in Ghana's oil fields. This study was conducted to establish the prevailing human resource local content in Ghana's offshore oil and gas industry, which was then compared with the requirements in L.I. 2204, as opposed to exploring the meanings that indigenous Ghanaians ascribe to the reportedly low human resource local content in this industry.

I considered applying a mixed methods methodology as an alternative research approach, but I did not select this methodology for the following reasons. First, a quantitative research methodology is ideal for examining statistical differences between groups within a population. In this case, my aim was to determine the extent of differences between the prevalent human resource local content and the requirements of Ghana's petroleum local content regulation. A further aim was to determine whether the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevalent local content in its offshore petroleum industry. ANOVA, which is consistent with a quantitative method of inquiry, was selected as the preferred statistical technique for analyzing the collated data as well as validating the procedure adopted in this study.

A quantitative research strategy facilitates the establishment of what transpires during a process of change, providing a specific direction for the implementation of a study (Buckley, 2015). L.I. 2204 was enacted to facilitate the establishment of a quota of indigenous employees within Ghana's upstream petroleum industry. To determine whether the requirements stipulated by L.I. 2204 were being adhered to by multinational oil and gas companies operating in Ghana's oil fields, I adopted a quantitative research strategy, which enabled me to determine the extent of differences between the prevalent

human resource local content and the requirements of L.I. 2204 in Ghana's offshore petroleum industry. Second, my use of this quantitative strategy enabled me to establish the extent to which the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects prevalent local content in its offshore petroleum industry.

A nonexperimental research design was deployed to answer the research questions in this quantitative empirical study. This type of research design enables a researcher to determine whether a variable tends to occur in a significant proportion along with another variable (Borrego et al., 2009). In this case, my aim was to compare the prevailing human resource local content with the requirements of L.I. 2204 in Ghana's upstream petroleum industry. Using inferential statistical procedures like ANOVA, I tested the collated data for variability in the dependent and independent variables. In addition, nonexperimental designs do not require any manipulation of the variables and conditions of a study, which suited the purpose of this study. I did not select an experimental research design, as this type of design would have entailed manipulation of variables and conditions, which would have defeated the purpose of this study. Researchers applying experimental designs artificially manipulate variables and conditions when analyzing their data to be able to better observe dependent variables (Buckley, 2015).

Based on the research questions and associated hypotheses, a quantitative cross-sectional research design was deployed to answer the research questions. According to Barnham (2015), survey-based research yields a quantitative description of attitudes, trends, and opinions of representative samples obtained from the population under study.

This view correlates with that of Yu and Cooper (1983) who noted that surveys allow for generalization of the results obtained from analyzing a sample of a population. Hence, a survey-based research design enables the population under investigation to be described.

Population

Tsang (2014) defined a population as the designated set of specifications that conform to the aggregate of all cases. This definition of a population is supported by the definition of a population provided by Bonvicini, Ganapini, Spadoni, and Cozzani (2012) as the set of specific units under investigation based on a study's research questions. To answer RQ1 and RQ2, the population for the study was drawn from two multinational petroleum companies whose oil and gas development plans have been approved by the Petroleum Commission of Ghana. The employees of these two companies were grouped according to the following three categories: management, technical, and other staff. The total estimated permanent workforce of the two selected multinational petroleum companies was 379.

Sampling

Uprichard (2013) noted that sampling, which is a critical aspect of research, is a recognized issue in the social sciences. It is not feasible to capture each and every entity within a population when conducting a study. According to Bettis, Gambardella, Helfat, and Mitchell (2014), capturing a reasonably sized and acceptable quantum of the population is crucial for establishing the validity of a study, because it is impracticable to study every single entity within a population. Based on these observations, sampling can be viewed as a method whereby a suitable technique is deployed within a study to capture

an unbiased section of a population. Moreover, sampling entails collation of data, which serves as the basis for generalization from a subset of the population, which then represents the entire population (Tsang, 2014). Thus, provided that the correct sampling technique is applied, the results of a study can be generalized to the entire population under study.

Bettis et al. (2014) contended that for the results of a study to be valid and to serve the study's purpose, the sampling design, sample frame, and sampling unit should be clearly outlined. It is both practically impossible and imprudent for a researcher to carry out a study encompassing an entire population. Obtaining a sample frame from the entire population under study is, therefore, appropriate (Fowler, 2013). Moreover, as pointed out by Uprichard (2013), strategically drawing the sample frame from an entire population guarantees that each member of the population under study stands an equal chance of being selected. Concurring with this view, Fowler (2013) suggested that obtaining an adequate sample frame necessitates an appraisal of the sample to verify its completeness, the efficiency of the sample frame, and the probability of each individual sample within the population being selected. In this study, each sample had a fair chance of being selected. Further, there was a need to ensure that each individual sample that was selected was an eligible component of the general population under study (Fowler, 2013).

Stratified Sampling Strategy

Uprichard (2013) emphasized that the sampling strategy employed by a researcher is crucial for the success of any quantitative study. A sampling strategy must be carefully

selected based on the properties of the population being investigated. Because generalization is based on fractional information that seeks to validate the results provided by the sample data, it is essential for a researcher to ensure that the sampling technique and strategy deployed are adequate and free from errors (Fowler, 2013). Concurring with this view, Bettis et al. (2014) observed that the ultimate aim of sampling is to provide a conceptual basis for making accurate estimates of unknown parameter values based on calculated sample sizes. As noted by Uprichard, sampling entails extracting individual entities that adequately represent a population. By defining the sample frame, which gives an indication of the group of individuals who have an equal chance of being selected for the sample, the sampling strategy can be strengthened. Further, by defining the statistical power, which normally has an 80% acceptable value in probability sampling, the sampling strategy could be strengthened.

In this study, stratified sampling, which entails first dividing the elements of a population into relevant subgroups or strata and subsequently drawing a sample from within each subgroup (Fowler, 2013), formed the basis of the sampling strategy. This sampling method was selected, because human resources within Ghana's upstream petroleum sector are categorized into management, technical, and other staff. This categorization is also found in Ghana's local content and local participatory regulation, L.I. 2204. To adequately cover the human resource requirements of L.I. 2204, and to ensure adequate representation of the entire population under study, the sample frame was grouped into management, technical, and other staff. Samples were then drawn from each group or strata for the subsequent gap analysis.

For the survey of the selected multinational petroleum companies, human resources were divided into the above three strata, comprising six subgroups in all. Stratifying samples in advance ensures that their proportions within each class are the same as the proportion for the whole population (Fowler, 2013). Once all the human resource categories had been grouped into the required strata, simple random sampling was performed to select the participants.

I considered cluster sampling as an alternate sampling strategy for this study. This type of sampling is usually conducted in large-scale studies entailing large groupings, with t groups selected through simple random sampling (Uprichard, 2013). Unlike cluster sampling, stratified sampling conducted for this study ensured that each of the management, technical, and other staff within the two selected multinational petroleum companies stood an equal chance of being selected, despite the comparatively small population.

G*Power analysis was performed to determine the required sample size for this study. According to Uprichard (2013), G*Power analysis has played a momentous role in statistical power analysis. Its use enables concerns regarding inadequate sample size or excessive sample size to be overcome (Bettis et al., 2014). By performing G*Power analysis, I was able to determine the appropriate sample size and to avoid an inadequate or excessive sample size in this study.

To determine the required sample size for this study, G*Power analysis was conducted using G*Power version 3.1. 9.2. As indicated in Figures 5 and 6, the required sample size of 159 was obtained using three predictors, a medium effect size of 0.25, a

power of 0.8, and three groups. A sample comprising 159 participants was drawn from the two selected multinational oil companies. The total permanent workforce of the selected two multinational petroleum companies was 379.

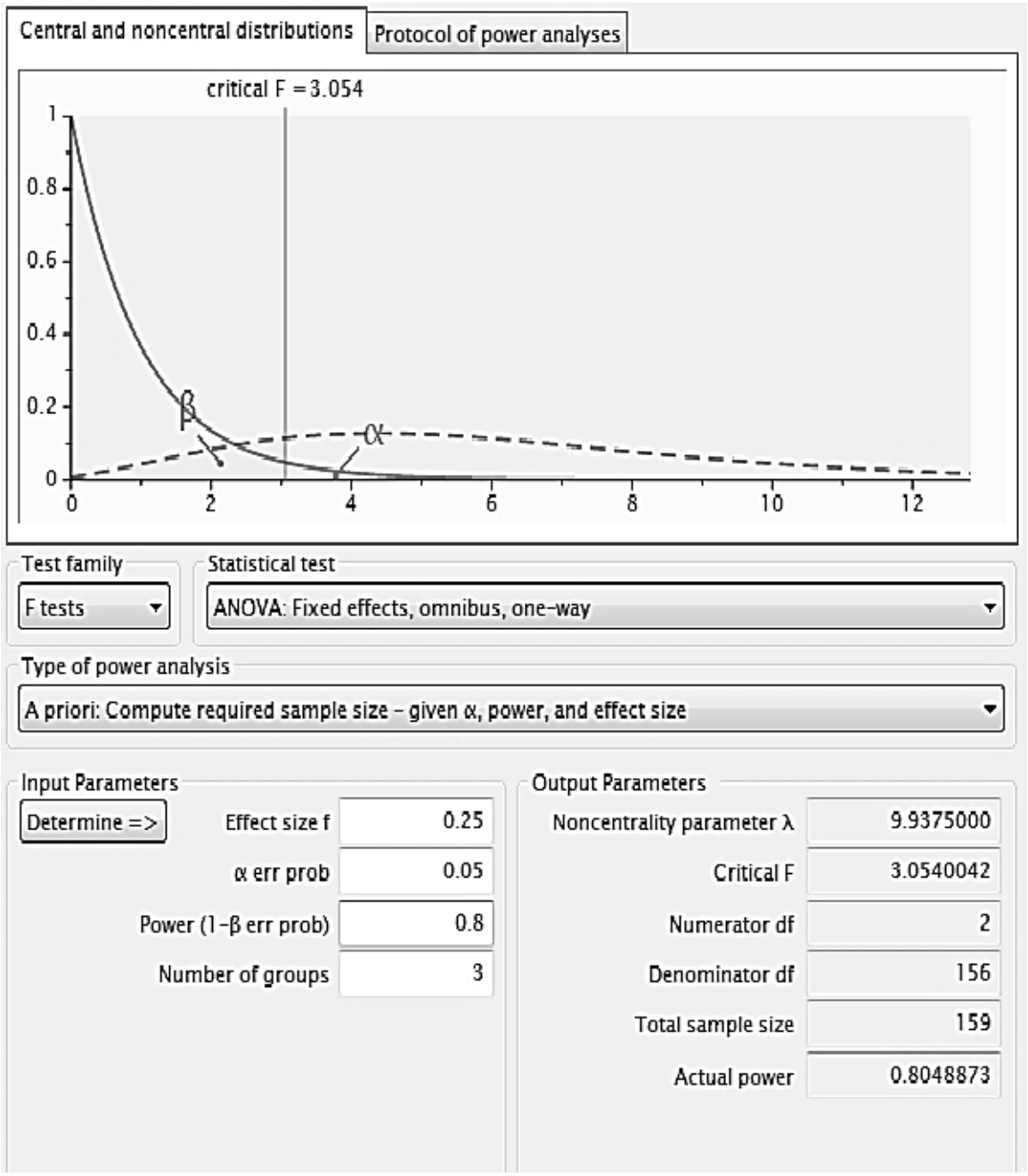

Figure 5. Results of the G*Power analysis.

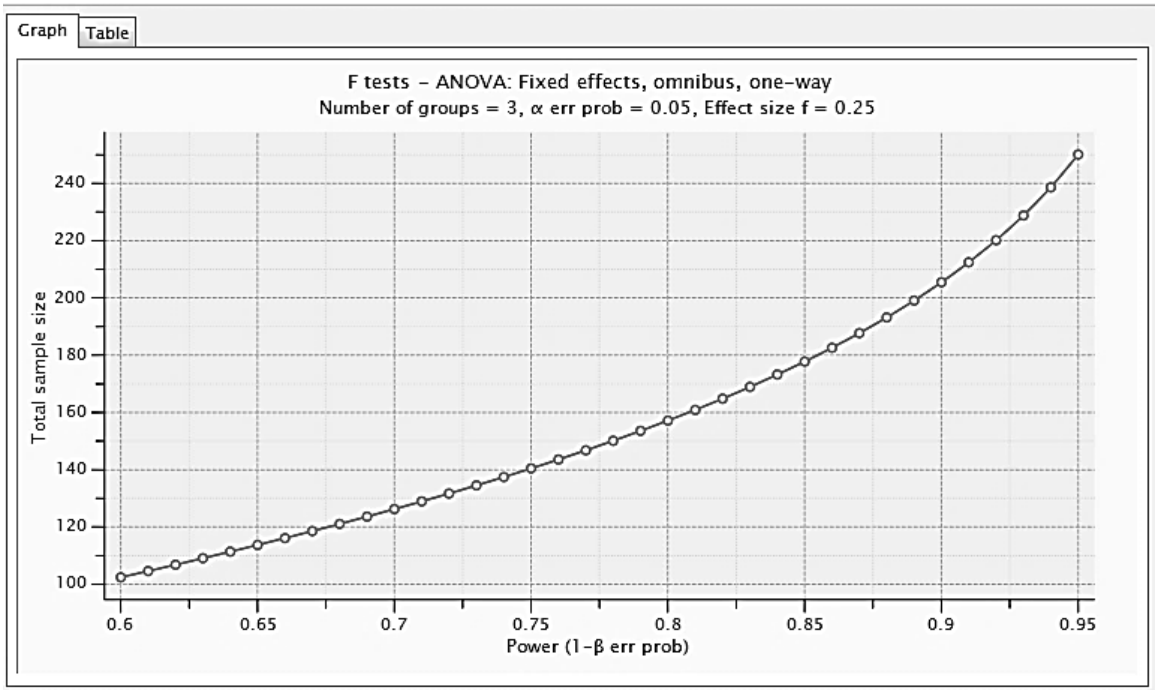

Figure 6. G*Power statistical graph.

Strengths and Weaknesses of the Stratified Sampling Strategy

A key strength of the chosen stratified sampling method is that it enhances the precision of estimates of the characteristics of an entire population by avoiding selection bias (Fowler, 2013). In addition, stratified sampling conducted for this study enabled me to deploy different sampling strategies within the seven different strata of my study population. The administrative convenience offered by a stratified sampling technique was another key strength of this method (Bettis et al., 2014). However, this sampling strategy also had some weaknesses, as it required properly sorting out participants within each strata, which was time consuming and tedious.

Operational Structure of Ghana's Upstream Petroleum Sector

Ghana's upstream petroleum sector is representative of the organizational structure of offshore oil and gas industries worldwide. There are three categories of staff: management, technical, and other staff. The main departments, which are subsea, topsides, engineering, operations, procurement, accounts, human resources, and administration, are interlinked within the supply chain that ensures oil and gas production. The management staff are the heads of the various departments. The technical workforce includes engineers, technicians, geoscientists, and chemists. The other staff work in the areas of procurement, accounts, human resources, and administration. The data for this study related to these categories of human resource personnel. Though the Petroleum Commission is a key stakeholder that regulates the Ghanaian upstream petroleum sector, it did not fall within the scope of this research. Consequently, its staff were not surveyed.

Recruitment, Participation, and Data Collection Procedures

Data related to the independent and dependent variables were collated through a web-based survey. Because of the virtual nature of the upstream petroleum industry, the survey was distributed to participants through their private emails. A stratified sampling technique was used to draw 159 participants from each of the three groups, namely management, technical, and other staff within the entire workforce of the two selected multinational petroleum companies. Thus, there were six subgroups in total. Survey Monkey, which is an online survey tool, was used to administer surveys conducted with

each of the six groups to collate data. An ANOVA was performed to analyze the collated data obtained from the selected participants.

Saari and Scherbaum (2011) reported that over the past decade, web-based surveys have emerged as the preferred survey instrument for collating psychometric and other related data. The virtual nature of the upstream petroleum industry makes the deployment of a web-based survey ideal. In the social and behavioral sciences, the web-based survey offers enormous benefits to researchers, especially those engaged in employment-related surveys (Saari & Scherbaum, 2011).

According to Naithani (2011), the quality of data collected through questionnaires that are self-administered and web-based has always posed challenges relating to coverage and accessibility within the social sciences. However, because of the virtual nature of the upstream petroleum industry, these challenges were mitigated as the mode of communication was web based. Hence, the coverage of all the participants who were eligible to participate in this study was sufficient.

Pilot Test

A pilot study, involving a few participants to pre-test the research instrument, enhanced the validity and reliability of the collated data. According to Naithani (2011), pilot testing of web-based questionnaires enables the relevant structure, duplication, and errors to be checked. Hence, corrections were made based on the initial feedback before administering the web-based questionnaire to participants in the main survey. Pilot testing the survey enabled refining of the research instrument and mitigation of measurement errors associated with this study. In addition, expert review feedback,

aimed at improving internal validity and reliability (Saari & Scherbaum, 2011), was obtained.

Stone (2015) pointed out that reliability, which relates to the consistency of a measuring technique, is important in any quantitative research study. Consequently, during the pilot test, the reliability of the measuring instrument was improved by following the guidelines provided by George and Mallery (2003). Specifically, reliability values above 0.9 were considered excellent, those between 0.8 and 0.9 were considered to be very good, those between 0.7 and 0.8 were considered to be good, and those below 0.7 were considered to be unacceptable (George & Mallery, 2003).

Instrumentation and Operationalization of the Constructs

As pointed out by Saari and Scherbaum (2011), when developing questionnaires for surveying employees using a quantitative research design, researchers should consider including closed-ended rather than open-ended questions. For this study on the local content in Ghana's upstream petroleum sector, web-based questionnaires relating to the independent and dependent variables were carefully designed and administered to participants who were selected through stratified sampling. In accordance with the recommendation of Uprichard (2013) and Boynton and Greenhalgh (2004), the questions were kept brief. Moreover, to ensure confidentiality during the survey (Boynton & Greenhalgh, 2004), the web-based survey was structured in such a way as to guarantee participants' confidentiality.

To ensure clarity, the web-based survey questionnaire included an explanation of the reasons for the survey, its purpose and objectives, the procedure adopted for the

survey, and its benefits (Uprichard, 2013). It also guaranteed the confidentiality of participants as well as their right to terminate the survey midway at their discretion (Stone, 2015). Moreover, the participants were informed of the risk associated with the survey and were provided with an explanation of how the collated data would be used (Boynton & Greenhalgh, 2004).

George and Mallery (2003) clarified that the main purpose of a survey is to develop an appropriate instrument for measuring all the independent and dependent variables. A set of 11 questions was developed for this survey to collate empirical data on the independent and dependent variables. A Likert-type scale provides the means of measuring the extent to which survey participants agreed with a statement (Adamsen, Rundle-Theile, & Whitty, 2013). Consequently, this type of scale was used to evaluate and compare the prevailing local content in Ghana's upstream petroleum industry with the requirements of L.I. 2204 and, further, to determine the extent to which the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevalent local content in its offshore petroleum industry.

The survey questions were grouped into five main categories, with each category focusing on the extent to which the independent variable influenced the dependent variables. The five sets of questions, which were aimed at eliciting answers to RQ1 and RQ2, were administered to the management, technical, and other staff within the two selected multinational petroleum companies. The first and third sets of questions addressed RQ1, while the second and fifth sets addressed RQ2. Three further questions were introduced within the fourth set to buttress the results of the study.

Within the first set of survey questions, the first question was aimed at determining the extent of differences between the percentage of local management staff in the upstream petroleum sector and the requirements of L.I. 2204. The second question was aimed at determining the extent of differences between the percentage of local technical staff in the upstream petroleum sector and the requirements of L.I. 2204. The third question was aimed at determining the extent of differences between the percentage of other local staff in the upstream petroleum sector and the requirements of L.I. 2204. The third set of survey questions was aimed at determining the extent to which the overall prevailing local content meets the requirements of L.I. 2204.

Within the second set of survey questions, the first question was aimed at determining the extent to which the training acquired by indigenous Ghanaians to take up management positions in Ghana's oil fields affects the prevailing local content in its offshore petroleum industry. The second question was aimed at determining the extent to which the training acquired by indigenous Ghanaians to take up technical positions in Ghana's oil fields affects the prevalent local content in its offshore petroleum industry. The third question was aimed at determining the extent to which the training acquired by indigenous Ghanaians to take up other positions in Ghana's oil fields affects the prevalent local content in its offshore petroleum industry. The fifth set of survey questions was aimed at determining the extent to which the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevailing local content in its offshore petroleum industry.

The fourth set of survey questions was developed to buttress the results of the study. The first of these questions was aimed at determining the extent to which effective succession planning increases the prevailing local content. The second question was aimed at determining the extent to which the Petroleum Commission of Ghana encourages multinational petroleum companies to increase their prevailing local content. The last question was aimed at determining the extent to which multination petroleum companies are committed to increasing their prevailing local content.

Data Analysis

During the data analysis process, the two hypotheses were tested and all the independent and dependent variables were examined. IBM's Statistical Package for the Social Sciences (SPSS) analytical tool was deployed for the collated data and a one-way ANOVA was performed to establish statistical differences between the management, technical, and other staff groups regarding their opinions on the dependent variables. Karagöz and Saraçbasi (2016), who tested the equality of population means, found that an ANOVA enables significant differences existing between two or more groups to be determined. Applying an ANOVA to the unit of analysis of this study enabled me to determine whether the prevalent human resource local content varied from the requirements of L.I. 2204.

Konietschke et al. (2013) observed that the traditional statistical method used to distinguish specific significant differences among the effects of interest within a population, and to compute simultaneous confidence intervals, includes the following three steps. The first step entails the use of an appropriate procedure like an ANOVA to

test the null hypothesis. If the null hypothesis is rejected, then the second step entails multiple comparisons conducted to test individual hypotheses. The final step comprises computation of simultaneous confidence intervals. Rejection of the associated null hypotheses of RQ1 and RQ2 would result in the calculation of the measure of association, known as w^2, to determine the strength of association between the independent and dependent variables.

The results of an ANOVA performed to determine the extent to which the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevalent local content in its offshore petroleum industry, may help prospective employees to identify and pursue appropriate training courses. Prior to conducting the ANOVA, the collated data from the survey were screened and checked for consistency. The data were also checked for inconsistent responses as well as missing data. As recommended by Luigi, Oana, Mihai, and Simona (2012), checks were carried out to determine whether the collated data satisfied the statistical assumptions underlying the ANOVA.

Statistical Assumptions Underlying the Study

The statistical assumptions underlying the ANOVA were reviewed and considered appropriate for this study. In accordance with the observations of Luigi et al. (2012), a nonexperimental random effect model was deemed appropriate. Further, as recommended by Bettis et al. (2014), my focus was on testing the statistical assumptions underlying the ANOVA in this study. The first of these assumptions was that of independence entailing observations of random and independent samples derived from the population (Luigi et al., 2012). The second underlying statistical assumption in this

study was that of normality, referring to distributions of the population from which samples were selected (Green & Salkind, 2011). The third assumption was that of homogeneity or equality of variance in the distribution of the population (Green & Salkind, 2011).

Missing Data

Hazzi and Maldaon (2015) noted that in the process of collating survey data, the issue of missing data could arise for several reasons. These reasons include insufficient information provided to participants to answer a question, accidental skipping of questions by participants, and misunderstanding questions, as well as discomfort regarding a particular question among participants. Local content in Ghana's upstream petroleum sector is a very sensitive subject. Missing data could thus have arisen as a result of participants not feeling comfortable about offering reasons for the prevailing local content in Ghana's offshore petroleum sector. However, while there were no missing data, the response rate in this study was relatively low.

If not properly handled, missing data could threaten the external validity of a study by causing a reduction in the overall sample size (Fowler, 2013). Because I anticipated that missing data would be an issue when collating the survey data for this study, I followed the recommendation of Hazzi and Maldaon (2015), paraphrasing sensitive local content questions in the reverse order to mitigate the issue of missing data. I opted to conduct multiple imputations by applying the recommended three-step technique of imputation, analysis, and pooling, recommended by Rubin (1987), to replace any missing values if the total missing data exceeded 4% of the total expected data.

Reliability

According to Boynton and Greenhalgh (2004), reliability refers to the extent to which the results of a study are consistent and provide an accurate representation of the entire population under investigation. Endorsing this view, Adamsen et al. (2013) pointed out that a research instrument is considered reliable if the results of a study can be replicated using a similar methodology. It was important to guarantee the reliability of the measuring instrument used in this study. Kirk and Miller (1986) identified three types of reliability applicable to a quantitative research design that are relevant to this study. These three types of reliability refer to the degree to which a measurement, made repeatedly, remains the same; the stability of a measurement over time; and the similarity of measurements made within a given period (Kirk & Miller, 1986).

Although other methods of measuring reliability exist such as the test-retest, parallel forms, and split-half methods, Cronbach's alpha reliability (Cronbach, 1951) is the most widely used measure of reliability within the organizational and social sciences (Bonett & Wright, 2015). As previously noted, George and Mallery (2003, p. 231) provided the following interpretation of Cronbach's alpha reliability: "≥ 0.9 – Excellent, ≥ 0 .8 – Good, ≥ 0.7 – Acceptable, ≥ 0.6 – Questionable, ≥ 0.5 – Poor, and ≤ 0.5 – Unacceptable." For the purpose of this study, Cronbach's coefficient alpha was used to test the reliability of scale. Bonett and Wright (2015) indicated that when measurements relate to multiple questionnaires or test items, Cronbach's alpha is considered a measure of internal consistency reliability. Hence, in this study, which employed multiple questionnaires as the measurement instrument, I determined that the closer the value of

Cronbach's alpha was to 1, the more reliable would be the scale with associated improvement of the internal consistency of the scale.

Threats to Validity

Validity in relation to quantitative research designs entails determining whether what was intended to be measured in a study has been measured, or how accurate the research results are (Floyd & Fowler, 2013). Validity within a research study relates both to its design and to the measurement applied. Based on their comparison of the concept of validity related to design and to measurement, Kirk and Miller (1986) reported that validity in relation to research design entails determining whether the research study actually measures what was intended to be measured, or how accurate the research findings are. Adamsen et al. (2013) claimed that researchers determine the validity of a research design by asking a sequence of questions, with the responses to these questions usually being derived from the research designs of other scholars. Seale (1999) pointed out that the validity of a research design, which could either be external or internal, usually relates to the ability of a researcher to correctly interpret the compiled data. This interpretation normally entails generalizing the findings of a research study based on its results. Fowler (2013) added that design validity also involves assessing the extent to which the research design is appropriate for the kind of study that a researcher intends to conduct. In this study, because of the appropriateness of the selected quantitative cross-sectional survey design as the data collection technique, validity of this design for investigating the prevailing local content in Ghana's offshore petroleum industry was achieved. According to Seale (1999), validity relating to measurement entails

determining whether the right variables are being measured and whether or not the appropriate level of measurement is being used to measure these variables.

Ensuring Content Validity, Empirical Validity, and Construct Validity

Kirk and Miller (1986) identified three types of validity in relation to measurement. These types of validity are (a) content validity entailing coverage of all of the attributes of concepts being measured by the measuring instrument, (b) empirical validity denoting a relationship that exists between the measuring instrument and the measurable outcome, and (c) construct validity relating the measuring instrument and outcome to the theoretical framework. In this study on local content in Ghana's offshore oil and gas industry, the questionnaires, which constituted the measuring instrument, were directly related to the measurement of all the attributes of the independent and dependent variables pertaining to the human resource requirements of L.I. 2204, thereby ensuring content validity. Moreover, the use of a stratified sampling technique ensured that every member of the targeted population stood an equal chance of being selected as a participant.

To ensure empirical validity pertaining to the relationship between the measuring instrument and the measurable outcome, evidence was gathered from the literature on the benchmarked local content in emerging oil producing nations as well as the stipulations of L.I. 2204. Consequently, the results could be thoroughly evaluated in relation to the actual outcome of the study. This evaluation procedure enabled me to estimate the predictive validity.

Wainer and Braun (1988) noted that construct validity entails determining what data are to be collated and whether the measure behaves as the theory says it should. In this study, construct validity was maintained by ensuring that Lewin's (1947) change theory provided the pivot for the measuring instrument. This theoretical focus was reflected in the questions on the effects of management, technical, and other skills acquired through training on the prevalent local content in Ghana's upstream petroleum sector. These questions related to the status quo and the actions required to unfreeze the status quo.

Ethical Procedures

This quantitative cross-sectional survey-based research design underwent a review according to the protocol and strict guidelines set out by the Institutional Review Board (IRB) of Walden University. Walden University's IRB approval number for this study, which is 08-12-16-0293756, expires on August 11, 2017. As noted by Jordan (2014), an IRB review, which is an essential component of any research project, is aimed at protecting the surveyed subjects and participants. Fowler (2013) emphasized the importance of mitigating risk for research participants. Accordingly, I ensured that participants in my research study were not exposed to risk.

The participants in my survey were briefed on the purpose of the research and how the responses that they provided in the form of the collated data would be used. Protecting the identities of the participants was a critical aspect of the survey procedure. Therefore, participants were given a guarantee that any information that they provided would only be seen by me and by my dissertation committee members.

The ethical requirement of ensuring participants' anonymity and confidentiality (Fowler, 2013) was also guaranteed. Moreover, to avoid unauthorized access to the collated data (Jordan, 2014), all survey documents and participants' responses were protected against unauthorized access. Last, evidence relating to the names, identities, and positions of participants mentioned in the survey responses, which are essentially confidential (Ranjbar, 2012), were destroyed.

Summary

I conducted a quantitative cross-sectional survey to determine the extent of differences between the prevalent human resource local content and the requirements of Ghana's petroleum local content regulation in the country's offshore petroleum industry. This survey was also aimed at determining to what extent, if at all, the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevalent local content in its offshore petroleum industry. Because of the virtual nature of the offshore industry, a web-based survey was used to collate psychometric data on both the independent and dependent variables. Participants from Ghana's offshore petroleum industry were selected using a stratified sampling technique. A one-way ANOVA provided the statistical data analysis technique for addressing the research questions of the study.

Chapter 4: Results

The purpose of this quantitative cross-sectional study was to determine the extent of differences between the prevailing human resource local content and the requirements of L.I. 2204 in Ghana's upstream petroleum industry. A key aim of the study was to ascertain to what extent, if at all, the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevailing local content in its upstream petroleum industry. The study's quantitative cross-sectional design was aimed at eliciting answers to two research questions relating to the prevailing human resource local content component of L.I. 2204. The first research question was aimed at investigating the extent of differences, if any, between the prevailing human resource local content and the requirements of L.I. 2204. The second research question was directed at ascertaining to what extent, if at all, the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevailing local content in its offshore petroleum industry. The associated null and alternative hypotheses were tested, and the results of these tests were analyzed.

Chapter 4 includes the results pertaining to the collected data and those of subsequent statistical analytical procedures conducted for this quantitative cross-sectional study. The chapter begins with a presentation of the descriptive statistics, which provide a general profile of the characteristics of the participants in the study, and subsequently presents the results of the data analysis addressing the two research questions. I review the results of the pilot study, discussing the characteristics of the sample selected for the study and the instrumentation and mode of data collection. The results of the statistical

analysis performed for the main study, which addressed the two research questions, are subsequently presented and summarized.

Pilot Study

The main study was preceded by a pilot study involving nine participants. The key objective of this pilot study was to collect feedback on the structure of the survey and to assess the clarity of the questions. A further objective was to test the reliability of the 7-point Likert-type scale using Cronbach's coefficient alpha to measure the internal consistency between items in the scale. Criteria identified by George and Mallery (2003) were used to measure the internal consistency of the scale. The reliability of Cronbach's alpha values was interpreted as follows: "≥ 0.9 – Excellent, ≥ 0.8 – Good, ≥ 0.7 – Acceptable, ≥ 0.6 – Questionable, ≥ 0.5 – Poor, and ≤ 0.5 – Unacceptable" (George & Mallery, 2003, p. 231). As shown in Table 5, the overall reliability of the scale in the pilot study was 0.799, which was considered good.

Table 5

Reliability Statistics for the Pilot Study

Cronbach's alpha	Cronbach's alpha based on standardized items	No. of items
.799	.812	11

As shown in Table 6, when specific local content variables were deleted from the scale, Cronbach's alpha values ranged from 0.745 to 0.852, indicating acceptable to good

reliability. Based on the outputs of item-total statistics, there was no need to eliminate any of the items in the scale. The scale was also reviewed by an expert panel to enable improvements to be made to the construct validity.

Table 6

Item-Total Statistics

	Scale mean after item deletion	Scale variance after item deletion	Corrected item-total correlation	Cronbach's alpha after item deletion
Prevalent management staff local content	56.4444	19.278	.737	.760
Prevalent technical staff local content	56.4444	21.528	.191	.810
Prevalent other staff local content	55.6667	25.000	-.267	.852
Prevalent overall staff local content	56.3333	21.500	.448	.788
Acquired management skills training effect on local content	55.7778	17.444	.774	.745
Acquired technical skills training effect on local content	55.6667	19.500	.691	.764
Acquired other skills training effect on local content	55.8889	17.861	.672	.757
Effective succession planning effect on local content	55.8889	20.861	.242	.808
Petroleum Commission's efforts to improve local content	55.5556	18.778	.694	.759
Multinational petroleum companies' commitment to local content improvement	56.2222	19.194	.472	.781
Locals' acquired training effect on local content	55.6667	17.250	.703	.751

Descriptive statistics were obtained to determine whether the collated data contained any anomalies. These statistics showed that standard deviations and means, as well as variances, were all within statistical ranges. The results of the inter-item correlation were also reviewed to improve the scale reliability. Based on the results of the Cronbach's alpha and inter-item correlation analysis, the scale was found to be very reliable. As such, no changes were made to the scale.

Sample Population

The population for the study was drawn from the permanent staff of two multinational petroleum companies whose oil and gas development plan have been approved by the Petroleum Commission of Ghana. The workforce of the selected companies was categorized into management, technical, and other staff. As of September 2016, these two companies employed a total of 379 permanent staff comprising both locals and expatriates. To completely capture the human resource component relating to L.I. 2204, and to provide an accurate representation of the entire population under investigation, the sample frame was divided into management, technical, and other staff, and samples were drawn from each group or strata for the subsequent gap analysis.

For the survey of the two selected multinational petroleum companies, human resources were divided into three strata, resulting in a total of six subgroups. The stratified sampling strategy used for the study ensured that the samples had precisely equal proportions of management, technical, and other staff. The three categories of human resources were grouped into the required strata, and simple random sampling was used to select the participants. G*Power analysis was conducted, using G*Power 3.1. 9.2, to determine the required sample size for the study. The total required sample size of 159 participants was obtained using three predictors: a medium effect size of 0.25, a power of 0.8, and three groups. Anticipating that some participants might not respond to the survey given their busy schedules, I distributed the survey to a total of 298 participants with the aim of obtaining the required sample size of 159.

Data Collection

Research participants provided the primary data in this survey. A set of 11 questions was developed for collating empirical data on the independent and dependent variables. On November 8, 2016, the survey was distributed to a total of 298 participants via Survey Monkey. Excluding the pilot study conducted with nine participants, a total of 88 participants had fully responded to all of the survey questions as of December 1, 2016. The response rate for the research study was thus 61% in relation to the required sample size of 159 participants. According to Frankfort-Nachmias and Nachmias (2008), a survey respondent rate of 61% is considered acceptable and is not likely to affect the validity of the results of a study. A 7-point Likert-type scale was used for the 11 survey questions relating to the prevailing local content in Ghana's upstream petroleum industry. A Likert-type scale provides a means of measuring the extent to which survey participants agree with a statement (Adamsen et al., 2013). The survey questions were grouped into five main sets, with each set focusing on the extent to which the independent variable had an effect on the dependent variable.

Within the first set of questions, the first question was aimed at soliciting the participants' opinions on the extent of differences between the percentage of local management staff in the upstream petroleum sector and the requirements of L.I. 2204. The second question was aimed at soliciting the participants' opinions on the extent of differences between the percentage of local technical staff in the upstream petroleum sector and the requirements of L.I. 2204. The third question was aimed at soliciting the participants' opinions on the extent of differences between the percentage of other local

staff in the upstream petroleum sector and the requirements of L.I. 2204. The third set of questions was aimed at soliciting the participants' opinions on the extent to which the overall prevailing local content meets the requirements of L.I. 2204.

Within the second set of questions, the first question was aimed at soliciting the opinions of participants on the extent to which the training acquired by indigenous Ghanaians for taking up management positions in Ghana's oil fields affects the prevailing local content in its offshore petroleum industry. The second question was aimed at soliciting the opinions of participants on the extent to which the training acquired by indigenous Ghanaians for taking up technical positions in Ghana's oil fields affects the prevalent local content in its offshore petroleum industry. The third question was aimed at soliciting the opinions of participants on the extent to which the training acquired by indigenous Ghanaians for taking up other positions in Ghana's oil fields affects the prevalent local content in its offshore petroleum industry. The fifth set of questions was aimed at soliciting the opinions of participants on the extent to which the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevalent local content in its offshore petroleum industry.

The fourth set of questions was aimed at buttressing the results of the study. The first of these questions was aimed at soliciting the opinions of participants on the extent to which effective succession planning increases the prevailing local content in Ghana's offshore petroleum industry. The second question was aimed at soliciting the opinions of participants on the extent to which the Petroleum Commission of Ghana encourages multinational petroleum companies to increase their prevailing local content. The last

question was aimed at soliciting the opinions of participants on the extent to which multinational petroleum companies are committed to increasing their prevailing local content. Sample survey questions are provided in the Appendix.

Survey Administration

With the help of the Petroleum Commission of Ghana, I collected psychometric data from the two selected multinational petroleum companies. The total permanent workforce of these multinational petroleum companies was 379. The sample frame consisted of management, technical, and other staff in the two multinational petroleum companies. Following the successful administration of the pilot study, on November 8, 2016, I distributed the survey instrument to the wider group of participants via Survey Monkey. To encourage rapid responses to the survey, I used Survey Monkey to incorporate the consent form within the survey questionnaire. I also promised to share the final results of the study with the participants.

As of December 1, 2016, the total number of participants who responded was 88 after I had sent out five follow-up reminders. Including the responses of the nine participants in the pilot study, I obtained a total of 97 responses representing 25.6% of the entire population of the study. The head of Local Content in the Petroleum Commission of Ghana recommended I stop sampling on December 1, 2016 to avoid irritating nonresponsive participants. I informed my committee about this development and obtained approval to stop sampling on December 1, 2016.

The data obtained from the survey were inputted into SPSS for the analysis. To develop an understanding of the demographics of all the variables, I obtained descriptive

statistics using SPSS. Means, variances, and standard deviations were computed for all of the variables, indicating the characteristics of each variable.

One-way ANOVAs were performed to answer the two research questions. This method of analysis facilitated an examination of the extent of differences between the prevailing human resource local content and the requirements of Ghana's petroleum local content regulation in its upstream petroleum industry. Moreover, this method of analysis facilitated the determination of the extent to which the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevailing local content in Ghana's upstream petroleum industry. Because a one-way ANOVA revealed statistical differences between management, technical, and other staff relating to their opinions on the extent of differences between the prevailing local content and the requirements of L.I. 2204, it was considered appropriate for an analysis of the collated data. Moreover, analysis revealed statistical differences between these three groups of staff relating to their opinions on the extent to which the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevailing local content in its offshore petroleum industry. The independent variable was categorized into three groups: (a) management staff, (b) technical staff, and (c) other staff. The dependent variables included 11 items related to the prevalent local content. These items were (a) prevalent management staff local content, (b) prevalent technical staff local content, (c) prevalent other staff local content, (d) prevalent overall staff local content, (e) acquired management skills training effect on local content, (f) acquired technical skills training effect on local content, (g) acquired other skills training effect on local content, (h)

effective succession planning effect on local content, (i) the Petroleum Commission's efforts to improve local content, (j) multinational petroleum companies' commitment to local content improvement, and (k) locals' acquired training effect on local content. An alpha level of .05 was applied for this study. A 7-point Likert-type scale was used to assess the participants' opinions regarding the dependent variables. In this scale, the values 1, 2, 3, 4, 5, 6, and 7, respectively, denoted "strongly disagree," "disagree," "somewhat disagree," "neither agree nor disagree," "somewhat agree," "agree," and "strongly agree." The opinions obtained within the three groups of participants on the 11 dependent variables associated with the prevailing local content in Ghana's upstream petroleum sector were subsequently compared.

Results of the Analysis

SPSS was used to obtain descriptive statistics that could be used to answer the two research questions. After computing the descriptive statistics, I performed a one-way ANOVA to investigate the 11 dependent variables in relation to the management, technical, and other staff groups. The overall results of the one-way ANOVA showed that the prevailing local content in Ghana's upstream petroleum industry meets the requirements of L.I. 2204. Moreover, these results showed that the training acquired by indigenous Ghanaians to enable them to gain jobs in Ghana's oil fields affects the prevailing local content in its upstream petroleum industry.

Descriptive Statistics

A total of 97 participants completed this survey. Thus, the survey response rate was 61% in relation to the required sample size of 159 participants. Out of the 97

participants who responded, 26 were management staff, 37 were technical staff, and 34 were other staff. The overall reliability for scale in the pilot study was 0.799, which was considered good. The descriptive statistics presented in Table 7 indicate that the mean value for each of the management and technical staff groups regarding their opinions on the extent to which the overall prevailing local content meets the requirements of L.I. 2204 was 5.4. The mean value for the other staff group was 5.5. This range of means between 5 and 5.5 indicated that the management, technical, and other staff were "somewhat agreed" that the prevailing local content meets the requirements of L.I. 2204. Descriptive statistics also provided insights on participants' opinions concerning the extent to which the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevailing local content. The mean value for the management staff group was 5.8, while the mean value for each of the technical staff and the other staff groups was 5.6. This range of means between 5.5 and 6 indicated that the management, technical, and other staff groups "agreed" that the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevailing local content in its offshore petroleum industry.

Table 7

Descriptive Statistics Obtained for the Survey

		N	Mean	Std. dev.	Std. error	95% confidence interval for mean		Min.	Max.
						Lower bound	Upper bound		
Prevalent management staff local content	Mgt._staff	26	5.1923	1.02056	.20015	4.7801	5.6045	4.00	7.00
	Tech_staff	37	5.3514	.91943	.15115	5.0448	5.6579	4.00	7.00
	Other_staff	34	5.1176	.97746	.16763	4.7766	5.4587	4.00	7.00
	Total	97	5.2268	.96291	.09777	5.0327	5.4209	4.00	7.00
Prevalent technical staff local content	Mgt_staff	26	5.2692	1.25085	.24531	4.7640	5.7745	3.00	8.00
	Tech_staff	37	5.4865	.98943	.16266	5.1566	5.8164	3.00	7.00
	Other_staff	34	5.5000	1.18705	.20358	5.0858	5.9142	2.00	7.00
	Total	97	5.4330	1.12645	.11437	5.2060	5.6600	2.00	8.00
Prevalent other staff local content	Mgt_staff	26	6.1154	.71144	.13953	5.8280	6.4027	5.00	7.00
	Tech_staff	37	6.0270	.72597	.11935	5.7850	6.2691	5.00	7.00
	Other_staff	34	6.1176	.76929	.13193	5.8492	6.3861	5.00	7.00
	Total	97	6.0825	.73130	.07425	5.9351	6.2299	5.00	7.00
Prevalent overall staff local content	Mgt_staff	26	5.3846	.69725	.13674	5.1030	5.6662	4.00	7.00
	Tech_staff	37	5.4324	.64724	.10641	5.2166	5.6482	4.00	7.00
	Other_staff	34	5.5294	.78760	.13507	5.2546	5.8042	4.00	7.00
	Total	97	5.4536	.70741	.07183	5.3110	5.5962	4.00	7.00
Acquired management skills training effect on local content	Mgt_staff	26	5.7692	.81524	.15988	5.4399	6.0985	4.00	7.00
	Tech_staff	37	5.4054	1.03975	.17093	5.0587	5.7521	2.00	7.00
	Other_staff	34	5.6471	.88360	.15154	5.3388	5.9554	4.00	7.00
	Total	97	5.5876	.93266	.09470	5.3997	5.7756	2.00	7.00
Acquired technical skills training effect on local content	Mgt_staff	26	5.9615	.72004	.14121	5.6707	6.2524	4.00	7.00
	Tech_staff	37	5.7838	.85424	.14044	5.4990	6.0686	4.00	7.00
	Other_staff	34	5.8235	.93649	.16061	5.4968	6.1503	4.00	7.00
	Total	97	5.8454	.84583	.08588	5.6749	6.0158	4.00	7.00

(table continues)

		N	Mean	Std. dev.	Std. error	95% confidence interval for mean		Min.	Max.
						Lower Bound	Upper Bound		
Acquired other skills training effect on local content	Mgt_staff	26	5.9231	.62757	.12308	5.6696	6.1766	4.00	7.00
	Tech_staff	37	5.7297	.60776	.09991	5.5271	5.9324	5.00	7.00
	Other_staff	34	6.0294	.62694	.10752	5.8107	6.2482	5.00	7.00
	Total	97	5.8866	.62710	.06367	5.7602	6.0130	4.00	7.00
Effective succession planning effect on local content	Mgt_staff	26	5.8846	.86380	.16941	5.5357	6.2335	4.00	7.00
	Tech_staff	37	5.9189	.75933	.12483	5.6657	6.1721	4.00	7.00
	Other_staff	34	5.7941	1.06684	.18296	5.4219	6.1664	3.00	7.00
	Total	97	5.8660	.89709	.09109	5.6852	6.0468	3.00	7.00
Petroleum Commission's efforts to improve local content	Mgt_staff	26	6.0769	.74421	.14595	5.7763	6.3775	4.00	7.00
	Tech_staff	37	5.8108	.77595	.12757	5.5521	6.0695	4.00	7.00
	Other_staff	34	6.0000	.65134	.11170	5.7727	6.2273	4.00	7.00
	Total	97	5.9485	.72702	.07382	5.8019	6.0950	4.00	7.00
Petroleum MNCs' commitment to local content improvement	Mgt_staff	26	5.7308	.60383	.11842	5.4869	5.9747	5.00	7.00
	Tech_staff	37	5.5676	.83468	.13722	5.2893	5.8459	4.00	7.00
	Other_staff	34	5.5294	.70648	.12116	5.2829	5.7759	4.00	7.00
	Total	97	5.5979	.73115	.07424	5.4506	5.7453	4.00	7.00
Locals' acquired training effect on local content	Mgt_staff	26	5.7692	.51441	.10088	5.5615	5.9770	5.00	7.00
	Tech_staff	37	5.5946	.59905	.09848	5.3949	5.7943	5.00	7.00
	Other_staff	34	5.5588	.61255	.10505	5.3451	5.7726	4.00	6.00
	Total	97	5.6289	.58309	.05920	5.5113	5.7464	4.00	7.00

Research Questions

RQ1: To what extent, if at all, does the prevailing human resource local content differ from the requirements of Ghana's petroleum local content regulation in its upstream petroleum industry?

H1o: The prevailing human resource local content does not differ from the requirements of Ghana's petroleum local content regulation in its upstream petroleum industry.

$H1_1$: The prevailing human resource local content does differ from the requirements of Ghana's petroleum local content regulation in its upstream petroleum industry.

RQ 2: To what extent, if at all, does the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affect the prevailing local content in its offshore petroleum industry?

$H2_0$: The training acquired by indigenous Ghanaians does affect prevailing local content in Ghana's upstream petroleum industry.

$H2_1$: The training acquired by indigenous Ghanaians does not affect prevailing local content in Ghana's upstream petroleum industry.

One-way ANOVAs were performed to answer RQ1. These ANOVAs were aimed at determining whether significant differences existed between management, technical, and other staff regarding their opinions on the extent of differences between the prevailing human resource local content and the requirements of Ghana's petroleum local content regulation in its upstream oil and gas industry. A second set of one-way

ANOVAs was conducted to answer RQ2. These ANOVAs were aimed at ascertaining whether significant differences existed between management, technical, and other staff regarding their opinions on the extent to which the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevailing local content in its upstream petroleum industry.

Before conducting the one-way ANOVAs, the assumption of normality was tested by applying skewness and kurtosis tests as well as histograms. The results of the skewness and kurtosis tests for all 11 dependent variables fell within a range of -1 and +1, indicating that the assumption of normality held. The results of these tests are shown in Table 8.

Table 8

Skewness and Kurtosis Tests Results

		Prevalent management staff local content	Prevalent technical staff local content	Prevalent other staff local content	Prevalent overall staff local content	Acquired management skills training effect on local content	Acquired technical skills training effect on local content	Acquired other skills training effect on local content	Effective succession planning effect on local content	Petroleum Commission's efforts to improve local content	Multinational petroleum companies' commitment to local content improvement	Locals' acquired training effect on local content
N	Valid	97	97	97	97	97	97	97	97	97	97	97
	Missing	0	0	0	0	0	0	0	0	0	0	0
Skewness		.170	-.566	-.129	.348	-.733	-.436	-.173	-.703	-.419	-.185	-.360
Std. error of skewness		.245	.245	.245	.245	.245	.245	.245	.245	.245	.245	.245
Kurtosis		-1.016	.288	-1.101	-.103	1.180	-.285	.220	.346	.201	-.156	-.100
Std. error of kurtosis		.485	.485	.485	.485	.485	.485	.485	.485	.485	.485	.485

The histogram plots enabled the data to be inspected to determine whether normal distribution was evident. An analysis of the histograms depicted in Figure 7–17 indicated that the assumption of normality had not been violated for any of the 11 dependent variables.

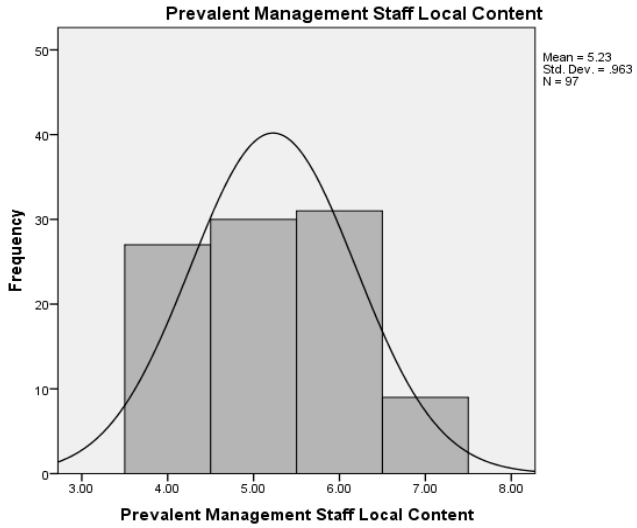

Figure 7. Normal distribution plot for prevalent management staff local content.

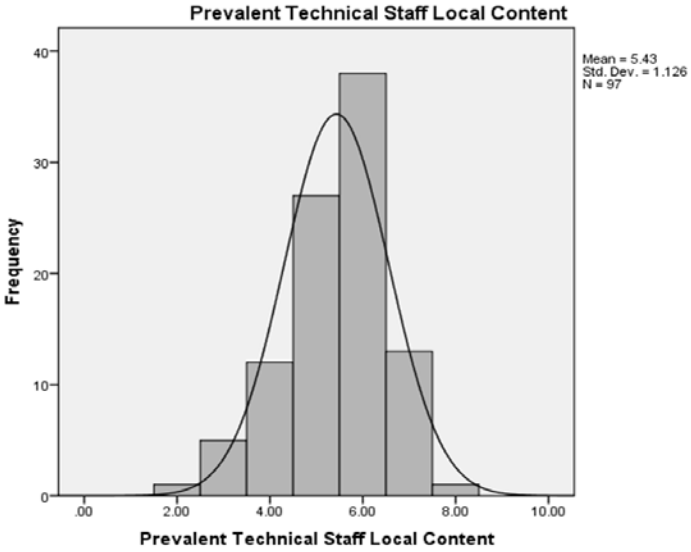

Figure 8. Normal distribution plot for prevalent technical staff local content.

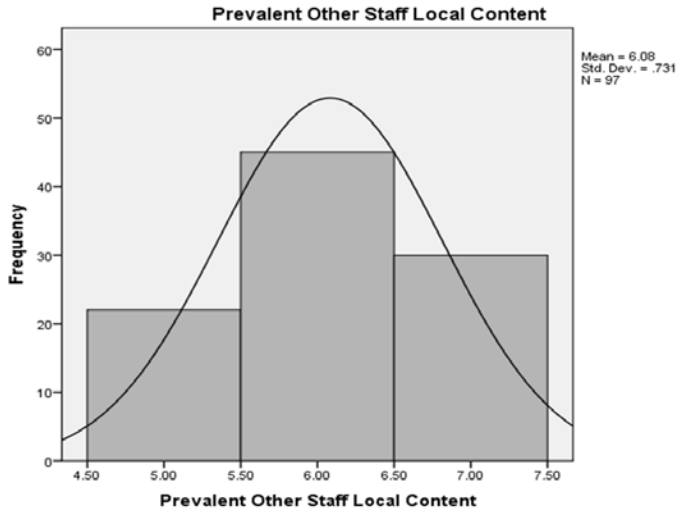

Figure 9. Normal distribution plot for prevalent other staff local content.

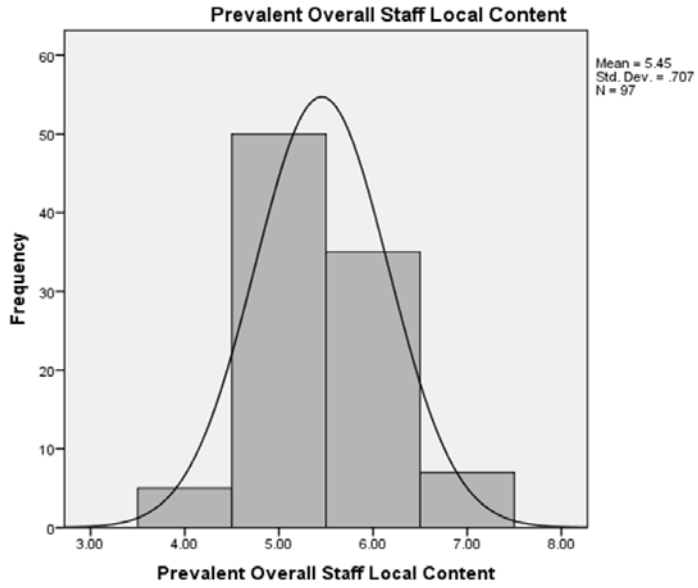

Figure 10. Normal distribution plot for prevalent overall staff local content.

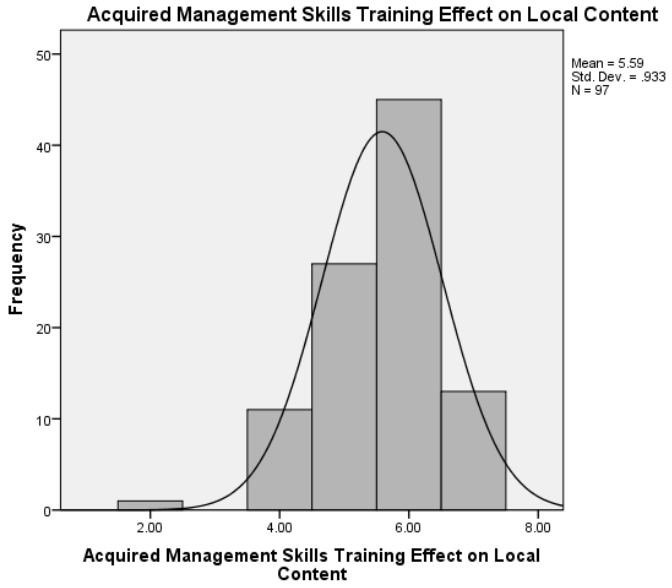

Figure 11. Normal distribution plot for acquired management skills training effect on local content.

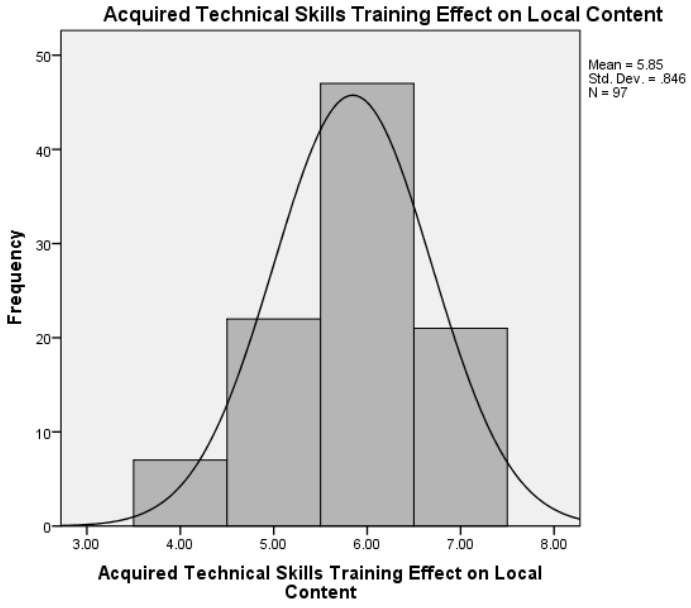

Figure 12. Normal distribution plot for acquired technical skills training effect on local content.

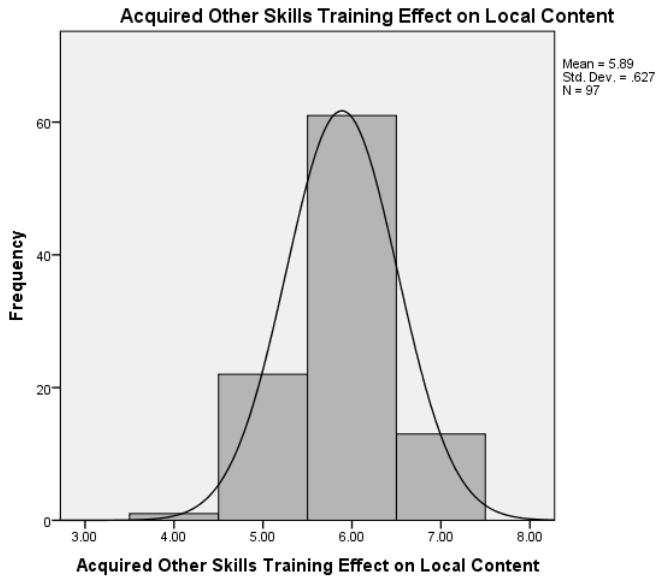

Figure 13. Normal distribution plot for acquired other skills training effect on local content.

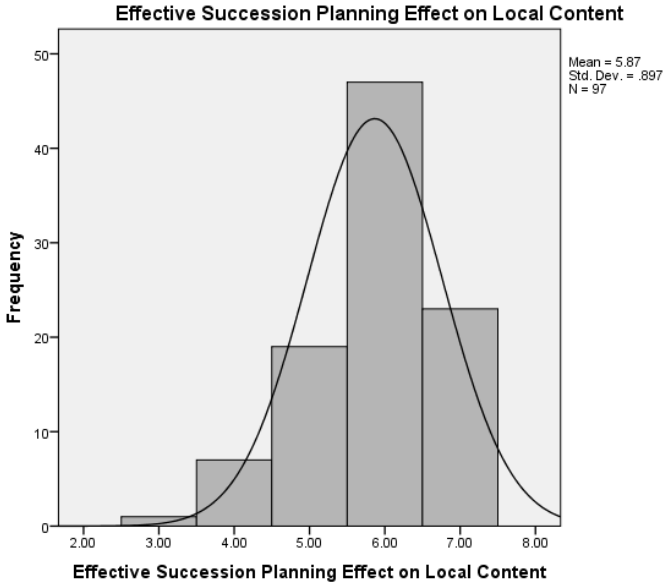

Figure 14. Normal distribution plot for effective succession planning effect on local content.

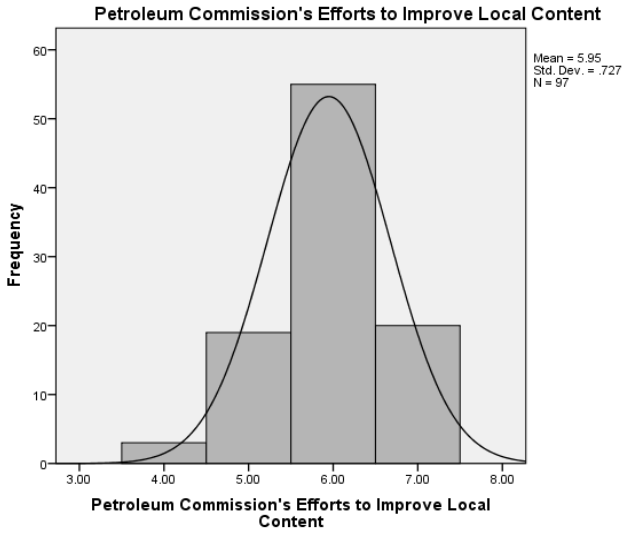

Figure 15. Normal distribution plot for the efforts of the Petroleum Commission of Ghana to improve the prevailing local content.

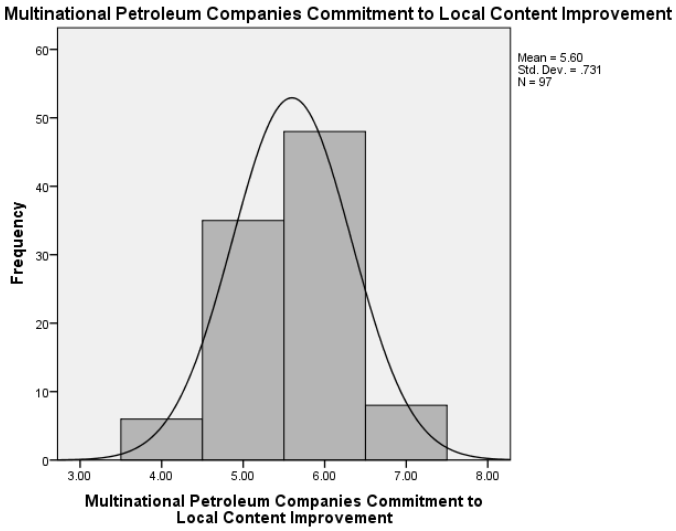

Figure 16. Normal distribution plot for multinational companies' commitment to local content improvement.

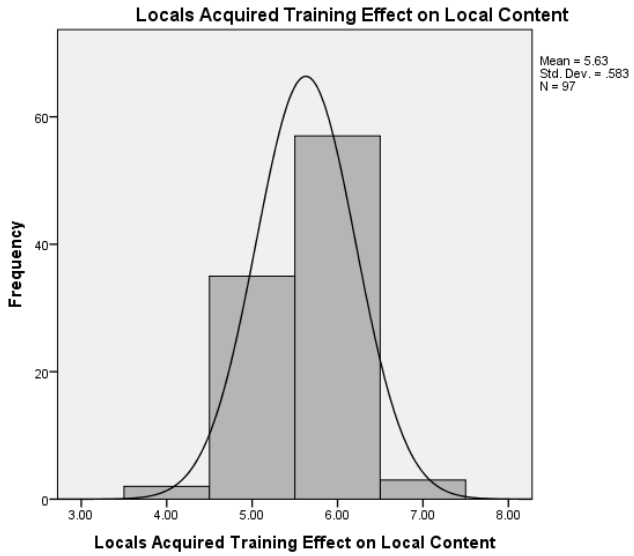

Figure 17. Normal distribution plot for locals' overall acquired training effect on local content.

The assumption of homogeneity of variance was tested using Levene's test. As shown in Table 9, the results of the test revealed that this assumption had not been violated at the $p > 0.05$ level.

Table 9

Levene's Test of Homogeneity of Variances

	Levene's statistic	df1	df2	Sig.
Prevalent management staff local content	.117	2	94	.890
Prevalent technical staff local content	1.557	2	94	.216
Prevalent other staff local content	.425	2	94	.655
Prevalent overall staff local content	.973	2	94	.382
Acquired management skills training effect on local content	1.043	2	94	.357
Acquired technical skills training effect on local content	2.588	2	94	.080
Acquired other skills training effect on local content	1.092	2	94	.340
Effective succession planning effect on local content	1.923	2	94	.152
Petroleum Commission's efforts to improve local content	2.498	2	94	.088
Multinational petroleum companies' commitment to local content improvement	2.542	2	94	.084
Locals' acquired training effect on local content	2.451	2	94	.092

Results of the One-way ANOVA

A one-way ANOVA was conducted to ascertain whether there were any significant differences between management, technical, and other staff groups regarding their opinions on the 11 dependent variables. The results of this ANOVA showed that there were no statistically significant differences between these three staff groups at a level of $p > 0.5$ for any of the 11 dependent variables. The results of the one-way ANOVA are summarized in Table 10.

Table 10

Summary of the Results of the One-way ANOVA

		Sum of squares	df	Mean square	*F*	Sig.
Prevalent management staff local content	Between groups	1.010	2	.505	.539	.585
	Within groups	88.000	94	.936		
	Total	89.010	96			
Prevalent technical staff local content	Between groups	.956	2	.478	.372	.691
	Within groups	120.859	94	1.286		
	Total	121.814	96			
Prevalent other staff local content	Between groups	.184	2	.092	.169	.845
	Within groups	51.156	94	.544		
	Total	51.340	96			
Prevalent overall staff local content	Between groups	.336	2	.168	.331	.719
	Within groups	47.706	94	.508		
	Total	48.041	96			
Acquired management skills training effect on local content	Between groups	2.206	2	1.103	1.275	.284
	Within groups	81.299	94	.865		
	Total	83.505	96			
Acquired technical skills training effect on local content	Between groups	.507	2	.254	.350	.706
	Within groups	68.173	94	.725		
	Total	68.680	96			
Acquired other skills training effect on local content	Between groups	1.639	2	.819	2.132	.124
	Within groups	36.114	94	.384		
	Total	37.753	96			
Effective succession planning effect on local content	Between groups	.288	2	.144	.176	.839
	Within groups	76.969	94	.819		
	Total	77.258	96			
Petroleum Commission's efforts to improve local content	Between groups	1.220	2	.610	1.158	.318
	Within groups	49.522	94	.527		
	Total	50.742	96			

(table continues)

		Sum of squares	df	Mean square	*F*	Sig.
Multinational petroleum companies' commitment to local content improvement	Between groups	.653	2	.326	.605	.548
	Within groups	50.667	94	.539		
	Total	51.320	96			
Locals' acquired training effect on local content	Between groups	.723	2	.361	1.064	.349
	Within groups	31.917	94	.340		
	Total	32.639	96			

Test Results for Hypothesis 1

H1o: $\mu_{Manag\_Staff\_LC} = \mu_{Tech\_Staf\_LC} = \mu_{Other\_Staff\_LC}$. The prevailing human resource local content does not differ from the requirements of Ghana's petroleum local content regulation in its upstream petroleum industry.

H1₁: At least two means (μ_k) are not equal. The prevailing human resource local content does differ from the requirements of Ghana's petroleum local content regulation in its upstream petroleum industry.

The results of the analysis indicated that the management, technical, and other staff were somewhat agreed that the prevailing human resource local content does not differ from the requirements of Ghana's petroleum local content regulation. Differences in the means obtained for management, technical, and other staff groups regarding their opinions on the extent of differences between the prevailing human resource local content and the requirements of Ghana's petroleum local content regulation were not statistically significant at the $p > 0.05$ level for the three conditions, $F(2, 94) = .331$, $p = .719$. As differences in the means were not statistically significant at the $p > 0.05$ level, the null

hypothesis was not rejected. Thus, in response to RQ1, the prevailing human resource local content somewhat meets the requirements of L.I. 2204.

Test Results for Hypothesis 2

$H2_0$: $\mu_{Manag\_Training} = \mu_{Tech\_Training} = \mu_{Other\_Training}$. The training acquired by indigenous Ghanaians does affect the prevailing local content in Ghana's upstream petroleum industry.

$H2_1$: At least two means (μ_k) are not equal. The training acquired by indigenous Ghanaians does not affect the prevailing local content in Ghana's upstream petroleum industry.

The results of the analysis indicated that management, technical, and other staff groups were agreed that the training acquired by indigenous Ghanaians does affect prevailing local content in Ghana's upstream petroleum industry. Differences in the means of the management, technical, and other staff groups regarding their opinions on the extent to which the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevailing local content in its upstream petroleum industry were not statistically significant at the $p > 0.05$ level for the three conditions, $F(2, 94) = 1.064$, $p = .349$. Because differences in the means were not statistically significant at the $p > 0.05$ level, the null hypothesis was not rejected. In response to RQ2, the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields does affect the prevalent local content in Ghana's upstream petroleum industry.

Additional Findings

A one-way ANOVA was performed to determine whether there were any significant differences between management, technical, and other staff groups regarding their opinions on the prevalent management staff local content in Ghana's offshore petroleum industry. The results of the ANOVA revealed that all three groups of staff were somewhat agreed that the prevailing management staff local content meets the requirements of L.I. 2204. Differences in the means of management, technical, and other staff groups regarding their opinions on the extent to which the management staff local content meets the requirements of L.I. 2204 were not statistically significant at the $p > 0.05$ level for the three conditions, $F(2, 94) = .539$, $p = .585$.

A one-way ANOVA was performed to determine whether there were significant differences between the groups of management, technical, and other staff regarding their opinions on the prevalent technical staff local content in Ghana's offshore petroleum industry. The results indicated that all three staff groups were somewhat agreed that the prevailing technical staff local content meets the requirements of L.I. 2204. Differences in the means of the management, technical, and other staff groups regarding their opinions on the extent to which the management staff local content meets requirements of L.I. 2204 were not statistically significant at the $p > 0.05$ level for the three conditions, $F(2, 94) = .372$, $p = .691$.

A one-way ANOVA was performed to determine whether significant differences existed between the groups of management, technical, and other staff regarding their opinions on the prevalent other staff local content. The results indicated that all three staff

groups were agreed that the prevailing other staff local content meets the requirements of L.I. 2204. Differences in the means of the management, technical, and other staff groups regarding their opinions on the extent to which the management staff local content meets the requirements of L.I. 2204 were not statistically significant at the $p > 0.05$ level for the three conditions, $F(2, 94) = .169$, $p = .845$.

A one-way ANOVA was performed to determine whether there were any significant differences between management, technical, and other staff groups regarding their opinions on the effect of management skills acquired through training on the prevalent local content in Ghana's offshore petroleum industry. The results indicated that all three staff groups were somewhat agreed that management skills acquired through training by indigenous Ghanaians does affect prevailing local content in Ghana's upstream petroleum industry. Differences in the means of the management, technical, and other staff groups regarding their opinions on the extent to which the management skills acquired through training by indigenous Ghanaians seeking jobs in Ghana's oil fields affect the prevailing local content in Ghana's upstream petroleum industry were not statistically significant at the $p > 0.05$ level for the three conditions, $F(2, 94) = 1.275$, $p = .284$.

Another one-way ANOVA was performed to determine whether significant differences existed between management, technical, and other staff groups regarding their opinions on the effect of technical skills acquired through training on the prevalent local content in Ghana's offshore petroleum industry. The results indicated that all three staff groups were agreed that technical skills acquired through training by indigenous

Ghanaians do affect the prevailing local content in Ghana's upstream petroleum industry. Differences in the means of the management, technical, and other staff groups regarding their opinions on the extent to which the technical skills acquired through training by indigenous Ghanaians seeking jobs in Ghana's oil fields affect the prevailing local content in Ghana's upstream petroleum industry were examined. At the $p > 0.05$ level for the three conditions [$F(2, 94) = .350$, $p = .706$], these differences were not statistically significant.

A one-way ANOVA was performed to determine whether there were any significant differences between management, technical, and other staff groups regarding their opinions on the effect of other skills acquired through training on the prevailing local content in Ghana's offshore petroleum industry. The results indicated that all three groups of staff were agreed that other skills acquired through training by indigenous Ghanaians do affect the prevailing local content in Ghana's upstream petroleum industry. Differences in the means of the management, technical, and other staff groups regarding their opinions on the extent to which other skills acquired through training by indigenous Ghanaians seeking jobs in Ghana's oil fields affect the prevailing local content in Ghana's upstream petroleum industry were not statistically significant at the $p > 0.05$ level for the three conditions, $F(2, 94) = 2.132$, $p = .124$.

To buttress the results of this study, a one-way ANOVA was performed to determine whether there were any significant differences between the management, technical, and other staff groups regarding their opinions on the effect of effective succession planning on the prevailing local content in Ghana's offshore petroleum

industry. The results indicated that all three staff groups were agreed that effective succession planning increases the prevailing local content in Ghana's upstream petroleum industry. Differences in the means of the management, technical, and other staff groups regarding their opinions on the extent to which effective succession planning increases the prevailing local content in Ghana's upstream petroleum industry were not statistically significant at the $p > 0.05$ level for the three conditions, $F(2, 94) = .176$, $p = .839$.

A one-way ANOVA was also performed to determine whether there were any significant differences between management, technical, and other staff groups regarding their opinions on efforts made by the Petroleum Commission of Ghana to encourage multinational petroleum companies to increase their prevailing local content in Ghana's upstream petroleum industry. The results indicated that all three groups of staff were agreed that the Petroleum Commission of Ghana encourages multinational petroleum companies to increase their prevailing local content in Ghana's upstream petroleum industry. Differences in the means of the management, technical, and other staff regarding their opinions on the extent to which the Petroleum Commission of Ghana encourages multinational companies to increase the prevailing local content in Ghana's upstream petroleum industry were not statistically significant at the $p > 0.05$ level for the three conditions, $F(2, 94) = 1.158$, $p = .318$.

A final one-way ANOVA was performed to determine whether there were any significant differences between the management, technical, and other staff groups regarding their opinions on the commitment of multinational petroleum companies to increasing the prevailing local content in Ghana's upstream petroleum industry. The

results indicated that all three groups of staff were somewhat agreed that multinational petroleum companies are committed to increasing the prevailing local content in Ghana's upstream petroleum industry. Differences in the means of the management, technical, and other staff groups regarding their opinions on the extent to which multinational petroleum companies are committed to increasing the prevailing local content in Ghana's upstream petroleum industry were not statistically significant at the $p > 0.05$ level for the three conditions, $F(2, 94) = .605$, $p = .548$.

Summary

In this chapter, I presented descriptive statistics for my study, along with the results of the pilot study, and reported on the scale reliability. I then discussed the data collection and analysis that I conducted for the study. Before conducting the one-way ANOVAs, I tested the underlying statistical assumptions. I tested for normality and homogeneity of variance for the collated data and verified that the underlying statistical assumptions were not violated. One-way ANOVAs were performed to investigate the research questions. Based on their results, the null hypotheses for RQ1 and RQ2, respectively, were not rejected. The overall results of the one-way ANOVAs showed that the prevailing local content in Ghana's upstream petroleum industry meets the requirements of L.I. 2204. Further, the results showed that the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields does affect the prevailing local content in its upstream petroleum industry. Chapter 5 presents an interpretation and evaluation of the findings of the study. It also discusses the study's limitations, as well as

its implications for positive social change, makes recommendations, and identifies potential opportunities for further research.

Chapter 5: Discussions, Recommendations, and Conclusions

Despite the enactment of Ghana's Petroleum (Local Content and Participation) Regulation, 2013 (L.I. 2204), there have been growing concerns regarding the unavailability of jobs for indigenous Ghanaians in Ghana's upstream oil and gas fields. This quantitative cross-sectional study was aimed at determining the extent to which the prevailing human resource local content meets the requirements of L.I. 2204 in Ghana's upstream petroleum industry. Moreover, it was aimed at ascertaining the extent to which the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevailing local content in its upstream petroleum industry. The findings of this study suggest that differences in the means of the management, technical, and other staff groups regarding their opinions on the extent of differences between prevailing human resource local content and the requirements of L.I. 2204 were not statistically significant at the $p > 0.05$ level for the three conditions, $F(2, 94) = .331$, $p = .719$. Consequently, the null hypothesis that the prevailing local content meets the requirements of L.I. 2204 was retained. In addition, the findings revealed that differences in the means of these three staff groups regarding their opinions on the extent to which the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevailing local content in its upstream petroleum industry were not statistically significant at the $p > 0.05$ level for the three conditions, $F(2, 94) = 1.064$, $p = .349$. Thus, the null hypothesis that training acquired by locals affects the prevailing local content was also retained. This chapter presents an interpretation of the study's findings and a discussion of its

limitations. I also make recommendations for future research and explore the implications for promoting positive social change.

Interpretation of the Findings

Two research questions were addressed in this study. These questions were developed based on an extensive review of the literature on local content regulations in developing countries. Lewin's change theory, which formed the theoretical underpinning of this study, aided me in developing the two research questions. Testing of the first hypothesis revealed that the overall prevailing local content in Ghana's upstream petroleum industry meets the requirements of L.I. 2204. Testing of the second hypothesis indicated that the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevailing local content in its upstream petroleum industry. The null hypotheses for RQ1 and RQ2, respectively, were not rejected.

Prevailing Local Content in Ghana's Upstream Oil and Gas Sector

The first research question was directed at investigating the extent to which the prevailing human resource local content meets the requirements of L.I. 2204 in Ghana's upstream petroleum industry. To answer this research question, I determined statistical differences between the management, technical, and other staff groups regarding their opinions on the extent to which the prevailing local content meets the requirements of L.I. 2204. I tested Hypothesis 1 to ascertain whether the prevailing human resource local content meets the requirements of L.I. 2204. The results of the test revealed that the management, technical, and other staff groups were somewhat agreed that the overall prevailing human resource local content meets the requirements of L.I. 2204 at the $p >$

0.05 level for the three conditions, F(2, 94) =.331, p = .719. As the means were not statistically different at the $p > 0.05$ level, the null hypothesis was not rejected. The fact that multinational petroleum companies operating in Ghana's oil and gas fields have been asked by the Petroleum Commission of Ghana to comply with the requirements of L.I. 2204 or face sanctions (IOGIRC, 2015) supports this finding.

Prevailing management staff local content. The statement by IOGIRC (2015) that multinational petroleum companies operating in Ghana's oil and gas fields are obliged to adhere to the requirements of L.I. 2204 was verified in relation to the prevailing management staff local content. The results of the analysis revealed that the management, technical, and other staff groups were somewhat agreed that the prevailing management staff local content meets the requirements of L.I. 2204 at the $p > 0.05$ level for the three conditions, F(2, 94) =.539, p = .585. This finding implies that these three groups of staff were somewhat agreed that the prevailing management staff local content in Ghana's upstream petroleum sector is 50–60%, thereby meeting the requirements of L.I. 2204.

Prevailing technical staff local content. The result of the study on the prevailing technical staff local content was in agreement with the finding of IOGIRC (2015) that multinational petroleum companies operating in Ghana's oil and gas fields are obliged to adhere to the requirements of L.I. 2204. Specifically, the three groups of management, technical, and other staff were found to be somewhat in agreement that the prevailing technical staff local content meets the requirements of Ghana's petroleum local content regulation at the $p > 0.05$ level for the three conditions, F(2, 94) =.372, p = .691. This

finding implies that these three staff groups were somewhat agreed that the prevailing technical staff local content in Ghana's upstream petroleum sector was 50–60%, thereby meeting the requirements of L.I. 2204.

Prevailing other staff local content. The statement by IOGIRC (2015) that multinational petroleum companies operating in Ghana's oil and gas fields are obliged to adhere to the requirements of L.I. 2204 was also substantiated by the result obtained for the prevailing other staff local content. Specifically, there was agreement among management, technical, and other staff that the prevailing other staff local content meets the requirements of Ghana's petroleum local content regulation at the $p > 0.05$ level for the three conditions, $F(2, 94) = .169$, $p = .845$. This finding implies that all three groups of staff agreed that the prevailing other staff local content in Ghana's upstream petroleum sector is 90%, thereby meeting the requirements of L.I. 2204.

Effect of Training Acquired by Locals on the Prevailing Local Content

The second research question was directed at investigating the extent to which the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevailing local content in its upstream oil and gas sector. To address this research question, I determined the statistical differences between the management, technical, and other staff groups regarding their opinions on the extent to which the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevailing local content in its upstream oil and gas sector. I tested Hypothesis 2 to ascertain whether the training acquired by locals affects the prevailing local content in this sector. The results revealed that the management, technical, and other staff groups were somewhat agreed

that the training acquired by indigenous Ghanaians does affect prevailing local content in Ghana's upstream petroleum industry, and that differences in means for these staff groups were not statistically significant at the $p > 0.05$ level for the three conditions, $F(2, 94) = 1.064$, $p = .349$. As the means were not statistically different at the $p > 0.05$ level, the null hypothesis was not rejected. These results support the finding of Heum et al. (2011) that extensive capacity-building investments in developing countries have increased local participation and the growth of the oil and gas industrial sector in these countries. Thus, the GoG is making the right decision by sponsoring indigenous Ghanaians to undertake oil and gas courses that will enable them to gain jobs in Ghana's upstream oil and gas sector.

Effect of management skills acquired through training on prevailing local content. The study's finding on the effect of management skills acquired by locals through training on the prevailing local content validates that of Heum et al. (2011) that extensive capacity-building investments increase local participation and the growth of the oil and gas industrial sector in developing countries. Management, technical, and other staff groups were somewhat agreed that management training acquired by indigenous Ghanaians does affect prevailing local content in Ghana's upstream petroleum industry. Differences in the means for these staff groups were not statistically significant at the $p > 0.05$ level for the three conditions, $F(2, 94) = 1.275$, $p = .284$. This finding implies that the management, technical, and other staff groups were somewhat agreed that the management skills acquired by locals through training meet the 50–60% requirement

stipulated by L.I. 2204 for the prevailing management staff local content in Ghana's upstream petroleum sector.

Effect of technical skills acquired through training on prevailing local content. The effect of technical skills acquired by locals through training on the prevailing local content was ascertained in accordance with the above described finding of Heum et al. (2011) for developing countries. The results of the analysis revealed that management, technical, and other staff were in agreement that technical skills acquired by indigenous Ghanaians through training do affect prevailing local content in Ghana's upstream petroleum industry. Differences in the means for these staff groups were not statistically significant at the $p > 0.05$ level for the three conditions, $F(2, 94) = .350$, $p = .706$. This finding implies that all three groups of staff were somewhat agreed that the prevailing technical staff local content matched the 50–60% requirement of L.I. 2204 for Ghana's upstream petroleum sector.

Effect of other skills acquired through training on prevailing local content. The study's findings on the effect of other skills acquired by locals through training on the prevailing local content corroborated the finding of Heum et al. (2011) on capacity-building investments in developing countries relating to the oil and gas sector. The results revealed that the management, technical, and other staff groups were agreed that technical skills acquired through training by indigenous Ghanaians affect prevailing local content in Ghana's upstream petroleum industry. Differences in the means for these staff groups were not statistically significant at the $p > 0.05$ level for the three conditions, $F(2, 94) = 2.132$, $p = .124$. This finding implies a consensus among the three groups of staff

that other skills training acquired by locals match the requirement of 90% stipulated in L.I. 2204 for the prevailing other staff local content in Ghana's upstream petroleum sector.

The Effect of Effective Succession Planning on the Prevailing Local Content

The effect of effective succession planning on the prevailing local content validated the finding of Esteves et al. (2013) that lack of succession planning is the main constraint to an increase in the human resource local content in the petroleum sector in developing countries. The results of the analysis revealed that the management, technical, and other staff groups were agreed that effective succession planning increases the prevailing local content in Ghana's upstream petroleum industry. Differences in the means for these staff groups were not statistically significant at the $p > 0.05$ level for the three conditions, $F(2, 94) = .176$, $p = .839$. The results supported the finding of Esteves et al. (2013) that effective succession planning increases local content.

Petroleum Commission's Efforts to Encourage Multinational Petroleum Companies to Increase Their Prevailing Local Content

Neff (2005) argued that transparent and independent monitoring oversight by a regulatory body is necessary for enhancing local content. This argument was endorsed by the finding of my study on the extent of the efforts made by the Petroleum Commission of Ghana to convince multinational petroleum companies to increase their local content. Specifically, the results of the analysis revealed that the management, technical, and other staff groups were agreed that the Petroleum Commission of Ghana encourages multinational petroleum companies to increase their prevailing local content in Ghana's

upstream petroleum industry. Differences in the means for these groups were not statistically significant at the $p > 0.05$ level for the three conditions, $F(2, 94) = 1.158$, $p = .318$.

Multinational Petroleum Companies' Commitment to Increasing Their Prevailing Local Content

I assessed the commitment of multinational oil and gas companies toward increasing their prevailing local content in relation to the statement made by Esteves et al. (2013) that under the NTO clause, if a better alternative exists abroad, foreign companies cannot be forced to procure goods and services locally. The results of the study substantiated this statement, revealing that the management, technical, and other staff groups were somewhat agreed that multinational petroleum companies are committed to increasing the prevailing local content in Ghana's upstream petroleum industry. Differences in the means of the three staff groups were not statistically significant at the $p > 0.05$ level for the three conditions, $F(2, 94) = .605$, $p = .548$.

Limitations of the Study

This study entailed several limitations. First, because of the confidential nature of administrative procedures in the offshore industry, the selected multinational oil and gas companies were unwilling to release detailed financial information on their human resources. This information was required to determine the prevailing local content in monetary terms. According to Tordo et al. (2013), if the human resource local content metric emphasizes the share of total gross salaries paid to indigenous employees, then multinational petroleum companies will be forced to establish a comprehensive

succession plan program that ensures that indigenes are recruited and trained to take up higher paying positions entailing advanced skills. Second, the generalizability of this study was limited as only two multinational oil companies whose oil and gas development plans have been approved by the Petroleum Commission of Ghana were selected for the survey. Third, out of the 159 participants sampled for this study, 97 responded, resulting in a response rate of 61%.

Despite the study's limitations, I made extensive efforts to improve the reliability and validity of the survey instrument by soliciting feedback from an expert panel. Moreover, the value of Cronbach's alpha was greater than 0.7. Importantly, this study was the first to measure the extent of differences between the prevailing human resource local content in Ghana's upstream petroleum sector and the requirements of L.I. 2204. It was also the first study to measure the extent to which the training acquired by indigenous Ghanaians seeking jobs in Ghana's upstream oil and gas fields affects the prevailing local content.

Recommendations

The perceived lack of jobs available within Ghana's upstream oil and gas sector has been attributed to the inability of politicians and the Petroleum Commission of Ghana to ensure that multinational petroleum companies are committed to the employment of locals. Plänitz and Kuzu (2014) found that 67.1% of Ghana's citizens who responded to a nationwide survey about the significance of the country's oil find stated that politicians would not help to improve their lives. Further, the findings of a study entailing a critical examination of livelihoods capitals relating to the job situation, conducted by Ramos-

Mrosovsky (2012), revealed that the jobs promised by the government following the inception of oil production were simply not available. Based on the rejection of the null hypothesis in this study, steps should be taken by the leaders of multinational petroleum companies and the Petroleum Commission of Ghana to create awareness among indigenous Ghanaians that the prevailing local content meets the requirements of L.I. 2204 in Ghana's upstream oil and gas industry. Further, leaders of the Petroleum Commission should take pragmatic steps to inform indigenous Ghanaians that the human resource requirements of L.I. 2204 relating to management, technical, and other staff positions within the upstream oil and gas industry are being met by Ghanaians with relevant and specialized skills. This finding is supported by the finding of the Ghana Oil Watch Strategy Review (2011) that the upstream oil and gas industry is not labor intensive. Rather, it is technical in nature and entails specialist staff engaged in oil field exploration, development, and production using sophisticated and expensive technology. The leaders of multinational petroleum companies and the Petroleum Commission of Ghana should bring these required specialized skills to bear.

As previously noted, this study was the first to measure the extent of differences between the prevailing local content and the requirements of L.I. 2204 and to establish whether the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil sector affects the prevalent local content. Consequently, a second recommendation concerns the need for further studies to validate the rejection of the $H1_0$ and $H2_0$ hypotheses. Given the rejection of the $H1_0$ hypothesis, further research is required to measure the local content in monetary terms. Tordo et al. (2013) asserted that if the human resource local content

metric emphasizes the share of total gross salaries paid to indigenous employees, then multinational petroleum companies will be forced to establish a comprehensive succession plan program that ensures that indigenes people are recruited and trained to take up higher paying positions entailing advanced skills.

A further recommendation relates to RQ1. A study on the procurement of local content, as described in L.I. 2204, should be conducted and its findings compared with the stipulated requirements of this regulation. A final recommendation concerns the data collection process implemented through Survey Monkey, which was extremely slow. Despite administering the survey questionnaires to 298 participants using this tool, I subsequently received only 97 responses over a period of one month. The likely reason for this low response rate is because within the upstream oil and gas sector, almost everyone has tight schedules. Thus, I would recommend that in future, researchers should also consider having survey questionnaires printed out for participants by their respective human resources departments.

Implications

Implications Relating to Existing Studies

Substantial numbers of petroleum producing countries do not have mandatory local content reporting requirements. Instead, foreign oil companies are left to report what they deem fit (Tordo et al., 2013). Section 44 of Ghana's L.I. 2204 stipulates that the Petroleum Commission of Ghana shall investigate and monitor the activities of foreign companies in the upstream petroleum sector to ensure compliance and attainment of the purpose of the local content regulation. The Petroleum Commission of Ghana

(2015) stated that there is a 75% participatory rate of indigenous Ghanaians in the upstream petroleum sector, as affirmed by IOGIRC (2015). However, this statement is vague, as it does not clearly specify what aspect of L.I. 2204 was measured. Measurements of the extent of differences between the prevailing human resource local content in Ghana's upstream oil and gas sector and the requirements of L.I. 2004, conducted for this study, can potentially address this important gap in the reviewed literature.

Tordo et al. (2013) further found that in the context of local content management, there is a need to measure training inputs and the impacts of the outputs of training programs. This study filled this gap in the reviewed literature by establishing the extent to which the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevalent local content in Ghana's upstream oil and gas sector.

Implications for Empirical Theory and Practice

Within the Ghanaian upstream petroleum sector, it is widely believed that the policies initiated by Ghana's Petroleum Commission to provide equal employment opportunities for indigenous Ghanaians have failed considerably. Marshak (2012) posited that in the process of conceptualizing change effort, the scientific worldview changes along with a shift in the management of a process from its current state to a desired future state. This shift occurs as a result of the application of planned interventions to overcome any resistance, initiate the necessary movement, and subsequently alter the status quo.

This study can potentially fill the gap between knowledge and professional practice regarding the prevailing human resource local content in the Ghanaian offshore

oil and gas industry. Otoo et al. (2009) found that because of the capital intensiveness of the upstream petroleum sector, only a few highly skilled professionals gain employment. These highly skilled professionals are mostly foreign nationals. The present study established that the prevailing human local content meets the requirements of L.I. 2204. Thus, it confirmed that only highly skilled professionals are employed within the Ghanaian upstream oil and gas sector, with the required percentages of different categories of local employees being met in accordance with the law. Hossan (2015) found that approximately 70% of the change management programs that had been initiated reported failures of their efforts to promote change. These failures could be attributed to the lack of implementation of change strategies and failure to conduct reviews of those that have been implemented. Thus, there is a need for the Petroleum Commission of Ghana to initiate change strategies through seminars and efforts to inform indigenous Ghanaians that L.I. 2204 is indeed working and that only highly skilled professionals can work in Ghana's upstream petroleum oil and gas sector. To initiate change in this direction, there is the need for locals to acquire the necessary specialized training and skills for gaining employment in the upstream oil and gas sector rather than complaining about job unavailability.

Further, once indigenous Ghanaians are informed regarding the expertise required by multinational oil companies, they can take the necessary steps for acquiring the requisite skills to compete with expatriates for positions within Ghana's upstream oil and gas sector. In addition, there is the need for multinational oil companies to institute reasonably accessible training programs at affordable prices. GETFund personnel should

be well informed when granting scholarships for studies that are relevant to the skills required in the upstream oil and gas industry.

Significance for Social Change

The findings of this study may help promote understanding of the human resource local content in Ghana's upstream oil and gas sector. These findings can encourage positive social change by informing indigenous Ghanaians seeking jobs in Ghana's upstream petroleum industry of the need to undertake training to acquire highly specialized skills relating to oil and gas production. This training is required as this sector is capital intensive and positions within it are limited. The findings of this study may contribute to positive social change by providing guidelines for seminars to be organized by the leaders of multinational oil companies and the Petroleum Commission of Ghana aimed at informing indigenous Ghanaians about the specialized skills required to take up jobs in Ghana's upstream petroleum industry. Based on the findings of this study that the prevailing human resource local content does indeed meet the requirements of L.I. 2204, indigenous Ghanaians may change their views on how the government is managing Ghana's oil and begin to support the human resource LCP that has been initiated.

Conclusion

The purpose of this quantitative cross-sectional survey-based study was to determine the extent of differences between the prevalent human resource local content and the requirements of Ghana's petroleum local content regulation in its offshore petroleum industry. A key aim was to ascertain the extent to which the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields affects the prevalent local

content in its offshore petroleum industry. To conduct this study, I developed a theoretical framework based on Lewin's change theory and collected survey data from two multinational petroleum companies whose oil and gas development plans have been approved by the Petroleum Commission of Ghana. My analysis of the collated quantitative data was aimed at answering two research questions that directed the study. The results of the one-way ANOVAs performed for the analysis suggested that the prevailing local content in Ghana's upstream petroleum industry meets the requirements of L.I. 2204. The results further suggested that the training acquired by indigenous Ghanaians seeking jobs in Ghana's oil fields does affect the prevalent local content in its upstream petroleum industry. These findings have strong implications for promoting positive social change. Recommendations emerging from the study include organization of seminars by leaders of the Petroleum Commission of Ghana and multinational petroleum companies. These seminars would be aimed at informing indigenous Ghanaians about the positive findings regarding prevalent human resource local content as well as the various specialized skills required to take up jobs in Ghana's upstream oil and gas sector. I anticipate that other researchers engaged in the field of local content will follow up on this study and validate its findings.

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Appendix: Survey Questions

Study of Prevalent Human Resource Local Content in Ghana's Upstream Petroleum Industry

Please refer to the definitions below as applicable.

Definitions:

Local Content: Measurement of the number of indigenous staff as a proportion of the total full-time equivalent (FTE) employees.

Prevalent local content: The extent to which the prevailing local content meets the requirements of Ghana's local content regulation, L.I. 2204.

Management staff: Staff in management positions

Technical staff: Include engineers, technicians, and geoscientists

Other Staff: Include accountants and finance personnel, procurement and logistics personnel, and human resources and administrative personnel.

According to the human resource component of Ghana's Local Content and Local Participatory Regulation, otherwise known as L.I. 2204, the table below indicates human resource requirements (based on head counts) that have to be attained from the date of effectiveness of the license or petroleum agreement.

Item	Start	5 years	10 years
Management staff	30%	50–60%	70–80%
Technical core staff	20%	50–60%	70–80%
Other staff	80%	90%	100%

Section 1

(H1). Five years after the inception of Ghana's upstream petroleum sector, please indicate the extent of variance of the prevailing human resource local content from the L.I. 2204 requirement as follows:

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7
The prevailing management staff local content meets the requirements of L.I.2204							
The prevailing technical staff local content meets the requirements of L.I.2204							
The prevailing other staff local content meets the requirements of L.I.2204							

Section 2

(H2). Please indicate the extent to which training acquired by indigenous Ghanaians affects prevailing local content in Ghana's upstream petroleum industry as follows:

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7
Management skills training acquired by locals increases the prevailing local content							
Technical skills training acquired by locals increases the prevailing local content							
Other skills training acquired by locals increases the prevailing local content							

Section 3

(H1) Please indicate the extent to which the overall prevailing local content meets the requirements of L.I. 2204 in Ghana's upstream petroleum industry.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7
The prevailing human resource local content meets the requirements of L.I. 2204							

Section 4

Please indicate the extent to which you agree with the following statements concerning Ghana's upstream petroleum industry:

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7
Effective succession planning increases the prevailing local content							
The Petroleum Commission of Ghana encourages multinational petroleum companies to increase their local content							
Multinational petroleum companies are committed to increasing the prevailing local content							

Section 5

(H2) Please indicate the extent to which the training provided to indigenous Ghanaians for acquiring jobs in Ghana's oil fields affects the prevailing local content in its upstream petroleum industry:

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7
The training provided to indigenous Ghanaians to acquire jobs in Ghana's oil fields increases the prevailing local content							