Operations Strategy to Achieve Sustainability in the light of Oil Oversupply and Price Deflation

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Abstract

Operations strategy in the current oil oversupply and price deflation represents an opportunity to manage and attain sustainability in oil and gas industry. This paper aims to evaluate the various operations strategies of the industry that will improve the company's operational performance. The results revealed that all components of operations strategy along process innovation, quality assurance, risk and safety, monitoring and control, and cost management indicate a very high relationship to sustainability. Risk and safety and monitoring and control came out as predictors of sustainability. This means that the industry can continue to make progress by embracing a commitment to sustain and strengthen the company's operation strategy. It is highly recommended that companies and establishments affected by global oil crisis must review their operations strategies, policies, standards, and procedures to achieve sustainability in the midst of crisis since the end of the era of oil shocks is not yet determined.

Keywords: Operations Strategy, Sustainability, Competitive Advantage, Process Innovation, Quality Assurance, Cost Management, Monitoring, Safety

1. Introduction

The oil and gas industry is among the largest in the world with increasing revenues and costs necessary to provide the needs of billions of people with the energy that they require in maintaining their style of living (Schneider, Ghettas, Merdaci, et. al., 2015; Ahuja & Tatsutani, 2009). This sector has grown significantly over recent years (Schneider, Ghettas, Merdaci, et. al., 2015); but, after a period of relative stability, the Brent price of crude oil, commonly considered a proxy for the global price of oil, recently experienced a sustained decline by 44%, resulting in one of the most dramatic declines in the price of oil in recent history (Kilian, 2015; Hou, Keane, Kennan, &Te Velde, 2015). As the price of oil continues to plummet, an increasing number of oil and gas companies have striven to create a competitive position by means of sustainability in their operations (Taghavi, 2015). According to Lewis and Slack (2002), operations strategy is more concerned with the total transformation process of the business, with how competitive environment is changing and what the operations have to do in order to meet the current and future challenges. It is very important in oil and gas industry in order to survive, prosper, and achieve long-term success.

The application of efficient operations can be achieved through optimization of existing production infrastructure that will help manage deferments to continue to deliver the dividend levels that investors have come to expect (Forrester, 2015); stop cost leakage using best practices in inventory management (SAP Business Networks, 2015); and sustainable cost reductions to transform into a leaner, more efficient business that will minimize the impact of future market dips (PWC Publications, 2015). Moreover, the optimization of strategic operations plan can reduce costs; develop a culture of operational excellence; promote zero-harm to people, equipment, and environment; and making the organization more competitive (Lewis and Slack, 2002).

Therefore, the integration of carefully calculated operations strategy in the current oil crisis represents an opportunity to manage and attain sustainability in oil and gas operations. Today, there are still strong agitations from oil and gas industries in maintaining sustainable production system in the midst of oil oversupply and price deflation. This study contends that integrating various operations strategies will improve the company's operational performance, which will, in turn, improve their profitability, thus achieving sustainability. The findings reported in this study provided the empirical basis for the link between operational strategies and sustainability of oil and gas industry in the light of oil oversupply and price deflation. Different areas like employee-related factors, operations strategy components and most importantly the company's sustainability were investigated. The researcher hoped that the result of the study will improve the operation processes of the oil and gas industry to achieve sustainability that optimize profitability and organizational competitiveness.

2. Literature Review

2.1 Sustainability

The concept of sustainability in the midst of crisis in the oil and gas industry is achieving competitive advantage and sustainable development (Anis & Siddiqui, 2015). Thiele's (2013) working definition of sustainability is an adaptive art wedded to science in service to ethical vision. It entails satisfying current needs without sacrificing future well-being through the balanced pursuit of ecological health, economic welfare, social empowerment, and cultural creativity (Braun & Glidden, 2014). The World Commission on Environment and Development (1987) defined sustainable development also as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. According to Kleindorfer, Singhal & Van Wasselhove, (2005), operation management is increasingly connected to sustainability, and it now concerns both the operational drivers of profitability and their relationship to people and the planet. For that reason, achieving sustainability requires sustainable operations strategy management. Hayes and Wheelwright's (1985) framework for the four stages of acceptance of the operations function captured its contribution to creating value and strategic success. Hart (2005) suggested that a similar slow and unwilling acceptance of sustainable Operation Management is expected, hence, the framework of Hayes-Wheelwright-Bowen in the context of sustainable operation has been reformulated into internal strategies and external strategies: (1) the internal strategies are to improve internal operations with continuous process improvements related to sustainability, such as employee involvement, waste reduction, energy conservation, and emission control; and (2) the external strategies are to improve extended supply chains to make trade-offs in the choice of materials and processes and pursuing closed-loop supply chains for remanufacturing and safe disposal.

2.2 Operations Strategy

Operations strategy refers to the process of maximizing the creation of goods and services in the most efficient and effective way of a business by planning, organizing, coordinating, and controlling all the necessary assets and resources. Therefore, people, equipment, technology, IT and all other assets involved in the production are managed always looking for an increase in revenues (or value), a reduction in costs through an improvement of internal effectiveness and at the same time, complying with strict HSE regulations (Kolios & Luengo, 2016). In light of the current oil oversupply and price deflation, oil and gas companies are finding it necessary to increase their competitive advantage (Taghavi, 2015). Indeed, companies in the oil and gas industry are looking to increase their bottom line by boosting their operating efficiency. Achieving this, however, is challenging, especially within the context of the increasing complexity of remote and extreme operational environments. One strategy oil and gas companies can employ is the full integration of sustainable operation strategy system (Mooney & Smith, 2012). Consistent with Slack (2015), operations strategy is the understanding of market requirements with operations resources. While Michael Porter (1996), says that strategy involves creating fit among company's activities. It is, therefore, the total pattern of decisions which shape the long-term capabilities of any type of operation and their distribution to overall strategy, through the reconciliation of market requirements with operations resources (Slack, N. 2015). The operations strategy model of Politis (2012), shows the market requirements on operations strategy in terms of five performance objectives namely quality, speed, dependability, flexibility, and cost. Their purpose is to articulate market requirements in a way that will be useful to operations. Moreover, operational excellence is not a new concept, but current conditions create a unique opportunity for the industry to realize its full promise. It is an element of organizational leadership that stresses how a variety of principles, systems, and tools can be applied toward the sustainable improvement of key performance metrics (EYGM, 2015).

2.3 Process Innovation

A sustainable innovativeness is one that continues to grow and adapt in order to meet the needs and expectations of its shareholders and stakeholders (Fiksel, 2003). Tough environmental standards can trigger innovations. It encourages companies to re-engineer their technology that can result in many cases a process that not only pollutes less, but also lowers costs or improve quality, and profitability (Kleindorfer, Singhal, & Van Wassenhove, 2005). Embracing innovation of processes can decrease the use of scarce resources by recycling wasted by-products (Kleindorfer et al., 2005; Michael E Porter & Linde, 1995; Michael Eugene Porter & van der Linde, 1995). Converting wastes into valuable secondary products creates value for shareholders as well as for society at large (Fiksel, 2003). Effective use of technological knowledge and encouraging employees to be innovative can help processes sustainable. It can add value to the company success and competitive advantage. Kotabe& Murray (1990) and Siyanbola et al. (2016) stated that process innovation is a major component of innovation. It enables the companies to maintain its competitive advantage for a long period while keeping away from deterioration of process and equipment. Many successful innovative companies are good at managing change to achieve sustainable competitive advantage by the way they operate. When process innovation improves production efficiency, stability, reliability, and company's sustainability it will allow the company to develop opportunities for future expansion (Ning, O 'sullivan, Zhu, & Decker, 2006).

2.4 Quality Assurance

Quality is defined as meeting customers' expectations at the least cost which involves all segments of design, production, and delivery of a product (Waldman et al., 1994). Quality assurance or quality control evaluates the actual quality and to verify that control is being maintained (Juran & Godfrey, 1998). Its prime purpose is to help operations personnel control the process to produce high-quality products. Producing high-quality products and services is absolutely essential to long-term organizational survival (Hackman & Wageman, 1995). Total quality management helps the company stay in the business. It improves productivity and accountability, increases efficiency, and quality by encouraging the use of science in decision-making. Total quality management is science-based because employees at all levels of the organization are trained to use the scientific method in everyday decision-making (Hopper Wruck, Jensen, Wruck, & Jensen, 1998). The Company must provide training and tools to employees to consistently produce high-quality products based on quality standards and procedures. The quality of products and services depends most of all on the process by which they designed and produced (Hackman & Wageman, 1995). Having the best available technology allows the company to continuously produce high-quality products and stay in the business. According to Juran & Godfrey (1998), the philosophy of using quality standards has changed over the years. In the 1960s the universal perspective of employees to quality assurance was if "ain't broke, don't fix it" which prevailed in most of the industries. Today, with the minimal use of ISO 9003, quality assurance is viewed as a continuous improvement. Continuous improvement is increasingly necessary to produce high-quality products which are the reliable way to sustain marketplace advantage (Juran & Godfrey, 1998).

2.5 Risk and Safety

The oil and gas industry is high risk in nature. Several disasters, for example, Piper Alpha (UK), Longford (Australia), Alexander Keilland (Norway) have focused the attention of both operating and contracting company management on safety issues (Mearns & Yule, 2009; Van Thuyet, Ogunlana, & Dey, 2007). Helmreich and Merrit (1998) stressed that safety is a 'universal value', which every culture should try to hold and that people will try to react unfavorably once their family, friends, and colleagues being harmed at work. Zero-harm to people and equipment is a safety culture and strategy to manage risk and safety. It keeps the oil and gas operation sustainable by following the permit-to-work system in every activity without causing harm and damage to people and equipment, avoid downtime, disaster and damage to the environment (Mearns & Yule, 2009). Safety procedures and standards can save life and avoid damage to equipment. Hence, regular review of safety procedures and standards must be carried out as awareness to all employees (Flin, Slaven, & Stewart, 1996). Risk and safety playvital role to the sustainable process operation. Neglecting risk and safety best practices and culture will cause damage and harm to people and equipment that can affect revenue and profitability of the company. Thus, mitigating environmental, health, and safety impacts promote socially responsible and good business (Chinander, K. R. 2001).

2.6 Monitoring and Control

In the daily operation of an oil and gas production plant, a lot of decision have to be taken that affects the product volume produced and the cost of production (Bieker, Slupphaug O., & Johansen, 2006). These are proper monitoring and bump-less control of process plant; proper handover of work status; safe execution of start-up, shutdown and safe handling emergency; and adherence to operating procedures and bypass-override procedures. Failure to properly control and monitor the process operation can lead to shutdown, disaster, poor quality of products, equipment failure, and low profitability (Kano, M., & Ogawa, M., 2010).A typical oil and gas production has many automatic control loops that support efficient production and meet the production targets (Bieker et al., 2006). An example of control loops is valve opening/closing, level control, temperature control, pressure control, flow control, power generation control, and anti-surge control that is operated, controlled and monitored by the plant operator. Thus, adherence to proper bypass-override system procedure can avoid an untimely shutdown of process facility that could affect production volume and product quality. The whole operating system that controls the overall plant operations is being protected against cyber threats to oil and gas production (Bieker et al., 2006; Kieffer, 1981). On time decision-making (Flin, Slaven, & Stewart, 1996) during an emergency situation without undue delay avoid plant shutdown and safety incidents. Monitoring and control is the heart of oil and gas industry. It is being operated and maintained by high caliber and competent diverse workforce (Armstrong, Flood, Guthrie, Maccurtain, & Mkamwa, 2010).Efficient and reliable operations through monitoring and control help companies achieve production volume targets at the same time avoid untimely downtime, compromise safety performance, and zero harm to people and equipment. According to Kano & Ogawa (2010), a robust monitoring and control make stable process operation.

2.7 Cost Management

Epstein & Buhovac (2014) stated that management commitment to sustainability as a core value can create financial value for the corporation through enhanced revenues and lower costs. Numerous oil and gas companies have taken important steps towards improving their sustainability performance by applying cost management best practice and reducing their social and environmental impacts (Svatikova, Bilsen, Ellis, et. al., 2012). Cost management practices that cannot affect the operations efficiency and overall performance of the company includes reduction of wastage of company's assets like office consumables, proper dosing of chemicals as per required, proper planning, and utilizing of the workforce to perform multi-tasking activities in a safe manner (Baumeister, & Kilian, 2016).

3. Objectives of the Study

This study aims to 1.) assess the oil and gas industry sustainability towards strategic operations management; and 2.) to determine the significant effect of operations strategy along process innovation, quality assurance, risk and safety, monitoring and control, and cost management to the company's sustainability.

4. Method

4.1 Design

The design used in this study is descriptive-correlational (Omair, 2015; Lappe, 2000). This design seeks to relate two or more variables to see if they relate or influence each other (Omair, 2015; Simon and Goes, 2011). The extent of an association is known as a correlation coefficient (English, 2015) and a regression equation could be used make predictions to a population (Simon and Goes, 2011).

4.2 Research Locale and Participants

This study was conducted inan Oil & Gas company, particularly in the Operations Department, Doha, Qatar, for the year 2015-2016. This study utilized purposive sampling technique in choosing its respondents (Teddlie& Yu, 2007; Tongco, 2007; Catane, 2015). Fifty-seven (n=57) employees from Oil & Gas company Operations Department were purposely chosen to answer the survey questionnaire. They were selected as participants because they were the persons who can provide the needed information by virtue of knowledge and experience (Teddlie& Yu, 2007; Tongco, 2007; Bernard, 2002).

4.3 Research Instrument

An adapted survey questionnaire was used as the main data-gathering tool (Kirk, 2003; DeVaus1986). It was composed of three parts: respondents' demographic profile, operations strategy, and sustainability.

Part I sought information on the respondents'' profile such as sex, age, nationality, employment classification, educational attainment and length of service. Part II assessed the respondents' perception of the company's operations strategy in terms of process innovation, quality, risk and safety, monitoring and control, and cost management. This part used a five-point scale ranging from strongly agrees (5) to (1) strongly disagree. Part III, looked into the respondents' perception of sustainability. This used a five-point scale, ranging from strongly agree (5) to strongly disagree (1). A panel of professionals or experts in the field of research was used to secure the content validity of the survey instrument. The Cronbach's Alpha coefficients were calculated in order to assess the internal consistency and gauge the reliability of the statements in the survey instrument (Trizano-Hermosilla, & Alvarado, 2016).

4.4 Cronbach Alpha Reliability Test

The values of Cronbach's Alpha for the current research study are given in table 1.

Table 1: Cronbach Alpha Coefficients

Variables	Number of Items	Cronbach's Alpha
Process Innovation	10	.854
Quality	10	.904
Risk & Safety	10	.911
Monitoring & Control	10	.857
Cost Management	10	.693
Sustainability	10	.960

The value of Cronbach's alpha for every variable or factor is greater than 0.50 which indicates that the instrument is a reliable one (Nyengane, 2007; Chakrapani, 2004).

4.5 Data Collection

Data are collected through questionnaires (English, 2015). The data were gathered in the following manner. First, the current number of employees in the operations department of an Oil & Gas company for the year 2015-2016 was identified. Second, the permission to conduct the study from the department head was solicited, likewise, permission from the different supervisors of the different offices of the operations department was requested. The third step was the actual administration of the developed instrument or survey questionnaire to the research participants followed by its retrieval.

4.6 Data Analysis

Collected data were culled, tallied and then analyzed with descriptive, correlation, and multiple regression statistical techniques using the Statistical Package for the Social Sciences (SPSS) Software V21 x64.

5. Results and Discussion

5.1 The demographic characteristics of respondents are given in table 2.

Table 2: Demographic characteristics of respondents

Demographic characteristic		Frequency	Percentage
Age	≤ 26-30 years old	1	1.8
	31-35 years old	4	7.0
	36-40 years old	22	38.6
	41-45 years old	18	31.6
	46-50 years old	9	15.8
	51-55 years old	1	1.8
	56-60 years old	1	1.8
	≥ 60 years old	1	1.8
Education	High School Graduate	2	3.5
	College Graduate	41	71.9
	Master's Degree	9	15.8
	Doctoral Degree	1	1.8
	Post-Graduate	4	7.0
Employment	Executive Management	2	3.5
	Senior Level Staff	12	21.1
	Non-Senior Level Staff	43	75.4
Years of Service	≤ 1-5 years	2	3.5
	6-10 years	10	17.5
	11-15 years	20	35.1
	16-20 years	14	24.6
	21-25 years	7	12.3
	≥ 25 years	4	7.0
Nationality	Filipino	29	50.9
	Other Nationalities	28	49.1
		57	100.0

Fifty-seven responses were obtained from the respondents and majority of them are 36-40 years old (n=22 or 38.6%). Almost all of the respondents have completed secondary level education and majority has a college degree (n=41 or 71.9%). Their employment classification varies but majority of them hold a non-senior level position (n=43 or 75.4%). Overall, the results show that they are well-experienced, as the reported work experience of 35.1% (n=20) ranges from 11-15 years, while the work experience of 24.6% (n=14) ranges from 16-20 years. Although 50.9% (n=29) are Filipinos, diversity is evident as the reported 49.1% (n=28) respondents are other nationalities.

5.2Descriptive Statistics of Operations Strategy and Sustainability

Table 3. Descriptive Statistics of Operations Strategy

Operations Strategy Indicators	Mean	Rank	Qualitative Description
Risk & Safety	4.58	1	Strongly Agree
Quality Assurance	4.43	2	Strongly Agree
Monitoring & Control	4.41	3	Strongly Agree
Process Innovation	4.18	4	Agree
Cost Management	4.11	5	Agree
Grand Mean	4.34		Strongly Agree

One of the core parts of the survey was to determine the perceptions of respondents on operations strategy along the areas of risk and safety, quality assurance, monitoring and control, and cost management. The results presented in Table 3 show that the respondents strongly agree to the company's operations strategy. However, among the five indicators of operations strategy, risk and safety (x=4.58) came out as the most important. This could be attributed to the fact that the oil and gas industry is high risk in nature (Bigliani, 2013; Osabutey, Obro-Adibo, Agbodohu, Kumi, 2013).

As stated by Helmreich and Merrit (1998), safety is a 'universal value', which every culture should try to hold and that people will try to react unfavorably once their family, friends, and colleagues being harmed at work. Zero-harm to people and equipment is a safety culture and strategy to manage risk and safety. It keeps the oil and gas operation sustainable by following the permit-to-work system in every activity without causing harm and damage to people and equipment, avoid downtime, disaster and damage to the environment (Mearns & Yule, 2009). Safety procedures and standards can save life and avoid damage to equipment. Hence, regular review of safety procedures and standards must be carried out as awareness to all employees (Flin, Slaven, & Stewart, 1996).

Table 4. Descriptive Statistics of Sustainability

Sustainability Indicators	Mean	Rank
The company and its employees are committed to a strong environment, health, and safety record in the most cost-effective manner.	4.65	1
The company has a culture of zero incidents to people, plant, and environment.	4.58	2
The company operates in a prudent and responsible manner and care about employees' health and safety.	4.58	
The company follows a process operation with continuous process improvements related to sustainability such as employee involvement, waste reduction, and energy conservation.	4.54	3
The company has a strong track record of production and reliability in delivering quality products to customers.	4.47	4
The company adopted an environment-friendly technology that would give a competitive advantage.	4.44	5
The company has a culture of operational excellence that enables process operations more sustainable.	4.44	
The company follows a process operation with continuous process improvements related to minimizing carbon footprint and emission control.	4.44	
The employees actively support the company's drive towards corporate social responsibility.	4.42	6
The company builds a competitive edge through human development.	4.14	7
Grand Mean	4.47	

Ten indicators of sustainability were identified as shown in table 4. The respondents evaluated the company's sustainability practices and the result indicate that the respondents corroborate to the company's sustainability practices as supported by the grand mean of 4.47. Among the 10 indicators, "the company and its employees' commitment to a strong environment, health, and safety record in the most cost-effective manner" (*x=4.65)* was identified as the most essential. Since the introduction of sustainable development in 1972, an increasing number of companies strived to create a competitive position by means of sustainability in their operations (Taghavi, 2015) since operations strategy is progressively associated with sustainability as the key to profitability, economic competitive advantage, and its relationship to people, process operations, and environment (Pojasek, 2007; Ferrer, 2008). Henceforth, sustainability has become part of a firm's business strategy; therefore, strategic alignment of the manufacturing function to the business strategy's vision and goals regarding sustainability has become essential for manufacturing companies (Taghavi, 2015). It can be described as the application of knowledge, skills, tools, and techniques to the organization's activities, products, and services (Pojasek, 2007). It is also meeting present needs without compromising the ability of future generations to meet their own needs (United Nations, 1987 cited in Ferrer, 2008) through the balanced pursuit of ecological health, economic welfare, health and safety, social empowerment, and social creativity (Braun & Glidden, 2014; Kleindorfer et al., 2005). Thus, sustainability to some extent operationalized in manufacturing firms' day-to-day decisions and activities through improvement programs and initiatives, integrated management systems, health and safety processes, and employee involvement (Taghavi, 2015).

5.3 Correlation Analyses

Table 5. Correlation Analysis between the respondents' profile and operations strategy

Demographic Characteristics	Operation Strategy Variables	Pearson Correlation (r)	Sig. (2-tailed) (p)
Age	Quality Assurance	.265*	.046
	Risk & Safety	.331*	.012
	Monitoring & Control	.340**	.010
Educational Attainment	Process Innovation	.270*	.042
	Quality Assurance	.291*	.028
	Risk & Safety	.320*	.015
Length of Service	Risk & Safety	.299*	.024
	Monitoring & Control	.296*	.026

**p = .01 level (2-tailed) *p = .05 level (2-tailed)

On table 5 the summary of results on the correlation analyses of the respondents' profile and their perceptions onthe company operations strategy is presented. As shown, three of the profile variables such as: age, educational attainment, and length of service are statistically related to some of the areas of operations strategy. Age is statistically related to the three areas of operations strategy such as: quality assurance (r=.265, p=.046), risk and safety (r=.331, p=.012), and monitoring and control (r=.340, p=.010). Educational attainment is found to be statistically related to three areas of operations strategy such as: process innovation, risk and safety, and monitoring and control as supported by the correlation coefficients of: .270; .291; and .320, respectively. All these areas yielded to p-values lower than 0.05.

Length of service is also statistically related to two areas of respondents' perception on operations strategy such as: risk and safety (r=.299, p=.024) and monitoring and control (r=.296, p=.026). This could mean that age, educational attainment, and length of service has something do to with how respondents perform the operations strategy in the organization in terms of quality assurance, risk and safety, monitoring and control, and process innovation.

In the oil and gas industry, Quality Assurance (QA) activities include a planned system of review procedures conducted by personnel not directly involved in the inventory compilation/development process (Saxena, 2009; Ravindranath & Ostwald, 2007). Effective quality initiatives of any sort involve every employee in the organization. It is the commitment of all employees to the continuous improvement of work process with the aim of satisfying customers' requirements and needs. Furthermore, it is fundamentally a way of organizing and involving the whole organization so that all members participate in planning and implementing continuous quality improvements (Lin & Clousing, 1995; Akdere, & Schmidt, 2008; Lee& Chang, 2006). Hence, all employees, regardless of age, education, length of service should commit to the company's quality assurance practices to maintain a quality-oriented culture within the organization. Organizations should be proactive in continuously teaching employees about quality management. This could be done through ongoing training of both a formal and informal nature that specifically addresses these topics or by weaving them through existing training and development initiatives within the organization (Akdere & Schmidt, 2008).

As regards to risk and safety, the aim of risk and safety management is to identify and assess safety and health hazards existing in the workplace to minimize or to eliminate hazardous conditions that can cause bodily injury and to define appropriate control and retrieval steps (Renewable UK, 2014). Business processes in oil and gas industry are very complex. Therefore, it is essential that a systematized approach should be used for managing risk and safety as it is paramount in the oil and gas industry. It should ensure the safety of different operational sites by correctly mapping the business processes, risks, and controls involved in all the segments of the oil and gas industry. It should enable workers to follow consistent risk and safety practices. It should help in managing site inspections, permits, violations, lessons learned and best practices execution for oil and gas sector and it must be well documented (strategies and action plans) and should be easily understood and readily available to all the workers (Skogdalen, 2011; Chauhan, 2013; Osabutey, Obro-Adibo, Agbodohu, & Kumi, 2013). Moreover, the company should step up its educational campaigns on risk and safety for workers to understand the relevance of risk management.

A well-defined reporting guideline should be in place and punitive action should be fairly enforced on workers who flout risk and safety rules which will reduce the bad attitude of workers towards risk and safety management. Management should also be committed to enforcing risk management policies (Osabutey, Obro-Adibo, Agbodohu, & Kumi, 2013; Bigliani, 2013). In light of this, all employees should obtain understanding and agreement around what the risks really are and how they will be managed to improve performance, enable continual improvement in decision making, increase the value of firms and reduce financial distress.

Complex operations carried out in the oil and gas industry require constant and accurate real-time monitoring and control of the process (Sui, Nybø, Gola, Roverso, & Hoffmann, 2011). This involves the ongoing checking, inspection or examination of equipment, monitoring equipment to ensure it is in good working order, management systems, and operational activities on a regular and frequent basis (Wawryk, 2003). Monitoring and control should be ongoing throughout the life of a project and employees must be involved in effective monitoring and control to achieve operational excellence as the operations at oil and gas sites require lots of equipment, and the complexity and cost involved to keep these sites operating can be challenging for the industry. Nonetheless, these challenges are not insurmountable.

More and more oil and gas sites are equipped with monitoring and control equipment which is the key to attaining a high level of equipment dependability and profitability (American Innovations, 2017). Additionally, oil and gas monitoring and control systems provide data that informs the optimization of drilling, artificial lift, and other processes. Improved efficiency, reliability, and safety lead to more efficient transportation and safer processing. Facility-wide and enterprise-wide views into asset performance, unplanned shutdowns, and optimization of maintenance resources can help the company increase production and help keep operational costs in check (Wawryk, 2003). Accordingly, it is important to choose the one that best meets the company's operational needs but one consideration should be the human interface so that an authorized user can view the data from a mobile device. Also, a solution that allows notification of equipment events by email, text message or phone ensures the appropriate personnel is notified (American Innovations, 2017).

Process innovation is the introduction of new or significantly improved production methods or delivery of products. At industry, methods of production involve changes in techniques, machinery, equipment, and software used in the process of transforming inputs into outputs (Zucoloto and Nogueira, 2016). It involves the implementation of a new or significantly improved production or delivery method and it happens when a change is made to an existing operation that creates significant value for an organization (Milling and Stumpfe, 2000). In order for employees to participate in activities related to process innovation and growth, educating them is essential since it provides the technical competence and mastery of currently available analytic tools (Baumol, 2005). Improving technical skills and knowledge of employees will boost production efficiency as well (Kotabe& Murray, 1989; Siyanbola et al., 2016). Oil and gas companies nowadays operate with the best available technology and require highly educated engineers knowledgeable in computers as a tool and possess the skills needed for operations. Thus, employees with high educational attainment are likely to be recruited because they are more creative, innovative, and can easily adapt to changes in process innovation (Watson, 2006); therefore, making process innovation attainable which enables the company to maintain its competitive advantage (Siyanbola, Egbetokun, Abiola Adebowale, &Olamade, 2016).

Table 6. Correlation Analysis between the respondents' profile and sustainability

	Sustainability	
Respondents' Demographic Profile	Pearson Correlation (r)	Sig. (2-tailed) (p)
Age	.249	.061
Nationality	.087	.519
Employment Classification	.075	.579
Education	.216	.107
Length of Service	.166	.216

**p = .01 level (2-tailed) *p = .05 level (2-tailed)

Table 6 is a summary of results on the correlation analyses on the respondents' profile variables and their perceptions on their company sustainability. It appears that none of the profile variables such as: age, nationality, employment classification, educational attainment, and length of service are statistically related to their company's sustainability. This finding could be attributed to the fact that attaining and maintaining company sustainability is the function and duty of each employee regardless of age, nationality, employment classification, educational attainment, and length of service.

For oil and gas companies, the concept of sustainability is most appropriately used when evaluating their business strategy. A sustained growth is an overall increase in output. Failure to increase the output would invariably result in a rise in prices for the present and future generations (Islam &Sumathy, 2013). The oil and gas industry recognize its important role in the world in fuelling economic development and social progress. It also understands the need to respond to stakeholder concerns, including those related to sustainability, which is of ever-increasing significance (Silvestre & Gimenes, 2017; Boyle & Depraz, 2006). In this view, the industry performs its role in sustainable development by managing its operations safely and in reducing emissions and discharges with minimal ecological and environment impact; by meeting the needs of the global society while providing energy at a reasonable cost until suitable alternate energy sources are available (Arscott, 2004).
Given the scale and complexity of sustainable development; establishing the groundwork for sustainability is a task that will take discipline and commitment from all employees, employers, and stakeholders (Schneider, Ghettas, Merdaci, et. al., 2015).

Table 7. Correlation Analysis between operations strategy and sustainability

DV	OPERATIONS STRATEGY				
	Process Innovation	Quality Assurance	Risk and Safety	Monitoring and Control	Cost Management
	r	r	r	r	r
Sustainability	.697**	.822**	.868**	.780**	.565**
p=.000 significant at .01 level (2 tailed)					

**p = .01 level (2-tailed) *p = .05 level (2-tailed)

The correlation between operations strategy and sustainability is shown in table 7. All the five components of the operations strategy such as process innovation (r=.697), quality assurance (r=.822), risk and safety (r=.868), monitoring and control (r=.780), and cost management (r=.565) are statistically related to the company's sustainability. All these areas yielded to p-values that are significant at 0.01 level. This could be statistically meant that all these areas of operations strategy are significantly affect sustainability.

5.4 Regression Results

Table 8. Regression Analysis of Operations Strategy and Sustainability

IV	Regression Coefficient			
	B	Beta	t value	Sig.
Constant	-8.112			
Risk and Safety	.773	.638	7.167	.000
Monitoring and Control	.420	.316	3.550	.001
R =. 894, R^2= .800, Adjusted R^2= .792, F statistics = 107.742, Significance = .000				

The regression results of operations strategy and sustainability is reported in table 8. As shown in the equation, it appears that two components of operations strategy are significant, they are: risk and safety with a B of .773 and t value of 7.167 which is significant at .000 and monitoring and control with a B of .420 and t value of 3.550 which is significant at .001. The beta regression coefficients are positive. However, among the two significant variables, risk and safety have a stronger coefficient with a Beta weight of .638 than monitoring and control with a Beta weight of .316. The R is .894 with an adjusted R-square of .792 which indicates that 79.2% of the variation on company's sustainability can be attributed to risk and safety and monitoring and control. While 20.8% of the variation could be explained by other factors not mentioned in the study.

The F-value for ANOVA is the 107.742 and is significant at .000. This could be interpreted to mean that risk and safety and monitoring and control significantly determine company's sustainability. Risk and safety is associated with process operations in oil and gas industry are significant to sustainability as it is the number one priority in day-to-day activities of employees and contractors which affect the overall performance of the business (Flin, Mearns, O 'Connor, & Bryden, 2000; Muftah & Lafi, 2011). They are also considered as essential elements in running a successful business with the ability and competency to survive in the market (Molamohamadi, & Ismail, 2014). At their most basic level, sustainability and safety are really about the same thing: conserving resources. In the case of sustainability, those resources are typically thought of as environmental. In the case of safety, the resources are human (Taubitz, 2010; Molamohamadi, &Ismail, 2014). At present, sustainability is seen as a delicate balance between the economic, profitability, risk and safety of humans, the community, the environment, and the earth (Stankevičienė, Sviderskė, &Miečinskienė, 2014; Amponsah-Tawiah et al., 2013). At every stage of operations, the company must seek to reduce the impact on the environment by reducing emission and carbon footprint. Companies can also lower the risk of pollution to the environment by eliminating waste by using it as useful input (Hart, 1996).

Promoting safety culture, best safety practice of zero-harm to people and equipment, work with valid safety work permit, working according to safety procedures, and reporting safety hazards and unsafe behaviors are important business strategy to achieve sustainability (Flin, Mearns, O 'Connor, & Bryden, 2000; Muftah & Lafi, 2011). Superior health, risk, and safety policies are critical for sustainable development since organizations that practice the best health, risk, and safety policies will achieve the best economy in their operations (Amponsah-Tawiah et al., 2013).

Furthermore, monitoring and control of process operations are significant to sustainability. Operators and engineers monitor historical data using trend and control the process to ensure safe operation (Grimstad, Almklov, Foss, &Gunnerud, 2015). A study of Umugwaneza (2016), recommended that commitment by the management in overseeing the monitoring and control exercise will enhance operation's sustainability. Thus, Implementation of operations strategy in terms of risk and safety and monitoring and control to achieve sustainability ads value and respect to the society which is essential to the longevity of the business. Employees must operate, monitor and control process operation according to company standard and procedures to maintain smooth operation thereby producing high quality products. In this way, effective use of resources and cost are optimized at the same time reducing waste discharge to the environment. Everyone must work together to achieve sustainability in light of oil oversupply and price deflation.

6. Conclusion

This study identified the factors that determine the sustainability of Oil and Gas Company in light of oil oversupply and price deflation. As perceived by the respondents, all components of operations strategy along process innovation, quality assurance, risk and safety, monitoring and control, and cost management indicate a very high relationship to sustainability, while risk and safety and monitoring and control were identified as predictors of sustainability. This means that the industry can continue to make progress by embracing a commitment to sustain and strengthen the company's operation strategy. It is highly recommended that companies and establishments affected by global oil crisis must review their operations strategies, policies, standards, and procedures to achieve sustainability in the midst of crisis since the end of the era of oil shocks is not yet determined. Although this study was carefully prepared and has reached its aims, there were some unavoidable limiting factors. First, the study was conducted only in one of the Oil & Gas company and might not represent the majority of the oil and gas industry. Therefore, to generalize the results, the study should have involved more oil and gas companies in the Middle East region. Second, since the questionnaire was designed to limit the operations strategies to variables to process innovation, quality assurance, risk and safety, monitoring and control, and cost management; there might be other variables that are equally important to consider. For these reasons, this study leaves some unanswered questions and opens a door for future research and in-depth exploration as regards to achieving sustainability in the oil and gas industry.

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