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Project Managers' Strategies for Megaproject Success

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Walden University

College of Management and Technology

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Nkenamchi Benedict Oputa

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Walden University
2017

Abstract

Project Managers' Strategies for Megaproject Success

by

Nkenamchi Benedict Oputa

MSc, Tadeusz Kościuszko Cracow University of Technology, 1984

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

Walden University

December 2017

Abstract

In Africa, most oil and gas megaprojects exceed their original budget and time deadlines despite advancement in project management processes and systems. This study explored strategies project managers used for megaprojects' success in the oil and gas industry in Nigeria, from the perspectives of the owner and contractor organizations. Multiple case study design was utilized to collect data by asking open-ended questions in separate interviews with 4 project managers. Archival project data was also reviewed to eliminate information incongruences. The conceptual framework for the study is the contingency theory that there is no universal management structure for every project. The data analysis approach was thematic coding. Study findings from the data analysis were aggregated into 5 themes. The 1st, 2nd, and 3rd themes include the project managers' view of measures of megaproject successes, project managers' strategies for managing the business environment, and the strategies for achieving megaproject execution excellence. The 4th and 5th themes are the strategies for facilitating employee performance and the typical social change development and social change performance initiatives to benefit neighboring communities because of a megaproject. The conclusion from the evidences gathered is that megaproject success is contingent on the ability of the project manager to unravel and address complexity leveraging strategic leadership and systems thinking. From these findings, project managers from the client and contractor organizations may use, adapt, learn, refresh, and improve their project management skills. The significance of the study to positive social change from improving the success rates of megaprojects includes improvement in human capacity development and infrastructural additions that can facilitate economic growth in the region.

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Dedication

I dedicate my doctoral study to my wife and best friend, Mrs. Dorothy Nkiruka Oputa, for her emotional support encouraging me to achieve the rarified accomplishment of taking the Doctor of Business Administration in Project Management from the prestigious Walden University. To my children, family, extended family, friends, and colleagues in workplaces, past and present; all of you that missed my association because of my focus on completing the study, I dedicate the study. To all of you that will be proud of my doctoral academic achievement; most especially my late father, Mr. Joseph Onumonu Oputa who instilled the spirit of pursuing excellence early in my life, I am happy I did not give up the pursuit.

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Section 1: Foundation of the Study

Project managers may encounter low success rate delivering industrial megaprojects (Rolstadås, Tommelein, Schiefloe, & Ballard, 2014; Subaih, 2015). Scholars and practitioners have attributed the underperformance to the challenges in managing megaproject complexity (Chanmeka, Thomas, Caldas, & Mulva, 2012; El Asmar, Hanna, & Loh, 2013; Klein, Biesenthal, & Dehlin, 2015). The challenges impact the project managers' abilities to deliver successful megaprojects.

Notwithstanding using scientific project management tools and techniques, assurance of project management successes appears unreal given the high failure rate (Muhammad, Rizwan, Sijun, & Libiao, 2013). Despite the emphasis to improve megaproject performance, there are no signs of significant improvement (Liu, Borman, & Gao, 2014). According to Sage, Dainty, and Brooks (2014), there is a continuing tendency towards underperformance and a limit to what the project manager can do to improve megaproject performance. However, Saunders, Gale, and Sherry (2015) opined that having a better understanding of project complexity is the key to successful megaproject outcomes.

Background of the Problem

In the upstream sector of the oil and gas industry, 78% of megaprojects underperform, over capital expenditure (CAPEX) by 33% and schedule by 30% (Morrow, 2011). Despite the advancement in project management processes and systems, project performances have not significantly improved (Liu et al., 2014; Mir & Pinnington, 2014). The implication is that some megaproject managers lack the requisite

strategies for dealing with the challenges in project management to deliver successful megaprojects. The main concerns emanate from the inappropriateness of the megaproject structures using mainstream project management practices for executing megaprojects, irrespective of the distinctive complexity of megaprojects (Klein et al. 2015; Martinsuo, 2013). The fundamental proposition of the study was that inadequate handling of project management challenges impairs megaproject success and business profitability.

Problem Statement

Project managers may encounter low success rates delivering industrial megaprojects (Rolstadås et al., 2014; Subaih, 2015). In Africa, about 67% of oil and gas megaprojects exceed their original budget by circa 51%, and 82% exceed the time deadlines (Ernst & Young Global Limited [EY], 2014). The general business problem was that project management challenges can impair megaproject success and business profitability. The specific business problem was that some project managers lack requisite strategies to deliver successful megaprojects.

Purpose Statement

The purpose of this qualitative multiple case study was to explore the strategies that project managers use to deliver successful megaprojects. The target population group included four project managers in two multinational oil and gas corporations and two contracting conglomerates in Nigeria. The implication for positive social change from increasing success rate of megaprojects was an improvement in human capacity development and infrastructural additions that can facilitate economic growth in the region.

Nature of the Study

The qualitative research method was appropriate for the study because of the alignment with the purpose, and adequacy for exploring open-ended themes in complex business settings (Thamhain, 2014). Using the qualitative method enables researchers to gain an in-depth understanding of complex business phenomena to improve business practice by addressing how and why descriptive research questions (Yin, 2014). Depending on the research question, other applicable research methods include quantitative and mixed methods. Quantitative researchers apply empirical, analytical methods for examining relationships and differences; and they are inappropriate for exploring participants' views in organizational settings (Thamhain, 2014). The mixed method is a combination of both quantitative and qualitative methods. Although the mixed method is suitable for researching in-depth, multilayered problems (Yin, 2014), because I did not use the quantitative method, the mixed method was outside the scope of my study.

I employed the multiple case study design using multiple sources of data focusing on asking participants structured open-ended questions in interviews, supported by the reviews of archival project documents. Other examples of qualitative research designs include narrative design, phenomenology, grounded theory, and ethnography (Creswell, 2013). The narrative design may be biographical or oral history describing individuals' stories about an event in chronological order focusing on the individuals' life reflections (Petty, Thomson, & Stew, 2012). Conversely, case study researchers describe the experience of more individuals or group about one or more events, asking how and why

questions (Yin, 2014). Phenomenologists explore a phenomenon from which they can generate the basis for a worldview (Marshall & Rossman, 2016). Grounded theory research includes generating the theory (Cho & Lee, 2014). However, case study researchers focus on the real-life application of theory (Fusch & Ness, 2015). In ethnography, participant observation is the key means for data collection (Marshall & Rossman, 2016; Yin, 2014); whereas, in a case study, the use of observation is not mandatory.

Research Question

The central research question was: What strategies do project managers use to deliver successful megaprojects?

Interview Questions

The open-ended questions (included in Appendix A) that I used in the interviews with participants were:

1. How would you describe a successful megaproject?
2. How do you deliver a successful megaproject?
3. Describe the strategies you used to deliver a successful megaproject.
4. How did you implement these strategies?
5. Why were these strategies successful?
6. What barriers prevented successful megaprojects?
7. How did you address each barrier?
8. What remedial strategies have you used to improve megaprojects success rates?
9. How did you implement these strategies?

10. Why were these remedial strategies successful?

Conceptual Framework

The conceptual framework for the study was the contingency theory that there is no ubiquitous organizational design for every company. Optimal organizational design depends on the contextual fit of the organizational structure and management system (mechanistic or organic) with the environment (stable or innovative) (Nebeker, 1975; Pennings, 1975; Peteraf & Reed, 2007). Nebeker (1975) shaped the current understandings of the contingency theory integrating Fiedler's (1967) work on the contingency theory of leadership style effectiveness, and Lawrence and Lorsh's (1969) work on contingency organizational theory.

Starkey, Wright, and Thompson (1991) consolidated the current understandings of the contingency theory using strategic flexibility to extend the framework for organizational choice reassessing the goodness of fit of strategy and organizational activities against management systems' structure or organizational systems of internal control (mechanistic or organic). The contingency theory was suitable for explaining the variety of organizational choice, designing megaproject management strategies and processes to address the diversity in project contexts and changing conditions (Wysocki, 2014). The propositions in the contingency theory were my lens for viewing participants' experiences, and reviewing archival documents and artifacts.

Operational Definitions

I used the following terms and phrases in the study.

Edge of chaos: The edge of chaos is a system archetype representing a transient state of counteracting forces of stability and instability in organizations; the platform for generating an emergent pattern of behavior supposedly orderly in the short-term (Stacey, 2011).

Engineering, Procurement, and Construction Contract (EPC): Contract where the contractor is responsible for the delivery of the detail design, procurement, and project construction; predominantly based on fixed-price milestones versus cost-plus milestones (Brahm & Tarzizán, 2015).

Engineering, Procurement, and Construction Management (EPCM): A form of contracting for megaprojects in which the principal appoints a contractor to develop and manage the delivery of the project on behalf of the principal (Brahm & Tarzizán, 2015).

Integrated Project Delivery (IDP): From the onset of the project delivery requires the involvement of the key stakeholders such as the client, owner, sponsor, operator/user, contractors and subcontractors to guarantee operations readiness in advance for flawless commissioning and start-up (Heravi, Coffey, & Trigunarsyah, 2015).

Megaproject: A project involving capital expenditures of about 1 billion USD or more requiring an exceptional level of organizational and managerial capability because of the complexity (Davis & Mackenzie, 2014).

Organizational citizenship behavior: An organizational citizenship behavior is the beneficial discretionary work behavior in permanent organizations outside formal reward system (Ferreira, Braun, & Sydow, 2013).

System of systems: A system of systems is a concept denoting systems integration of interacting social components (systems agents) and technical components (systems artifacts) recognizing the complexity from multiple interfaces between the agents and their artifacts that evolve emergent coherent total system's behavior (Harvey & Stanton, 2014).

Assumptions, Limitations, and Delimitations

The assumptions are the researcher's unverifiable beliefs about a study (Hancock & Algozzine, 2011). An assumption of the study was that the participants answered the research questions honestly. The limitations are the factors that may affect the findings of a study that are beyond the researcher's control (Hancock & Algozzine, 2011). The limitation of the study was that sociopolitical and environmental factors may impact the study's confirmability by others. The information received about megaprojects in the oil and gas industry in Nigeria may not apply to other industries or megaprojects. The delimitations are the boundaries that the researcher sets (Hancock & Algozzine, 2011; Simon, 2011). The delimitations included the choices that I made about the specific business problem, the research question, the population of the study, and the geographic location that limited the scope of the study.

Significance of the Study

Addressing potential contributions to business practice, the findings from my study may lead to more awareness on how project managers (of the client/owner and the agent/contractor organizations) may improve megaprojects' success rates. Project managers may learn, refresh, improve their project management skills, and use/adapt the project managers' strategies from the five themes that I presented in the study findings. Business leaders may better understand how to support the project manager to achieve megaproject success and how the partners in megaproject delivery may know what is important to each other, to achieve mutual project execution success.

Some project managers may begin to employ appropriate project management structures depending on project complexity. Some project managers may develop project management capability and improve the implementation of systems thinking, innovative thinking, and derivative project leadership principles beyond the mainstream project management practices. Project managers refresh on the best-fit approach to managing sensibilities and nontechnical risks in megaprojects. Business owners and other stakeholders could achieve desirable megaproject performance targets through improving efficiency and effectiveness, and catalyzing stakeholders' value creation.

Regarding the potential contributions to social change from my study findings, business owners and project managers may gain more awareness of what constitutes social development and social performance of a megaproject and how to replicate/adapt the concept in subsequent megaprojects. The potential contributions to social change include the creation of value inside and outside the oil and gas industry by developing

indigenous construction capability and local labor competencies. Also, increasing success rates of megaprojects because of my study could reduce financial wastes making more resources available for funding corporate social responsibility (CSR) to remote host communities. Examples of potential CSR benefits in the oil and gas industry in Nigeria include providing primary health care, hospitals, human capacity development, sponsorships, scholarships, and schools (Alabi & Ntukekpo, 2012; Musa, Yusuf, Mcardle, & Banjoko, 2013). Other examples of potential CSR benefits include the provision of good access roads, bridges, and independent power plants (IPPs) (Alabi & Ntukekpo, 2012; Musa et al, 2013). These potential derivative benefits to individuals and communities may enhance growth in economic activities in remote host communities, resulting in more employment opportunities, poverty alleviation, and reduction in crime and violence in Nigeria.

A Review of the Professional and Academic Literature

The review of the professional and academic literature involved comprehensive analysis and synthesis of the research publications related to the study. The primary source of the professional and academic literature was the Walden University Library. I also searched the Google Scholar for additional information. The total number of the references is 175, including peer-reviewed journal articles, textbooks, doctoral dissertations, and government materials. One hundred and forty-nine or 85% of the references are publications within the 5 years of the Chief Academic Officer's approval. Twenty-seven or 15% of the references were published before 2013 and the number of the peer-reviewed sources in the literature review is 135 or 77% of the references.

Based on the study title, which is project managers' strategies for megaproject success, focusing on the contingency theory (the study's conceptual framework), and complex project management (as the related body of knowledge), I selected keywords for global and specific searches of the relevant literature databases. The main keywords and combination of the keywords, connected with Boolean operators, were: project success, project performance, contingency theory, project contingency theory, and complex project management. Other keywords and the combination of keywords include project governance, project management challenges, project management strategies, strategic leadership, systems thinking, and knowledge management. Most of the literature searches in the Walden University Library were from multidisciplinary databases such as the ScienceDirect, ProQuest Central, and the Academic Search Complete.

I organized the review of the professional and academic literature in subsections beginning with the contingency theory, the lens for viewing the study, presenting the origin and the historical development to the present understanding of project contingency theory. Following the subsection on project contingency theory are subsections relating project management success versus project success, conceptualizations of project management approaches, and choosing an appropriate project management approach. Subsequent subsections contain the strategies for megaproject success including the various designs of megaproject governance, application of project-resource assets, and strategies for managing stakeholders, adversarial cultures, collaboration, and self-interest behaviors in megaprojects.

Contingency Theory

The contingency theory that there is no universal organizational design to cater for all business contexts is the study conceptual framework. The optimal organizational design is contingent on the parallel alignment of the management system structure (mechanistic or organic) and the environment (stable or dynamic, depending on the market and technology perspectives) with the corporate strategy and the corporate activities (Nebeker, 1975; Pennings, 1975; Peteraf & Reed, 2007). The current understandings of the application of contingency theory to organizational design and practice evolved from Nebeker's (1975) integration of Fiedler's (1967) work on the contingency theory of leadership style effectiveness, and Lawrence and Lorsh's (1969) work on contingency organizational theory.

Leadership style effectiveness depends on situational favorableness (Fiedler, 1967) whereas the appropriateness of organizational structure is contingent on the environment (Lawrence & Lorsh, 1969). Organizational structure is contextual to the set of organizational activities, and external activities' boundaries, shaped by markets dynamics and technology (Lawrence & Lorsh, 1969; Peteraf & Reed, 2007; Starkey et al., 1991). Contextual favorability is contingent on environmental uncertainty rather than on a blueprint control premise (Nebeker, 1975).

Starkey et al. (1991) consolidated the current understandings of the contingency theory using strategic flexibility to extend the framework for organizational choice reassessing the goodness of fit of strategy and organizational activities against management systems' structure or organizational systems of internal control (mechanistic

or organic). The contingency theory is suitable for explaining the variety of organizational choice; designing megaproject management strategies and processes to address the diversity in project contexts and changing conditions (Wysocki, 2014). The propositions in the contingency theory are my lens for viewing participants' experiences, and reviewing archival documents and artifacts.

The mechanistic and organic systems of management. Woodward (1958) and Burns and Stalker (1961) proposed the theory of mechanistic and organic systems of management. The theory of mechanistic and organic systems of management indicates that there is no ideal type of management system for achieving effective organization of industrial resources (Burns & Stalker, 1961). The ideal type of organizational management system (mechanistic or organic) depends on the changing dynamics of the market and technological environment (stable or innovative) (Burns & Stalker, 1961).

The mechanistic system of management involves stable conditions and the full knowledge of project's requirement breakdown structure and work breakdown structure. From the organic perspective, project characteristics are subject to changing conditions, and it is not possible to provide scope details at the project's onset (Wysocki, 2014). In the organic system, teams become self-organizing, self-sufficient, and self-directing (Burns & Stalker, 1961; Kliein et al., 2015; Tanaka, 2014; Wysocki, 2014). Teams develop the attitude and the enabling environment supporting values and processes common to the whole group for accessing foreknowledge and harnessing emergent knowledge for creativity (Ahern, Leavy, & Byrne, 2014a, 2014b; Aramburu, Sáenz, & Blanco, 2015; Kliein et al., 2015). In the organic system, leadership involves shared

interpretation of group's environment; leaders emerge not appointed, and vision is an intrinsic part of the organizational culture (Malewska & Sajdak, 2014).

Project Management Contingency Theory

There is no single fit-for-purpose set of principles for all project management contexts (Aaron & Dvir, 2007; Brown & Eisenhardt, 1997). Optimal strategies in project management vary with changes in market conditions, and technology (Brown & Eisenhardt, 1997). Project management is contextual and situated as a discipline (Morris, 2016). Knowing which aspect of project contexts to use to determine project practice and which practice leads to the most desired outcome is a tough challenge (Besner & Hobbs, 2012).

It is hard to identify best-fit project management practice for all project contexts (Besner & Hobbs, 2012; Brown & Eisenhardt, 1997). No two megaprojects are alike, and adapting project management style is key to project management success (Aaron & Dvir, 2007). Davis and Mackenzie (2014) recognized that there is no single predictable managerial strategy for every complex project. Badawi and Shehab (2016) added that applying project management even in routine organizational projects is not sufficient to guaranty investment success. The underpinning fact about project management contingency is that the critical success factors (same as project success factors or the enablers for achieving the project success criteria) are not universal (Van der Hoorn, 2016).

The insights from project management contingency theory include understanding project complexity, and the critical success factors. Van der Hoorn (2016) presented a

tailored approach for identifying and visually representing the critical success factors of a specific project at any point in time during the project execution. Managers using the tool can indicate where to efficiently and effectively direct attention during project execution (Van der Hoorn, 2016). Project complexity affects the initial cost estimate that depends on the knowledge base, organizational and personal biases, and interests of the key stakeholders or groups reflecting the influence of the principal-agency and transaction cost economics issues (Zwikael & Smyrk, 2015). Ahola and Davis (2012) stressed on taking advantage of the task decoupling principle based on the tension between organization's core roles versus commoditized roles and using the make or buy decisions of transaction cost economics.

Other insights from project management contingency include understanding: sources and management of uncertainty in projects, applicable governance approaches, adaptability to creativity and innovation perspectives, and emergent decision-making capabilities (Ahola & Davis, 2012). Handling project contingent factors require the project manager understanding the framework on the ramifications of the transaction cost economics, control structures, incentive systems, standard operations procedure, dispute resolution procedures and the use of nonmarketing pricing to expedite delivery (Ahola & Davis, 2012).

The underlying contingent factors characterizing the low success rates of megaprojects include issues with the many layers of stakeholders with divergent expectations, over-optimism, political inferences, and manipulations evident in the strategic misrepresentation/misinformation (Ika & Hodgson, 2014) in shaping/defining

the project, and the project governance approach. There are issues with the centralized/single agent approach to project governance versus the alliance governance structure (Guo, Chang-Richards, Wilkinson, & Li, 2014; Toivonen & Toivonen, 2014). The ineffective knowledge management in project execution (Bosch-Sijtsema & Henriksson, 2014) and lack of other overarching strategies for megaproject success are among the key project management challenges. Effective megaproject competencies should address the diverse contexts of contingent variables for understanding megaproject management dynamics (Miterev, Engwall, & Jerbrant, 2016). I focused the study on understanding how the concept of fit between project characteristics and associated project management approach impact megaproject outcomes to improve project management practices in the oil and gas industry in Nigeria.

Project Management Success Versus Project Success

Project management success, same as project performance success, depends on the traditional task related iron triangle measurement criteria of cost, schedule, and quality (Salazar-Aramayo, Rodrigues-da-Silveria, Rodrigues-de-Almeida, & Castro-Dantas, 2012). Employees have their own perceptions of project success (Khan & Rasheed, 2015). Project success is a measure of the project outcome compared to the objectives (Salazar-Aramayo et al., 2012). Project success is about achieving the organizational strategic target using an effectiveness or emotional criterion, such as meeting the stakeholders' satisfaction (Cserhádi & Szabó, 2014). However, Mortaheb, Amini, and Younesian (2013) and Ika (2015) viewed project success to include achieving both the effectiveness targets and the efficiency goals. Ika (2015) also added the concept

of project impact that is about national relevance besides relevance to beneficiaries. Berssaneti and Carvalho (2015) observed a significant relationship between project management efficiency and project management maturity. In the project lifecycle, the project management execution success has a direct impact on client satisfaction and indirect impact on relationship quality (Williams, Ashil, Naumann, & Jackson, 2015).

Project Success Factors and Project Success Criteria

Project success factors are how we achieve the project success criteria (Cserháti & Szabó, 2014; Joslin & Müller, 2015). Project success factors include communication, coordination, relationships, structure and control, planning, problem solving, monitoring, and feedback (Cserháti & Szabó, 2014). Other project success factors include understanding the project publicity/significance, human resource management, predefinition and acceptance of the success criteria, and top management support (Cserháti & Szabó, 2014). Top management support of the project team, and appointing a dedicated project manager, enhance the chances of achieving schedule but not customer satisfaction; indicating a focus on project management efficiency against the effectiveness (Berssaneti & Carvalho, 2015). However, top executives' influence on strategic change management depends on the individual leadership character traits (Herrmann & Nadkarni, 2014).

Krane and Olsson (2014) worried about the success factors of project management not addressing the principal's perspective. Mortaheb et al. (2013) determined how factors influencing the quality of engineering work affect project success criteria. Rahman, Memon, and Abd Karim (2013) indicated that issues with site

management/supervision in construction projects impact budget overrun more than design documentation, financial management, information and communication, labor, materials and machinery, and project management, and contract administration.

Project management methodology is a project success factor (Joslin & Müller, 2015). Project management methodology is a heterogeneous collection of practices that are different in organizations (Joslin & Müller, 2015) whereas a method is an approach in each context (Joslin & Müller, 2015). Project context includes the physical and mental characteristics of the situation of the project. Another project success factor is appointing line managers as project benefit managers to enhance the chances of realizing the project benefits (Dupont & Eskerod, 2016). In the oil and gas industry, the business opportunity manager plays the role of the project benefit manager.

Chanmeka et al. (2012) determined the relationships between project performance, productivity metrics main features (such as cost, schedule, safety, change, rework performance, and productivity of engineering and construction), and execution strategies and best practices. The outcome is that labor productivity is not the primary cause of performance problems in project execution (Chanmeka et al., 2012). Deficiencies in front-end loading and inadequate forecasting and predictability in estimating costs and schedule are contributory to performance problems. Most of the projects are schedule-driven, demanding mobilization to site for construction with some open switches such as design holds not yet resolved. The fastest success occurred when best practices are applied from other projects.

Allen, Alleyne, Farmer, McRae, and Turner (2014) investigated the critical success factors of projects comparing a successful project to a failed project. The main project success factors in Allen et al. included the project team's ability to align with external influences (mainly from the principal organization), and the project manager's ability to leverage lessons learned from previous projects. Other considerations of project success factors in Allen et al. included collaboration, relationship building, and the ability to maintain teamwork. Further project success considerations were issues with broad scope, unrealistic schedule, and budget constraints (Allen et al., 2014).

The internal control factors that affect existing project plans include revisions of work scope, changes in the basis of cost estimates and project schedule, and changes in specifications (Laslo & Gurevich, 2014). The external control factors include issues with open switches (pending decisions), materials delivery failures, the inability to utilize a weather window, and labor unrests (Laslo & Gurevich, 2014). There is a trade-off relationship between cost and schedule (Laslo & Gurevich, 2014). Pruning and redistributing activities may decrease costs but increasing resources even though increase costs does not imply certainty in schedule reduction (Laslo & Gurevich, 2014). Interactive use of a project control system enhances performance when project complexity is high but may lower performance when complexity is low (Sakka, Barki, & Côte, 2016).

Haji-Kazemi and Andersen (2013) explained the use of a performance measurement system based on key performance indicators in providing early warning signal for projects facing impending problem in future. However, Meng (2014) linked

early warning signs with problem solving and project performance in a cause-effect relationship, highlighting the importance of proactive management. Continuous improvement activities leading to performance improvement does not necessarily result in outperforming competitors and sustaining the competitive advantage (Sarmiento, Shukla, & Izar-Landeta, 2013).

Regarding achieving the project management efficiency success criteria, there is a limit to what the project manager can do, faced with the introduction of new regulations, codes, and standards; new laws, changes in the supply of labor, and procurement strategies; and changes in the design, the executive personnel, and the cost of materials; all these factors increase project cost and duration (Sage, Dainty, & Brooks, 2014). There is a limit to which a project manager can freeze a project to avoid changes because projects are legally, politically, culturally, and economically entangled with societal dynamics (Sage et al., 2014). The socioeconomic perspective, although present external challenges, impacts the project manager's ability to complete a project. Besides the external challenges, project managers face internal challenges (Aarseth, Rolstadås, & Andersen, 2014; Pinto, 2014; Pinto & Pantanakul, 2015). Project managers deal with the challenges to achieving a desirable outcome.

Conceptualization of Project Management Approaches

Conceptualization of project management practices based on positivism still underpins current project management tools and techniques, contributing to the challenging experience in megaproject delivery; and is preventing understanding and communication of the true nature of megaproject management (Van der Hoorn, 2015). In

the ontological approach of positivism, the project manager is external to the project steering the project by command and control, objectivity and detachment, believing in the capability of breaking down an entire project scope into blueprint details (Van der Hoorn, 2015). Complex projects are uncertain because of internal and external influences and unpredictability of interactions between partnering organizations and stakeholders (Davis & Mackenzie, 2014).

Coping with complexity involves decomposing a project into different levels of systems with discrete boundary interfaces between distinct levels and subsystems (Davis, & Mackenzie, 2014). Martinsuo (2013) proposed exploring behavioral and organizational views shifting from the systematic blueprint solutions to embracing dynamic and complex nature of practice and context in project portfolio management. Svejvig and Anderson (2015) offered a conceptualization of the rethinking project management practice based on moving beyond the traditional project management view, enhancing but not discarding it. The suggestion is about integrating categories such as contextualization, social and political considerations, complexity and uncertainty, actuality of projects, and broader conceptualization into the traditional project management approach (Svejvig & Anderson, 2015).

The project management function may leverage the services of the project support office or project management office. The organizations in the project coalition contend with the agency issue. Both the investor and operator contribute to the overall success of the project depending on their differing capabilities to support the dynamic capability of the project for successful delivery (Pinto & Winch, 2016). Tsureyan and Müller (2015)

addressed governance of multiple project management offices as an integration of loosely coupled multiple governance units in the major project-based organizations.

The alternative to the mainstream approach to project governance involves restructuring the traditional positivist paradigm of technical rationality with insights from social sciences to develop a sociotechnical framework to cope with project delivery in complex responsive/adaptive systems (Stacey, 2011). Using systems view and the concept of systems lifecycles, Artto, Ahola, and Vartiainen (2015) presented projects as multiple organizational systems linking project execution and operation phases for analyzing value creation mechanisms within the system lifecycle. The concept includes developing a network of multiple organizations into an adaptive alliance of self-organizing system for the execution phase that transits to the operations phase (Artto et al., 2015). Davis and Mackenzie (2014) explored organizational structure and processes for coping with projects with high degree of complexity. Joint venture delivery partnership approach is becoming acceptable worldwide for managing complex projects (Davis & Mackenzie, 2014). Success depends on collaboration and mutual adjustment within the network of organizations compared to the traditional blueprint approach of a controlling principal (Artto et al., 2015). Artto et al. proposed multiple organizational involvement reinforcing integration process at the early stage of the project focusing on external image-building activities, and emphasizing market view rather than a hierarchical view of a centralized integration by a powerful principal.

Ahern et al. (2014a) looking at the deficiencies of the traditional project management theories of the prescriptive schools proposed dropping the concept of total

planning for bounded planning applying complex problem-solving strategies to harness emergent knowledge unspecifiable from the onset. Ahern et al. (2014b) focused on complexity and indeterminacy scope of knowledge formation and learning as the underlying perspective of developing an organizational capability for delivering complex projects. Saunders, Gale, and Sherry (2015) developed the uncertainty framework for understanding sources of uncertainty in safety critical projects identifying four conceptual approaches for attenuating the impact of uncertainty on project delivery for successful project outcomes.

Kliein et al. (2015) related complexity in projects to the complexity of both the project-based environment and the increasing complexity of applicable project management theories, and tools; advocating a praxeology framework transcending the prescriptive and universal nature of current PM theories; using improvisation dependent on context. Silvius and Schipper (2014) recommended embedding sustainability factors. Ngoasong (2014) explained the complexities in interpreting the Nigerian local content law. Merrow (2011) provided a detailed account of concepts, practices, and strategies for the success of industrial megaprojects identifying three key drivers of failures to include issues with the completeness of front-end loading at the sanction gate, project-leadership turnover, and the aggressiveness of the schedule.

Choosing a Project Management Approach

Addressing project complexity, selecting appropriate management style is contingent on considerations of the product, task, and the environment perspectives (Aaron & Dvir, 2007; Wysocki, 2014). Aaron and Dvir (2007) recommended a

framework for mapping projects to management styles based on novelty, complexity, technology, and pace; stressing that organization should establish their specific project type and the matching project management style. Wysocki (2014) provided a framework for choosing best-fit project management approach and the associated project management life-cycle model based on the goal clarity (the confidence level with the requirement breakdown structure) and the solution clarity (the confidence level with the work breakdown structure). Besides goal and solution clarity, there are other contingency criteria for choosing a project management approach. They include considerations of project size relative to the project cost and duration, market instability and associated risks, changing business climate, technology, organizational environment; and team skills and individual competencies in the team (Wysocki, 2014).

Project managers assess project complexity to choose either formal or relational contracting strategy for project delivery (Brahm & Tarzijan, 2015). Examples of relational contracting include the Design and Build (DB) and the Joint Venture Partnership Alliance (JVPA) procurement approaches (Ning & Ling, 2015). Another example of relational contracting strategy is the Integrated Project Delivery (IDP) procurement process. The characteristics of the IDP practice include involving, from the onset, all stakeholders such as the client, owner, sponsor, operator/user, contractors and subcontractors to guarantee operations readiness in advance for flawless commissioning and start up (El Asmar, Hanna, & Loh, 2013; Heravi et al., 2015; Zidane, Stordal, Johansen, & Raalte, 2015). The lump sum pricing strategy is typical of less complex projects, in which learning and existing knowledge are transferable into contracts (Brahm

& Tarzuján, 2015). As project complexity increases, Zidane et al. (2015) suggested application of concurrent engineering principles approximating the IDP approach. The contract type is predominantly joint venture partnership alliance; sharing knowledge base and committing to firm time to delivery; upholding health, safety, and environmental (HSE) protection is a priority and a critical success factor (Zidane et al., 2015). The related business processes and technology are typically standard and available to all partnering firms through shared knowledge base and via the use of project support offices (Zidane et al., 2015). Partnering within and across the participating organizations facilitates project delivery capability, risk management, and project performance improvement (Du et al., 2016).

Wysocki (2014) outlined four project management strategies and the associated management lifecycle models. First is the traditional project management approach for delivering projects in stable conditions, in which both the goal and solution are unambiguous (Wysocki, 2014). Second is the agile strategy with characteristic goal clarity but a partially unknown solution (Wysocki, 2014). The third and fourth project management strategies proposed by Wysocki include the Emertxe and Extreme project management strategies. The Emertxe Project Management strategy is suitable for developing applications for newly discovered technology where the solution is clear, but the goal is not, from the onset (Wysocki, 2014). The Extreme project management (xPM) approach is best in situations where both goal and solution are unclear, as in research and development (R&D) projects (Wysocki, 2014). Also, Wysocki described Emertxe Project Management as the reverse version of the Extreme Project Management, which is the

idea behind naming the project Emertxe (Wysocki, 2014). A key learning for project sponsors is to guide against dabbling into technology projects that are not value adding to the business (Wysocki, 2014).

Project management approach in the oil and gas industry. The typical project management approach in the oil and gas industry involves taking all projects through the opportunity maturation funnel, a stage-gate process, beginning with the identify phase through assess, select, define, execute (Eweje, Turner, & Müller, 2012), and the operate phases. For small, medium, and uncomplicated projects, specific activities in the opportunity maturation process could be scaled down depending on complexity. The project management guidelines (tools, techniques, and processes) at each phase in the opportunity realization funnel are from the project academies of the oil and gas multinational companies.

Stage-gate process. The stage-gate process is a strategic decision-making process for evaluating the alignment of projects to business strategy at each decision gate (Johansson, 2014). The process contains reporting sessions at the end of distinct stages; facilitating decision making for steering the project to either progress to the next phase, delay, cancel or reprioritize/rework project; pursuing alignment with corporate strategy (Johansson, 2014). The components include the stage, where the activities take place, the gate, involving evaluation of stage deliverables and the tacit knowledge of the team for decision-making (Johansson, 2014).

Jugdev and Wishart (2014) explored tangible knowledge-sharing techniques based on mutual affection in conversations, and the display of self-confidence to enhance

the wisdom pool invaluable at decision gates. Decision-making in the stage gate process is not rational in practice because it is not possible to evaluate all alternatives (Johansson, 2014). Responding to project complexity, the pragmatic approach to rationality is bounded rationality trading off between what is optimal and what is sufficient to select a good enough option. I differ from Johansson's claims that the stage gate process provides an opportunity to communicate what is known and unsure about a project to stakeholders.

Decision making at the decision gate depends on the organizational culture. In a family culture, predominantly person oriented (Tompensaars & Hampden-Turner, 2012), team members elect not to contest or differ from the controlling steers of top management even if the steers are against business interest. It is rare to stop a project from the perspectives of the prospect theory (determining choices from a reference point) and the self-justification theory (failing to accept that previous actions and sunk costs were not appropriate). Other reasons supporting inability to make a kill decision include the attitude of normalization of deviance or institutionalized deliberate choices pervading in project organizations (Pinto, 2014; Pinto & Pantanakul, 2015).

Strategies for Megaproject Governance

Zwikael and Smyrk (2015) clarified the theoretical lenses for viewing project governance using the stakeholder theory, stewardship theory, institutional theory, and resource dependency theory but emphasized the principal-agency theory. Stewardship relationship is about mutual trust and unity among the partners, characterized by collective identity, autonomy, and empowerment whereas in the agency-type relationship; the characteristics include blueprint control, monitoring, driven by

individualistic identity, and self-interest (Toivonen & Toivonen, P., 2014). Based on the principal-agency theory, governance mechanisms include the exchange relationships between the principal and the agents (Bredillet, Tywoniak, & Dwivedula, 2015). Other governance structures can involve contracting to embed relational (bilateral/trilateral) perspectives, performance monitoring, and the cooperation of partnering organizations in pulling together resources, capabilities, and knowledge to deliver a common goal (Bredillet et al., 2015). The centralized/single agent governance enables top-down risk allocation; is a controlling approach to managing project risks. On the other hand, the alliance governance approach supports emergent sharing of risks and proactive solutions among partnering organizations (Guo et al., 2014).

Project governance should address the balance between the perspectives of the principal, investors, users, beneficiaries, and the executing parties (Klakegg, Williams, & Shiferaw, 2016) providing incentives for the executing parties to pursue objectives consistent with the company's and the shareholders' interests, facilitating effective supervision. In project governance, the project organization exercises dominant control such that partners lose micromanagement commitment. The contingent factors influencing the principal's choice of control modes and the interactions between the control modes are complex (Liu, Borman, & Gao, 2014). Combining the input, output, and organizational control can be effective in a client-contractor setting, and it is the balance of control, not the number, that determines performance (Liu et al., 2014).

P. Lu, Guo, Qian, He, and Xu (2015) observed that contractual governance and relational governance are complements, not substitutes, and contractual governance is

more effective than relational governance in supporting project performance. Relational governance has more influence in restricting opportunism but does not significantly impact project performance (P. Lu et al., 2015). Stakeholders in a coalition are not alike in opportunism, and clients have a greater inclination towards opportunism than contractors (P. Lu et al., 2015).

Klakegg et al. (2016) indicated that project governance and project management practices do not yet reflect the current knowledge of megaproject complexity. Increasing tasks and organizational complexity has also been associated with a higher degree of centralization and resulted in more hidden workload (Y. Lu, Luo, Wang, Le, & Shi, 2015). Conversely, Y. Lu et al. (2015) found that less complexity relates with a higher degree of formalization evidenced in team/position experience and less hidden workload. In megaprojects, there are limitations in using formal systems because the future is not knowable, and there are also limitations to human ability regarding optimism bias in dealing with project complexity (Klakegg et al., 2016).

Biesenthal and Wilden (2014) identified how concepts and themes of dominant corporate governance theories apply to project-based organizations focusing on multiple level structures. The specific themes and concepts underlying application of corporate governance theories to project contexts include costs, trusts, and control linked respectively to transaction cost economics, stewardship theory, and principal agency theory (Biesenthal & Wilden, 2014). Other themes such as strategic, contracts or roles align with the general target of project governance (Biesenthal & Wilden, 2014).

Guo et al. (2014) drew attention to the fact that centralized governance even under strong leadership ability is not as effective as the alliance governance. Toivonen and Toivonen (2014) described how top management intervention undermined an initial stewardship relationship transforming it into an agency-type relationship. Whereas decision-making is ad hoc under a centralized governance structure, it is proactively built into risk management and project agreement from onset under the alliance approach (Guo et al., 2014). Centralized governance is intended to be more responsive but certainly a more controlling approach to risk management compared to the alliance model that generate a sense of ownership and proactive approach solutions to risk sharing (Guo et al., 2014).

In defining the role of the project owner, Toivonen and Toivonen (2014) indicated preference for the managerial approach of trust in high-risk project situations compared to blueprint control in low-risk projects. Locatelli, Mancini, and Romano (2014) proposed to replace project governance with systems governance applying systems engineering tool such as systems thinking to improve project performance in complex environments. Systems governance, like alliance governance involves partnering organizations bringing in their specific expertise and competencies in decision making for a holistic approach to addressing the uncertainty and complexity in executing megaprojects (Locatelli et al. 2014).

Mosavi (2014) related governance with roles and responsibilities, decision-making frameworks, accountability, transparency, risk management, ethics, performance, and implementation of strategy in project portfolio management. Identifying the roles of

the steering committee in portfolio governance to include communication and confirmation role, negotiation role, and decision-making role, Mosavi highlighted that portfolio steering committee meetings are not just avenues for making collective decisions. Rather, the committee could become or be used for other purposes.

The organizational perspective is about the tussle for resource allocation and top management support from the tension and trade-off between what is best for the project versus what is best for the organization considering the influential project champion usually unchallenged by team members and subordinates (Pinto & Pantanakul, 2015). Corporate strategy is open to changes and aligns with the market dynamics and external factors. Projects change and stretch organizational operations and business strategy when they belong to the locked-in category or pet project of the project champion pursuing selfish interest (Pinto & Pantanakul, 2015).

Strategies for Applying Project-Resource Assets for Performance

The effective application of project management resource assets is invaluable to sustain megaproject performance (Gardiner, 2014; Kang et al., 2013; Muhammad et al., 2013; Tsaturyan & Müller, 2015). Integrating complementary practices such as project management training, leadership development, knowledge management, cost reduction, and building innovation capability, can add value to delivering successful megaprojects (Gardiner, 2014). There are different requirements for megaproject management competence profiles for various types of megaprojects (Miterev et al., 2016). Managers improve project performance aligning front-end planning with risk assessment, and

integrating planning for constructability, change management, and flawless start up (Kang et al., 2013).

Strategies for Developing Project Capability

Davies and Brady (2016) observed that developing project capability in a permanent organization that manages multiple projects requires embedding the experience, capabilities, and memories of the past projects in the permanent organization to be available to project members. Learning and project capability building is possible in standalone interorganizational projects if members form a network of enduring relationships (Davies & Brady, 2016). Understanding how projects' lessons learned contributes to knowledge assets in project organizations result in successful project outcome (Gardiner, 2014).

Project managers taking formal developmental training in project management, and establishing formal lessons learned system have a positive influence on project management competence retention (Ekrot, Kock, & Gemünden, 2016). Integrating complementary practices such as project management training, leadership development, knowledge management, cost reduction, and building innovation capability, can add value to delivering successful megaprojects (Gardiner, 2014). Emphasizing on reflective learning, Jergeas and Rasmusani (2015) recommended educational curriculum for developing the critical thinking faculty of future project managers to gain the right mentality for dealing with project complexities. Other improvements for the educational curriculum of future project managers include developing softer skills such as

interpersonal and leadership skills different from technical skills and exposing newcomers to real-life projects to gain relevant experience (Jergeas & Rasmusani, 2015).

Organizations need to embed useful project management improvement initiatives contingent on the organizational specific contexts besides designing the project manager's career path, and project management certifications (Fernandes, Ward, & Araújo, 2015). Principal organizations in need of managing their projects in-house require project management training and software solutions with characteristic functionalities specific to the organizations' resources and collaboration preferences (Stoshikj, Kryvinska, & Straus, 2014). The project management office supports clients by providing project management knowledge for formulating and resolving managerial issues for the firm to improve its project execution and organizational performance (Muhammad et al., 2013). Project-based organizations are becoming complex with the emergence of multiple project management offices (Tsaturyan & Müller, 2015). The survival of the project management offices is dependent on their ability to holistically align their services with the value perspectives of the principal (Kutsch, Ward, Hall, & Algar, 2015). Service firms need to work closely with their principal organizations to enhance value to the principals (Stoshikj et al., 2014).

Systems thinking. The poor perception and assessment of megaproject complexity is the bane of the systems that fail to apply systems thinking processes (Loosemore & Cheung, 2015). Harvey and Stanton (2014) discussed the concept of the system of systems. The system of systems denotes the coexistence of interacting social components (system or systems' agents) and technical components (system or systems'

artifacts) recognizing the associated complexity from the multiple interfaces between the agents and the artifacts that evolve an emergent, and coherent total system's behavior (Harvey & Stanton, 2014). Harvey and Stanton explained the key challenges of the system of systems in megaproject to include sociotechnical organizational interactions, exposure to extrinsic complexity, and emergent behavior having no foreseeable plan to fulfill certain functions but the behavior evolve through interaction and collaboration within the system and subsystems (Harvey & Stanton, 2014). The challenges include unpredictability from nonlinearity of relationships between actions and outcomes, shared- understanding of roles at interfaces or boundaries between autonomous entities or subsystems (Harvey & Stanton, 2014). Other challenges include change such as from disruptive technology arising from new technology, adaptation to new practices; legacy about the sustainability of the population-wide system; and safety culture or climate (Harvey & Stanton, 2014).

Systems thinking in project management might result in more successful projects (Davis & Mackenzie, 2014). Systems thinking embedding flexibility in managing megaprojects is superior to the mainstream blueprint approach that stifles creativity. Systems approach involving flexibility of collaborating partnering organization working with bounded schedules, focusing on addressing portions of the predictable constraints of the system, and avoiding premature commitment adapting to changes and emergent situations, is superior to conventional project management (Davis & Mackenzie, 2014).

Narcissistic behaviors of individuals and teams because of their attraction to maximum rewards relegate systems thinking to the background, creating silos in the

organization. The silos inhibit collaboration, impact resource optimization and alignment with business strategy (Pinto, 2014). Other barriers to systems thinking in project teams include the inability of the project management leadership to create the project culture in which systems thinking can flourish, conflict of interest within the project team, and schedule delivery dependence (Loosemore & Cheung, 2015). The traditional confrontational approach to managing risks, resistance to change, and dearth of resources, are among the barriers that inhibit systems thinking (Loosemore & Cheung, 2015). Other obstacles include the unknown legal implications of sharing risks, and absence of external validation of existing risk management practices by certified authorities (Loosemore & Cheung, 2015).

Strategic thinking. Strategic thinking is a thought process with aids and tools originating from military organizations centuries ago providing a common reference for discussing and reviewing strategy (Moon, 2013). Strategic thinking is a dynamic process for continually reviewing missions, strategies, and operations about customers' needs and market forces (Moon, 2013). Divergent strategic thinking compared to conservative and convergent strategic planning is central to creating and sustaining competitive advantage in project contexts characterized by uncertainty and capacity for innovation (Moon, 2013).

Project Leadership Practices and Competencies

Leaders' abilities to serve are references to performance and followers' behavior (Gartzia & Baniandrés, 2015). Leaders' abilities to serve are references to the prototype expectations people have of the leaders ascribing them a measure of respect,

trustworthiness, and authority (Gartzia & Baniandrés, 2015). Followers perceive people-orientation lower in effectiveness than task-related managerial effectiveness (Gartzia & Baniandrés, 2015). The lower perception of people-orientation may diminish people-oriented leaders' opportunities to influence followers, and may also affect personnel selection and placement of most effective leaders in management positions (Gartzia & Baniandrés, 2015). Gartzia and Baniandrés proposed to prevent the setback of the paradox by promoting the idea that both dimensions of leadership are mutually exclusive, not opposing to each other and are together fundamental in boosting effectiveness.

There is a positive correlation between competence level and the obsessive passion of the project manager and a nonlinear relationship between team members' competence and a project manager's obsessive passion (Omoredede, Thorgren, & Wincent, 2013). Project managers should consider their passion and the team competence on goal challenge and goal attainment before engaging in any endeavor (Omoredede et al., 2013). When team members are overly competent, there is a tendency for the project manager to lose the unease feeling that pushes them to direct team members to attain goals (Omoredede et al., 2013).

Project leadership skills include the ability to communicate business strategy, goals, responsibility, performance, and feedback (Laufer, 2012). The project manager should be capable of leading the project team focusing on the higher purpose, leveraging partnerships/alliances in megaproject governance and inspiring passion in the team (Laufer, 2012; Luntz 2011). A good project manager can facilitate the team's motivation, team building, and conflict resolution; aligning with the business strategy, goals, and

vision of the organization (Laufer, 2012; Luntz 2011). Project managers need to challenge deeply routed ontologies, pragmatic linguistic concepts, path dependencies, and confrontational practices, perceptions and ways of thinking (Loosemore & Cheung, 2015).

Applying Luntz's winning principles in megaproject management requires selfless, intuitive, and authentic leaders as project managers (Luntz, 2011). The leaders/managers pursue perfection, are people-centered, paradigm breakers, and able to prioritize by focusing on what matters (Luntz, 2011). Applying Luntz's principles also include project managers demonstrating mastery of the acts of persuasion and persistence, never giving up. Other ways of applying Luntz's winning principles include emphasizing principled actions, not compromising on morality, humanity, and decency (Luntz, 2011).

Project context and efforts in project management training are distinctively positively associated with project success (Carvalho, Patah, & Bido, 2015; Lappe & Spang, 2014; Mir & Pinnington, 2014). Investing in developing project management methods and training for project management staff make visible the relation of project management structure with policy and strategy, and with customers and partners for improving the key performance indicators (Carvalho et al., 2015; Lappe & Spang, 2014; Mir & Pinnington, 2014).

Ryan and Tipu (2013) identified active and passive leadership dimensions and explored the relation between these leadership dimensions and innovation propensity. Active leadership has a strong and significant positive effect on innovation propensity

(Ryan & Tipu, 2013). Effective leadership behavior positively impacts individual and organizational outcomes, and organizations use leadership training and development in modifying leadership behaviors for greater effectiveness (Ryan & Tipu, 2013). Ryan and Tipu suggested caution in applying Western leadership training and development in non-western contexts. Focusing on leadership training at the individual level versus transactional/transformational construct level provides a better understanding of a variety of leadership dimensions applicable to diverse contexts (Ryan & Tipu, 2013). The temporary nature of projects in the contexts of goal clarity indicates preeminence of transactional leadership over transformational leadership (Tyssen, Wald, & Spieth 2014). However, in contemporary project management practices, favoring self-organizing and emergent leadership over the traditional blueprint practices, managers find transformational leadership more appropriate (Tyssen et al., 2014).

Ika (2015) indicated that project supervision influences project management success but may not influence project impact. A project may turn out an implementation success, but an international development failure; and vice versa but not in the short term because evaluation of the international development project outcome is only tenable in the long-term (Ika, 2015). It is possible but less likely that a poorly performing project may be receiving exemplary supervision (Ika, 2015). The project characteristics variables (such as duration, budget, and experience) collectively show nonsignificant influence on supervision.

Project managers that use Luntz's (2011) principles of winning enable effective communication in organizational change management, negotiating outcomes and

grasping the human dimension in the process. The concept relates to the leadership models of accepting the living order concept or lack of geometric order in organizations and creating and shaping the right culture for organizational change management (Laufer, 2012). Another relationship of Luntz's winning principles to leadership model is the capability in applying the principles to recognize systems' archetypes underlying project/program/portfolio complexities. Luntz's principles also relate to the leadership model for changing complex organizational system's pattern to remove limiting factors, and applying fundamental solutions rather than quick fixes or symptomatic solutions.

Project managers, applying Luntz's (2011) nine principles of winning, focus on transforming and revolutionizing processes and people for a higher order of experience. Laufer's leadership practices are transformational, and managers that deploy the practices deliver performance outcomes of efficiency and effectiveness; aligning with business strategy. Project managers with skill/mastery competency in Luntz's principles of winning do better apply Laufer's leadership practices.

Laufer (2012) provided case study examples demonstrating the use of project leadership principles in developing collaborative relations, fostering alliances, and empowering self-confidence in the workforce. Applying Laufer's (2012) examples, project managers, as change agents should first drop the traditional approach to project management and then embrace system thinking. Locatelli, Mancini, and Romano (2014) suggested application of the concept of systems governance to replace project governance, and Lewis, Andriopoulos, and Smith's (2014) proposed leveraging strategic agility in project management.

Strategic leadership. Strategic leadership in megaproject is about project managers implementing strategic activities to achieve and sustain competitive advantage consistent with the business strategy conceived at corporate or business unit level (Laufer, 2012). Business strategy is about organizations matching external environment and its internal structures and resources (Mitchell, Nielsen, Nørretlit, & Nørretlit, 2013).

Strategy management involves evaluating and controlling the tension between the concept of an outside-inside match to competitive design reacting to market forces and inside-out design leveraging organizational capabilities and resources (Mitchell et al., 2013). Strategic leadership practices involve nonroutine interventions different from operational practices that are about routine interventions (Laufer, 2012). Examples of strategic practices include questioning the status quo challenging current ways of doing things encouraging divergent views, anticipating and navigating complexity beyond planning and monitoring activities (Laufer, 2012; Schoemaker, Krupp, & Howland, 2013). Other examples of strategic practices include thinking outside the box leveraging creativity in addressing complexity, shaping the right culture of teamwork, collaboration, mutual trust and responsibility for results respecting and not neglecting or ignoring cultural differences (Laufer, 2012). Schoemaker et al., (2013) identified other strategic leadership skills such as the ability to interpret, decide, align, and learn to navigate complexities.

Strategic leaders are vigilant and can scan the environment for signals of change (Schoemaker et al., 2013). Strategic leaders can make tough calls in situations of incomplete or information overload; are adept at finding common grounds in pursuing

buy-in with stakeholders, and are the focal point for organizational learning (Schoemaker et al., 2013). Schoemaker et al. (2013) provided a strategic aptitude test for individuals to check their strategic leadership potential. In the modern organization, the characteristics of strategic leadership, include employees enjoy a measure of autonomy, self-control, and self-organization (Malewska & Sajdak, 2014). Employees have a sense of purpose in their careers from the potential for them to emerge as leaders at various levels in diverse operating units (Malewska & Sajdak, 2014). Employees are versatile and have a wide range of skills. The leadership style is management by collaboration and leadership is willing to form self-improving teams sensitive to change (Malewska & Sajdak, 2014). Individuals and teams rely on common vision rooted in core values possessing a sense of responsibility for own actions (Malewska & Sajdak, 2014).

Strategic agility. Strategic agility is a leadership skill for responding to internal and external project dynamics, applying soft skills while identifying and leveraging opportunities and threats in complex, uncertain contexts (Lewis, Andriopoulos, & Smith, 2014). Strategic agility involves the effective tradeoff between competing strategic demands, weighing the paradox effect of the tension between change and stability, strong commitment and flexibility, and supporting both individual and team creativity (Lewis et al., 2014). Strategic agility is a state of instantaneous compromise integrating coexisting contradictory options for a common solution, leveraging aspects of the opposing elements for a slightly revised objective (Lewis et al., 2014). Strategic agility is about managing paradox, seeking alternatives, and leveraging novelty, creativity, learning, and long-term sustainability (Lewis et al., 2014). Project managers should assume the project leadership

role by leveraging strategic agility or paradoxical leadership as a balancing endeavor requiring interactive thinking, accommodating opposing concepts/perceptions, issues, and demands in reaching innovative, creative solutions (Lewis et al., 2014). Lewis et al.'s (2014) recommendations included encouraging leaders to seek proactively strategic tensions and synergistic potentials from the understanding of paradox in addressing competing demands.

Knowledge management. Understanding the importance of tacit knowledge sharing in project management is an important strategy for delivering successful megaprojects (Gardiner, 2014). A learning response renews dynamic capability enabling improvement in megaproject delivery capability. The preponderance of the positive influence of the acquisition and transfer of knowledge from lessons learned (from completed projects) is contingent on the project management maturity levels within the organization (Besner & Hobbs, 2012; Todorović, Petrović, Mihić, Obradović, & Bushuyev, 2015). Project management maturity is a reflection of the level of organizational support for project management practice and availability of competent personnel (Besner & Hobbs, 2012). Aramburu et al. (2015) ranked having an explicit organization-wide shared innovation strategy higher than hiring, having professional development policies, and having support from the external structure. Todorović et al. (2015) validated the hypothesis that implementing project success analysis can contribute to knowledge in the project environment.

Organizational culture affects managerial trustworthiness behaviors (Wiewiora, Murphy, Trigunaryah, & Brown, 2014). Managerial trustworthiness behavior is the

project team's emergent behavior resulting from the perception of the project manager's trustworthiness (Wiewiora et al., 2014). Knowing how knowledge sharing affects managerial trustworthiness behaviors and stakeholders' relations, in project management, is necessary for delivering successful megaprojects (Wiewiora et al., 2014). Also, implementing knowledge leadership enhances organizational performance (Yang, Haung, & Hsu, 2014).

Knowledge management theory. The theory of knowledge management is sharing knowledge, leveraging intellectual capital, focusing on the exchange of ideas and experiences, and encouraging the questioning of established patterns (Aramburu et al., 2015). Intellectual capital is the embodiment of tacit knowledge and codified knowledge residing within individuals, and organizational structures distinguishable into human and structural capital (Aramburu et al., 2015). Muhammad et al. (2013) distinguished between explicit knowledge and implicit knowledge. Explicit knowledge is same as codified knowledge, disseminated using knowledge assets such as organizational standards and documents (Muhammad et al., 2013). Implicit knowledge is same as tacit or foreknowledge, which is knowledge-in-practice residing in human minds, and not stored in a database because the individuals that possess this instinctive knowing are unaware of it (Muhammad et al., 2013). Muhammad et al. defined project management knowledge as tacit knowledge emerging from all forms of knowledge including tacit knowledge itself.

Knowledge interaction includes socialization, externalization, combination, and internalization (Aramburu et al., 2015). Whereas knowledge socialization involves tacit

to tacit knowledge interaction, knowledge externalization takes place in the process of creating explicit knowledge or documentation, interacting from tacit to explicit knowledge (Aramburu et al., 2015). Knowledge combination is the conversion of explicit knowledge to another form of explicit knowledge, but knowledge internalization involves learning by practice from codified source or conversion from explicit to tacit knowledge (Aramburu et al., 2015).

Elbanna (2015) examined how project environment influences intuition and whether reflexivity mediates the link between intuition and project outcomes. Reflexivity is cognitive/tacit information processing (Elbanna, 2015). Competition uncertainty and environmental complexity are determinants of intuition; intuition promotes team reflexivity that in turn enhances project outcomes (Elbanna, 2015). The intuitive approaches in planning projects and team reflexivity are complementary bases for improving different aspects of project performance (Elbanna, 2015).

Innovation thinking strategies. Innovation is about adding value using new knowledge emerging from the interaction of tacit knowledge and explicit knowledge (Aramburu et al., 2015). Understanding innovation type and the requirements of the components of intellectual capacity supports innovation success (Aramburu et al., 2015; Dumay et al., 2013). Altindag and Kösedagi (2015) indicated a positive relationship between a manager's emotional intelligence, innovative organizational culture, and employee performance. Doroodian, Ab Rahman, Kamarulzaman, and Muhamad (2014) developed a four-dimensional innovation capacity construct including knowledge and

technology management, idea management, project development, and commercialization capabilities for measuring innovation capacity of organizations.

Innovative thinkers overcome an organization's innovation-stifling culture by developing responsive, self-responsible, and self-organizing people, enabling flexibility in governance and a measure of autonomy and authority at the project level, and flexible structures and mindsets at the organizational level (Müller, Pemsel, & Shao 2014). Strategies for managing creative thinking in megaprojects include the Luntz (2011) nine principles that exemplify the philosophy, strategy, and language of winning. Individuals managing megaprojects or program portfolios need to learn and practice using Luntz's nine principles to skill/mastery level competence. Organizations should include skill/mastery competency of the nine principles in the company-wide competencies and frameworks for individuals in megaprojects management.

Strategies for Managing Stakeholders in Megaprojects

Strategic stakeholders affect project management whereas implementing a project affects moral stakeholders; and same individuals or group could be either strategic or moral stakeholders (Beringer, Jonas, & Kock, 2013). McKenna and Baume (2015) presented using concepts based on the pragmatic theory of knowledge and idea mapping to think and categorize stakeholders and reveal the underlying linguistic views. Using the stakeholder network analysis, apart from identifying the position of individual stakeholder in the network, provides an opportunity for uncovering the interrelationships between stakeholders' issues facilitating assessment of stakeholder influence and improving decision-making (Mok, Shen, & Yang, 2015).

The project manager should be capable of leveraging soft skills addressing the interface shortcomings between partners in projects (Bosch-Sijtsema & Henriksson, 2014). Aaron and Dvir (2007) advised project managers to adapt to the context and the people involved in the execution of megaprojects rather than expecting the people and the context to adapt to project managers. The owner/developer and the construction/project management groups get more involved than the designer group in the project planning process (Heravi et al., 2015). Engaging the EPC contractor at the beginning of a project is desirable as in the integrated project delivery approach.

There could be a lack of support from the management of the base organization notwithstanding their awareness of the cultural and legal content of the local requirements, codes and standards that should shape their understanding of what should be the role of the management of the base organization (Aarseth et al., 2014). Management of organizational integration in project-to-project and project-to-organization interface is contingent on the interfaces and the integration techniques (Turkulainen, Ruuska, Brady, & Artto, 2014). Bridging the international-local gap is essential (Van Fenema, Rietjens, & Van Baalen, 2016) for shaping the role of the management of the base organization. Even though managing stakeholder relationship is tops in every project manager's agenda, arriving at a win-win compromise situation extends beyond economic analyses to include aligning with the requirements of the in-country sociopolitical and cultural dimensions. The senior management at the center of a multinational organization may not understand or may decide to subvert a local regulation. Aarseth et al. (2014) proposed a relationship management approach for

companies handling global projects for managing external stakeholders such as local government agents and regulatory authorities, local content monitoring board, and the local industry. Applying theories fit for the practitioners' world might result in increased value creation and stakeholders' overall satisfaction (Laursen & Svejvig, 2016).

Advocating shared team responsibility, focused execution team, joint capability and structure, and the pairing of senior leadership can improve decision ownership and contractor-owner relationship (Suprpto, Bakker, Mooi, & Moree, 2015). Projects are about people and their mindsets within competing contexts and rationalities (Suprpto et al., 2015). Team-working and relational attitudes including affective trust, shared vision and objectives, open and honest communication, no blame culture, constructive conflict, social interaction and senior management commitment are invaluable themes in contractor-owner collaboration (Suprpto et al., 2015).

Strategies for Managing Adversarial Cultures in Megaprojects

Project performance success is not optimal when managers are unaware or disregard the contingent success factors for managing adversarial cultures. Adversarial cultures are cultural differences that impact knowledge management and decision-making in project delivery (Havermans, Keegan, & Den Hartog, 2015; Tompenaars & Hampden-Turner, 2012; Zidane et al., 2015). Strategies to manage adversarial cultures include respect for foreign cultures and the images these cultures use for creating coherence (Tompenaars & Hampden-Turner, 2012). The example is seeing values peculiar to foreign cultures that appear strange to us as lost attributes of our cultural heritage (Tompenaars & Hampden-Turner, 2012).

Project managers should be aware of the need to avoid imposing home culture on foreign cultures, taking note that global structures have different meanings in diverse cultures, based on the principle of inner-directedness (Tompensaars & Hampden-Turner, 2012). Project managers cannot transfer the Eiffel tower culture, guided missile or the family-style culture that work well in their respective country of origin to other cultures if the universals are foreign to the local culture (Tompensaars & Hampden-Turner, 2012). The Eiffel tower culture is typical of the task-oriented mechanistic system of management that sees employees as human resources, but the Guided Missile culture is characteristic of the problem-centered organic system, which regards employees as experts (Tompensaars & Hampden-Turner, 2012). The family-style culture emphasizes the organic system type of relationships and viewing employees as family members (Tompensaars & Hampden-Turner, 2012). Parent organizations of Eiffel Tower cultures need to learn from the Family-Style culture perspective that work does not have to be alienating, impersonal, and self-seeking (Tompensaars & Hampden-Turner, 2012). Project managers should focus on achieving cultural inclusiveness through mutual respect of foreign cultures and harnessing the differences in cultural diversity (Havermans et al., 2015). The alternative is ignoring and not taking notice of cultural differences with diverse emergent problems that could result in both loss of project performance and outright failure as in the Euro Disney example (Spencer, 1995).

Tompensaars and Hampden-Turner's (2012) work is invaluable for understanding cultural diversity in global business and megaproject delivery. Havermans et al. (2015) focused on diversity and inclusiveness, addressing the importance of managers' choosing

appropriate words because of the sensibilities of stakeholders recognizing cultural diversity. Johansson (2014) highlighted the influence of cultural differences on stakeholder behavior in the stage gate process pointing out that decisions are not necessarily rational at the decision gates.

Jugdev and Wishart (2014) presented the ideals of one-to-one interaction in mutual caring contexts. Cultural differences affect actual practice at the stage gates; is an attestation of the so what? question considering the paradox effect in practice. A paradox is the simultaneous existence of contradictory and interrelated concepts over time (Lewis et al., 2014). The paradox account of cultural differences is typical of the oil and gas industry where there are lofty ideas for addressing adversarial cultures inconsistent with actual practice.

The leader setting good communication example is best practice in planning and executing stakeholder engagements because the communication approach influences sense making, decision, and desired actions (Havermans et al., 2015). Leaders that are aware of organizational cultural sensibilities can shape responses focusing attention on specific threats, indicating steers of a new direction, and encouraging the stakeholders to adopt desired behaviors notwithstanding the relational conundrums of In-groups and Out-groups behavioral tendencies (Havermans et al., 2015). A leader's language appropriateness, when talking about outsiders, impacts the project team's disposition and framing of the outsiders (Havermans et al., 2015). It is important for leaders to strive at mobilizing both the insiders and the outsiders using the appropriate language that cocreates identity, paves the way and enhances collaboration of the different groups,

within and outside, across the organization (Havermans et al., 2015). Leaders can also bridge differences without reducing them, emphasizing the value of conflicting perspectives and highlighting group differences that bring the group together using their mutual relationships (Havermans et al., 2015).

Taylor (2014) used organizational culture to provide insight into the paradox between attainments of actual versus intended organizational performance goals. The individualistic, egalitarian, and hierarchic cultures respectively align with incentive structures, performance dialogue, and professional corpus of the organization as the best-fit performance management (Taylor, 2014). Organizations that focus only on one level of organizational culture to address performance management fail in achieving the desired outcome (Taylor, 2014). Also, changes in one level can affect another and impact the use of performance information (Taylor, 2014). Organizations that structurally align with information requirements of strategy implementation are more agile and efficient in implementing a new strategy (Kaiser, El Arbi, & Ahlemann, 2015).

Strategies for Managing Collaboration in Megaprojects

Managing collaboration is about creating a climate that enhances teamwork. A climate that enhances communication and cooperation with vendors is critical to the success of large-scale projects (Hannevik, Lone, Bjorkli, & Hoff, 2013). Teamwork is a desirable organizational behavior for innovation and creativity to blossom in organizations (Lloyd-Walker, Mills, & Walker, 2014). Examples of collaborative behavioral critical success factors include the culture of openness, willingness to share, and the culture of protection from blame-culture (Lloyd-Walker et al., 2014). Instituting a

no blame culture at the organizational level is imperative for innovation thinking to flourish. Developing teams for inclusiveness and effectiveness compared to efficiency focusing on both relationship and environmental-related actions versus task-related actions are examples for enabling innovation thinking in spite of cultural diversity (Northouse, 2013).

To influence team integration in construction projects Ibrahim, Costello, and Wilkinson (2015) recommended focusing on team objectives and goals, trust and respect, top management commitment, free-flow communication, and no blame culture. Ibrahim et al. (2015) also provided a framework using team formation, contractual model, teamwork principles, and operational monitoring for influencing and measuring team integration. Teams' joint capabilities, formal adoption of collaborative practices, and shared relational attitudes do not automatically result in a successful project without day-to-day managerial intervention in team working processes (Suprpto et al., 2015). Formal collaborative working arrangements such as relational contracting, partnering, and alliancing, are often taken for granted by managers not paying requisite attention to ascertaining mutual understanding and internalization of expectations of relationship and task orientations of partnering firms by the project team (Suprpto et al., 2015). This paradox reinforces why some alliances often fail to deliver desired outcomes (Suprpto et al., 2015). Project teams engaging in frequent joint risk management, team alignment and, frequent informal team building events improve collaborative practices curtailing adversarial culture (Suprpto et al., 2015).

Clan type cultures of collaboration, best in a noncompetitive atmosphere, tend to improve trustworthiness behaviors in project teams compared to the market culture of competitiveness and achievement that rank lower in supporting trusting relationships (Wiewiora et al., 2014). Whereas project managers in market cultures depend on explicit knowledge, in clan type cultures that promote social interaction; project managers can access foreknowledge of team members, and can create an innovation atmosphere that enhances performance improvement (Wiewiora et al., 2014). Cultivating the desired organizational culture enhances tacit knowledge sharing, a prerequisite for learning and performance improvement (Wiewiora et al., 2014).

Organizational and Project Citizenship Behavior

Organizational citizenship behavior relates individual discretionary and beneficial work behavior, not based on formal contracts or reward system, performed voluntarily that promotes the effective functioning of the organization (Ferreira et al., 2013). Leadership centered on developing followers' professions (developmental leadership) is more effective in promoting change-oriented citizenship behavior compared to supportive leadership that considers followers' needs in making decisions (López-Dominguez, Enache, Sallan, & Simo, 2013). Ferreira et al. (2013) demonstrated significant correlations between (a) organizational citizenship behavior and task performance, (b) project citizenship behavior and project goal achievement, and (c) project citizenship behavior and future opportunities for both the individual and the organization.

Strategies for Managing Self-interest Behaviors in Megaprojects

Narcissistic champions willingly subject organizations and project teams to projects and changes with underlying exhibitionism tendency, to draw/maintain attention for own aggrandizement (Pinto & Pantanakul, 2015). Project managers should be concerned with the self-interest behaviors and roles of project champions and other stakeholders considering the high cost of low performance (Beringer et al., 2013; Martinsuo, 2013; Mosavi, 2014). The examples of the self-interest traits include single-project mindedness (Pinto, 2014), the illusion of control bias (Kardes, Ozturk, Cavusgil, & Cavusgil, 2013), and defending a failing project based on justifications of sunk costs, the prospect theory, and the self-justification theory (Kardes et al., 2013). Other examples of self-interest behaviors include inconsequential blame culture and consequence management (Kardes et al., 2013) in organizations and project teams, and the entrenched practice of normalization of deviance (Pinto, 2014).

Single-project mindedness can affect business strategy impacting competitiveness, innovation, and sustainability (Pinto, 2014). The illusion of control bias is underestimating complexity not due to inexperience or lack of management skills (Kardes et al., 2013). The effects of sunk cost involve supporting more investment to save face and avoid losses of trust, confidence, and tarred reputation by reinforcing the arguments for the point of no return irrespective of the consequences of continuing underperformance of some megaprojects (Kardes et al., 2013). The link to the prospect theory is the determination of choices from a reference point, such as continuing investing in a failing project, acknowledging that further losses do not decrease perceived

value (Kardes et al., 2013). The blame culture and consequent management become immaterial and failing to evaluate risks rationally are taken for granted because responsible decision makers could only be exercising risk-taking or risk-averse behaviors (Kardes et al., 2013). The self-justification theory is about decision makers sticking to a failing course of action, unwilling to admit that prior decisions and spent resources were inappropriate or suboptimal, preferring to justify their behavior denying negative feedback (Kardes et al., 2013).

The normalization of deviance is the gradual processes through which unacceptable project management practices and standards have become acceptable (Pinto, 2014). The normalization of deviance represents a series of deliberative choices that become institutionalized over time. Individually, these decisions are seemingly normal but collectively militate against the likelihood of delivering a project successfully (Pinto, 2014). The normalization of deviance includes tolerance of strategic misrepresentation, willful flaws, self-interest, asymmetrical information, and differences in risks perception, timeline, clarity and accountability especially in principal-agent partnership and client/contractor relationships (Pinto, 2014). Under this circumstance, individuals end up neither challenging one another nor the self-interest behaviors of project champions and stakeholders.

Even though there is increasing emphasis on partnering, trust, and collaboration in some project organizations, the emergent pattern of organizational culture in practice is more of conflict and opportunism promoting confrontation and aggressive negotiation, fighting for power and superior position in the relationships (Pinto, 2014). Pinto (2014)

also related optimism bias, massaging the plan, and superficial risk management to normalization of deviance in planning and scheduling. Related to these are problems with perception, false manipulation, hijacking the planning process, senior management pressures in schedule-driven projects, taking sides and pitting of one project group or key project actor against another are other factors of normalization of deviance undermining the essence of corporate strategic management and governance (Pinto, 2014).

Transition

Section 1 contains the foundation of the study. The subsections include the background of the problem, the problem statement, the purpose statement, the nature of the study, the research question, and the interview questions. The other subsections of Section 1 comprise the conceptual framework, operational definitions, significance of the study, and the review of the professional and academic literature.

Section 2 contains the description of the processes for obtaining, collecting, and analyzing data. Section 3 contains an overview of the study, the presentation of the research findings, and the potential applications of the findings in business practice. Section 3 also contains the implication of improving the success rates of megaprojects on social change and the recommendations for future research.

Section 2: The Project

Section 2 contains the project outline and protocol. The headings of the subsections include the purpose statement, the role of the researcher, the participants, the research method and design, population and sampling, ethical research, data collection, data collection techniques, data instrument, data analysis, and reliability and validity. Following the outline and protocol in Section 2 is necessary for facilitating the reliability and validity of the research and the findings.

Purpose Statement

The purpose of this qualitative multiple case study was to explore the strategies that project managers used to deliver successful megaprojects. The target population included four project managers, one each from two multinational oil and gas corporations and two contracting conglomerates in Nigeria. The implication for positive social change from increasing success rate of megaprojects is an improvement in human capacity development and infrastructural additions that can facilitate economic growth in the region.

Role of the Researcher

As the researcher, I was the principal instrument for data collection. My role as the researcher involved demonstrating skill competency in asking the right questions, listening, and adapting to participant's peculiarities and situations. My role included facilitating unearthing of contradictions, and discerning when to search for additional evidence (Yin, 2014). I used ten open-ended questions in the interviews with participants as the primary data collection process (see Appendix A) following the interview protocol

in Appendix C. Review of one project's archival documents and memos from the body language and voice pitch were the additional data collection processes in the study. Observation of participants in project setting was not necessary because the multiple case study was about completed megaprojects, not under execution. I structured the interview questions to achieve data saturation by asking multiple participants the same questions to extract tacit knowledge and in-depth understanding from the participant's experience as recommended in Fusch and Ness (2015).

My experience and learning in project engineering management, backed by my professional certifications in project management earn me credibility and support my capability to carry out the research. My current professional certifications in project management include the Certified Senior Project Manager, validated by the International Project Management Association (IPMA) Level B, and the Senior Project Engineer, Level 2 Accreditation by the Shell Project Academy of the Royal Dutch Shell Company. Selection of participants will be from project managers who completed megaprojects among my acquaintances or their friends in the industry. I enlisted participants who accepted my written invitation and signed the consent form.

Implementing the data collection process, I used the interview protocol to mitigate biases and established high ethical standards for the study following Yin's (2014) recommendation. As the researcher, I followed the steps in Kemparaj and Chavan (2013) to achieve valid and reliable data collection complying with the ethical principles and guidelines for the protection of human subjects of research outlined in the Belmont Report issued by the United States' National Commission for the Protection of Human

Subjects of Biomedical and Behavioral Research (1978). To ensure data reliability, I demonstrated neutrality and trustworthiness by focusing on participants' views of actual events heeding Yin's (2014) advice.

The Walden research ethics planning worksheets were an excellent guide for identifying researchers' biases and avoiding compromising both ethical standards and the IRB requirements. In my role as a scholar-practitioner, besides committed to meeting and observing ethical standards, I evaluated the ethical concerns in the process of conducting and documenting my research, and paid attention so as not to compromise ethics in data collection, data analysis, and research outcomes in line with the recommendations in Yin (2014).

The rationale for the interview protocol was the provision of the guidelines for increasing the reliability of the research design by specifying procedures for credible data collection (Yin, 2014). Another rationale for the interview protocol was that I anticipated procedural problems and prepared for credible resolution of unfolding procedural challenges. I focused on the research design leveraging foresight, the rules of epoché, and bracketing my experience, avoiding mismatch and procedural recycling, besides checking of contrary perspectives and evidence.

Participants

I based the eligibility criteria for the study participants on Kristensen and Ravn (2015) that included a proven demonstration of in-depth experience, ability to contribute tacit knowledge, capability to cocreate knowledge with the researcher, and a comprehensive and nuanced understanding of the central research question. I chose

participants who were the project managers that delivered megaprojects in different oil and gas multinational companies (the principal organizations), and in different EPC contracting consortiums (the agency organizations) with no specific intention to explore contrasting situations. The number of project managers that participated in the research were four; one each from the four case organizations that contributed to the research.

I contacted each prospective research participant, three directly and one via the organizational gatekeeper. As a prerequisite for signing the consent form, the prospective participants received a letter containing the purpose of the research, criteria for selection of participants, data collection procedures, and data collection questions (Yin, 2014). I attached the consent form to the letters I used to recruit participants. I explained and confirmed the participants' understanding of the consent form before asking them to sign the consent form. I arranged the interview schedule outside each participant's place of work to meet individual participant's preferences for the venue. I conducted four interviews but two of them using Skype, following the advice from Redlich-Amirav and Higginbottom (2014) about using a communication technology when convenient.

The significant strategy for gaining access to participants was via the project management community across the oil and gas industry in Nigeria, and from my acquaintances over 25 years of working in the industry. Notwithstanding the privileges of special access to participants, I conformed to the practices for protecting human subjects in line with the Belmont Report. Also, I observed the requirements of working with vulnerable groups in research explained in Aldridge (2014). I complied with the official strategy for gaining access to organizations and research participants in the oil and gas

industry in Nigeria by obtaining approval via the country's Department of Petroleum Resources (DPR). Specific to my research design, the procedure involves writing the DPR indicating research topic and requesting clearance for data collection from identified oil and gas companies and associated EPC conglomerates (see Appendix B).

I followed the strategies I intended to use for a working relationship with prospective participants, which was conforming to the participants' schedules and availability for interviews from Yin's (2014) advice. In the process of the in-depth interviewing, I listened and recognized my responsibility not to interfere in the case or participants' experiences. I obtained insights into the meaning and essence of participants' experiences and shared participants' voice transcriptions and my interpretations of associated nonverbal data with the individual participants for their corroboration in line with Onwuegbuzie and Byers (2014). I explained the rights and risks associated with the research to participants, and obtained individual participant's informed consent in line with Yin (2014).

Focusing on the overarching research question, I used open-ended questions to steer the interviews with participants in line with the recommendations in Gray (2013) and Petty et al. (2012). The basis for conducting interviews using open-ended questions is focusing on predetermined areas of interests and using suitable prompts to steer the conversation within the confines of the overarching research question (Gray, 2013; Petty et al., 2012; Yin, 2014). Using open-ended interview questions involves following the direction of the participants with the potential of crossing outside the context of the overarching research question (Gray, 2013; Petty et al., 2012; Yin, 2014).

Research Method and Design

The qualitative method is appropriate for exploring the overarching research question. The research design is multiple case studies. The units of analysis include four project managers, two megaprojects, and four organizations consisting of two oil and gas multinational companies (the principal organizations) and two EPC contractor organizations in Nigeria.

Research Method

The qualitative research method is appropriate for the study because of the alignment with the purpose, and adequacy for exploring open-ended themes in complex business settings (Thamhain, 2014). The qualitative research method is adequate for gaining an in-depth understanding of complex business phenomena to improve business practice by addressing how and why descriptive research questions (Yin, 2014). Depending on the research question, other applicable research methods include quantitative and mixed methods. Quantitative research involves empirical, analytical methods for examining relationships and differences; and is inappropriate for exploring participants' views in organizational settings (Thamhain, 2014). The mixed method is a combination of both quantitative and qualitative methods. Although the mixed method is suitable for researching in-depth, multilayered problems (Yin, 2014), because I am not using the quantitative method, the mixed method is outside the scope of my study.

Research Design

I employed the multiple case study design based on the use of multiple methods for data collection. I applied open-ended questions in the interviews with participants

steering the interviews within the confines of the overarching research question. Other applicable methods that I used for data collection included reviews of archival and contemporary project documents and artifacts. Because I based the multiple case studies on two projects, commissioned between 2010 and 2014, observation of participants in the project setting was not necessary for data collection.

Other examples of qualitative research designs include narrative methodology, phenomenology, grounded theory, and ethnography. The narrative design may be biographical or oral history describing individuals' stories about an event in chronological order focusing on the individuals' life reflections (Petty et al., 2012). However, the case study involves describing the experience of more individuals or group about one or more events in no particular order asking how and why questions and involving multiple levels of analysis (Petty et al., 2012; Yin, 2014). Qualitative phenomenology involves generating the basis for a theory (Moustakas, 1994) without proclaiming the theory. In my case study, the focus was on real-life application of theory suggested in Fusch and Ness (2015), which is different from grounded theory research that is about generating a theory (Cho & Lee, 2014). In ethnography, observation is the most important method for data collection (Fusch & Ness, 2015), but in a case study, the use of observation in data collection is not mandatory.

Sample size is not a determinant of data saturation (Morse, Lowery, & Steury, 2014). To reach data saturation in qualitative research requires collecting data until there is enough information to replicate the study (O'Reilly & Parker, 2012) and further coding is not doable (Baker & Edwards, 2014). I structured the open-ended interview questions

to ask individually multiple participants the same questions to extract foreknowledge and in-depth understanding from the participants' experiences in line with Fusch and Ness (2015) until no new themes emerged.

Population and Sampling

The population for the study included project managers that delivered megaprojects in the oil and gas industry in Nigeria between 2010 and 2014. The sample size was four project managers from four different organizations. This population group was appropriate for the study because it provided the opportunity for understanding the Nigerian context of the phenomenon from a descriptive rather than interpretative process perspective (Giorgi, 2014).

The screening process for selecting cases/participants was purposeful sampling using predefined recruitment criteria based on the researcher's subjective decision-making process (Kristensen & Ravn, 2015). Also, the choice of a purposeful sampling approach for information-rich cases/participants is contingent on the relevance to the study for the in-depth and nuanced understanding of the research question, and cocreation of knowledge with the participants (Kristensen & Ravn, 2015). In Patton (1990), all sampling approaches in qualitative research may fall within the broad term of purposeful sampling because of focusing in depth on relatively small samples (Kristensen & Ravn, 2015). Patton (1990) listed 16 approaches for purposefully selecting information-rich cases including:

1. Extreme or deviant case sampling
2. Intensity sampling

3. Maximum variation sampling
4. Homogenous samples
5. Typical case sampling
6. Stratified purposeful sampling
7. Critical case sampling
8. Snowball or chain sampling
9. Criterion sampling
10. Theory-based or operational construct sampling
11. Confirmation and disconfirmation cases
12. Opportunistic sampling
13. Purposeful random sampling
14. Sampling politically important cases
15. Convenience sampling
16. Combination or mixed purposeful sampling

In the study, to achieve the desired sample, I applied the combination or mixed purposeful sampling using maximum variation sampling, critical case sampling, and criterion sampling. In using maximum variation sampling, I focused on picking project managers from four organizations who have delivered megaprojects, and possess the ability to address a wide range of variables of interest regarding adapting to project complexity for a nuanced understanding of project managers' strategies for megaproject success. The critical case sampling perspective is about choosing participants from the project managers that have delivered oil and gas megaprojects in the Niger Delta,

Nigeria. Critical case sampling will enhance transferability. Criterion sampling, which is the selection of cases that meet prior set criteria, is strong for addressing quality assurance (Patton, 1990).

Patton (1990) stated that applying the mixed purposeful sampling could ease triangulation, accommodate flexibility, address multiple interests, and facilitate the researcher's understanding of how diverse complexity factors configure in case study research. Other justifications for the selection of the mixed purposeful sampling strategy and the sampling size is the fitness with the purpose of the study, the resources available (Patton, 1990), and deepening my understanding of the research questions and constraints (Yin, 2014). Another justification for the number of participants or sample size is to have potential access to sufficient data for reaching data saturation (Umeh & Sangeeta, 2013) when participants begin to provide similar answers to the same interview questions (O'Reilly & Parker, 2012; Yin, 2014). Observing that sample size is not a determinant of data saturation as expressed by Morse, Lowery, and Steury (2014), I structured the open-ended interview questions to ask individual participants the same questions to extract in-depth understanding from their experiences until no new themes emerged (Fusch & Ness, 2015).

Ethical Research

In qualitative research involving human subjects, ethical research encompasses compliance with the informed consent process, minimization of risks to the participants, and obtaining letter of cooperation, and confidentiality agreement. I complied with the informed consent process in the Belmont Report on the ethical principles and guidelines

for the protection of human subjects of research issued by the United States' National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research (1978). I submitted for review and approval the application outlining the study's ethical research strategies to the Walden University's Institutional Review Board (IRB). The Walden University's approval number for this study is 12-05-16-0449931; the expiration date is December 4, 2017.

Potential participants completed and sign off the informed consent form (see Appendix C). Following the informed consent process, I provided potential participants the details of the study including assurance to abide by ethical principles of confidentiality. I explained the intention to use pseudo names for the participants, projects, and organizations in the study to protect the privacy and safety of individuals, the confidentiality of project teams and organizations, and pre-empt potential use of the research as legal evidence. I precluded the use of visual methods and photographic techniques in data collection, which otherwise are potential identifiers of participants' identities (Aldridge, 2014). I kept the research data to myself for confidentiality to avoid disclosing participants' identities to the third party. Other aspects of the informed consent process included providing potential participants with the details of the interview process including the aspect of electronically recording and transcribing the interviews. I informed participants of their role in transcript review to confirm the interview transcriptions for data validity and accuracy and member checking to reach agreement on the preliminary findings and deductive reasoning from the interview transcripts. I scheduled follow-up interviews to clarify disagreements. I will keep the interview records

and transcripts in the safety of my home, under lock and key for 5-years, and after that, delete all electronic data and destroy the physical data by burning.

A vital aspect of the informed consent process is the explanation to potential participants the voluntary nature of participating in the study, the procedures for withdrawing at any point in time during the study, and the description of benefits for participating in the study. There were no financial incentives to take part in the research, but there were potential competence development/refresh benefits. The procedure for withdrawing from the study involved the participant writing me a withdrawal note in any format, and I expunging from the study all data collection from the participant. However, no participant withdrew from the study.

Data Collection Instruments

The researcher is the principal instrument for data collection because of the researcher's responsibility as the channel for data collection and role in ensuring credibility, and trustworthiness (Marshall & Rossman, 2016; Yin, 2014). I deployed open-ended questions in the interviews with participants and supported the interviews with memos and the collection of archival material. Site observation was not applicable in the research because the two projects in my multiple case studies were completed and commissioned between 2010 and 2014. The basis for asking open-ended questions in qualitative interviews is defining areas of primary interest to explore and using suitable prompts to steer the conversation within the confines of the overarching research question (Gray, 2013; Petty et al., 2012; Yin, 2014). In asking open-ended questions in interviews, the researcher and the participant can diverge from target ideas, contexts, and responses

to provide further detail based on what is important to both parties even though not envisaged at the onset (Granot, Brashear, & Motta, 2012).

As the data collection instrument, I deployed the data collection instruments based on asking open-ended question in the interviews and collecting archival project data in line with the guidelines in Yin (2014) to ensure data reliability, demonstrate neutrality and trustworthiness that does not taint the participants' views of actual events. The process involved reconstructing participants' construction of reality, observing the rules of epoché, and bracketing my experience by controlling personal biases, assumptions, and attitude to avoid impacting the research negatively (Giorgi, 2014; Patton, 1990). To reach data saturation in qualitative research requires collecting data until there is enough information to replicate the study (O'Reilly & Parker, 2012), and there is no new information and codes/themes emerging (Baker & Edwards, 2014; Morse et al., 2014; Patton, 1990).

To enhance the reliability and validity of the data collection instrument, I focused on demonstrating repeatability of the operations of the study such that the data collection process in conducting the case study again, even though by other researchers, yields replicable results (Yin, 2014). The process included deploying a case study protocol to facilitate comprehensive documentation of the case study procedure and development of the case study database. The study protocol contained data and methodical triangulation techniques, transcript review, and member checking. Data triangulation is relating and comparing participants' views, project time, and space (Fusch & Ness, 2015). The methodical triangulation in the study involved connecting/correlating multiple sources of

data including (a) interview transcripts involving four participants, (b) project documentation, and (c) the memos from observing the participants' body language and tone of voice. Applying the triangulation techniques alone may lead to imprecise findings because of potential misunderstanding in data collection (Caretta, 2016).

The transcript review involves the researcher showing the interviewees their interview transcripts to examine the validity and accuracy of the data (Yin, 2014). Member checking, which is soliciting the participant's view to the preliminary findings and interpretations of the interview transcript (Caretta, 2016; Kemparaj & Chavan, 2013), clarifies any misunderstandings in data collection (Caretta, 2016). The member checking process involves the researcher interpreting the transcripts, making deductive reasoning/preliminary findings, and showing back to the interviewees to validate the accuracy of the preliminary findings, incorporating corrections from the participants, and repeating the cycle until participants agree to the researcher's interpretations and there is no need to make further changes (Fusch & Ness, 2015). Member checking provides the maximum benefit for reliability and validity of the study.

Data Collection Technique

I am the primary data collection instrument. To explore the overarching research question, I deployed open-ended questions in the interviews as the main data collection method and supported it with archival project data review. Besides using structured open-ended questions (see Appendix A) in the interviews, the data collection procedure involved making memos of participant's body language and the inferences of the voice pitch. Other aspects of the data collection that I used included making memos and

analyzing individual participant's multivoice and doublespeak to avoid unpleasant truths following the recommendations in Aveling, Gillespie, and Cornish (2015).

A weakness of the data collection method is contending with the emotional factors that may impact the recruitment of participants and the methodological discussions that in turn enhance strategies and lines of actions in qualitative research (Kristensen & Ravn, 2015). Countering the preceding weakness is the strength of the data collection technique in following the interview protocol in Appendix C to enhance emotional intelligence, disposition, and composure. Blix and Wettergman (2015) suggested an active, and not reactive, approach to the use of emotional labor to improve the quality of the data collection technique in qualitative research. Blix and Wettergren described three aspects of emotional work including strategic emotion, emotional reflexivity, and coping with emotive dissonance. Strategic emotion work involves building trusts and self-confidence (Blix & Wettergren, 2015). Emotional reflexivity is about attentiveness to a participant's emotional signals and monitoring the researcher's positions and actions (Blix & Wettergren, 2015). Coping with emotive dissonance is dealing with alienating effects (Blix & Wettergren, 2015) both during recruitment of and during interviews with participants. Another disadvantage of the data collection process is dealing with the unpredictability in participants' willingness to wholeheartedly participate in the qualitative research interviews. However, the persistence of the researcher in following up unreturned calls, sending reminders, using purposive sampling, and selling the research objective to prospective participants are the keys to the success of the data collection technique (Kristensen & Ravn, 2015). Another advantage

of the data collection procedure is the strategy for identifying and motivating participants based on mutual interests not involving a financial inducement, enhancing the value of the data collection technique as an intuitive evidence of data validity and reliability.

I started each interview by using introductory questions to establish rapport with each participant. After the initial questions, I used the open-ended questioning technique in the interviews with the participant to delve into the in-depth and nuanced understanding of the research question. Following Granot et al. (2012), there were instances when the participant and I digressed to ideas, contexts, and responses, not envisaged at the onset, which were important to us. The data collection technique also included the transcript review and member checking processes (to enhance the reliability and validity of data and research findings) that I explained in the last paragraph of the Data Collection Instruments section of the study.

Data Organization Technique

To avoid unorganized and unlabeled data, my plans for organizing the data was methodical along the lines of the participants and project settings in the principals' and contractors' organizations. Applying the guidelines in Marshall and Rossman (2016), I labelled the research audio files, memos, and reflective journals; kept backup copies of the interview transcripts, and made notes immediately after each interview. I used NVivo 11 Pro to log data according to the date, time, place, and participants' pseudonyms, which facilitated data management and analysis, including ease of revisiting of the data in line with Marshall and Rossman (2016). McClerklin (2013) used pseudonyms to indicate participants' names using the same for recording the interviews with the participants.

Observing the guidelines in Yin (2014), I will keep all raw data locked for 5 years and dispose of them by burning, and I will erase all electronic data from my personal computer and external disk memories after 5 years.

Data Analysis

Preparation for the data analysis commenced at the study design phase, involving the assembly of predefined categories from the study conceptual framework following Marshall and Rossman (2016) and Yin (2014), and I addressed the study proposition that project management challenges can impair megaproject success and business profitability. The predetermined categories or list of precodes reflect the review of the literature and the research questions. Besides using the precodes to commence the data analysis, I applied the precodes in shaping the data collection by incorporating both data triangulation and methodical triangulation as stated in Yin. The justification for preceding the data analysis with data triangulation and methodical triangulation was because the key units of analysis, which included four participants from four distinct organizations and two projects, were complex enough for reaching data saturation (Baker & Edwards, 2014). Data triangulation included correlating participants' views, project time, and space; whereas methodical triangulation was correlating multiple sources of data (Fusch & Ness, 2015), which apart from the interview transcripts included project documentation and the memos from observing the participants during the interviews.

I used the MS Word and the latest NVivo version 11 Pro for the data analysis. The data analysis involved reading each interview transcript several times, immersing in the data, and conducting data coding, compiling, identifying, refining, and reconstructing the

emergent themes of contextual meanings based on the precodes from the conceptual framework. The data analysis also involved orderly organizing and saving of the refined codes, categories, and themes and ensured their easy retrieval for analyzing subsequent interview transcripts, one after the other. The cycle of searching for and comparing categories, data coding, and identification of themes in subsequent interview transcripts continued until the last transcript, which was the fourth one in the study. Marshall and Rossman (2016) and Odemene (2013) recommended conducting data analysis and data collection in parallel, completing the data analysis of one interview transcript before conducting the next participant's interview, transcribing, and data analysis. Also, the data analysis involved examination of plausible rival explanations to the specific research question (Marshall & Rossman, 2016; Yin, 2014).

Reliability and Validity

A major difference between the quantitative and qualitative approaches to research is the assessment of the research rigor using the reliability and validity norms (Marshall & Rossman, 2016; Yin, 2014). In qualitative research the analogous criteria to reliability and validity are the dependability, credibility, transferability, and confirmability (Marshall & Rossman, 2016; Yin, 2014). The qualitative criteria are not measurable as in the quantitative research approach (Marshall & Rossman, 2016; Yin, 2014).

Using the multiple case study approach based on data from different participants (data triangulation) and different sources (methodical triangulation) involving member checking, transcript review, and ascertaining data saturation facilitated the achievement

of the research dependability, credibility, transferability, and confirmability (Marshall & Rossman, 2016; Yin, 2014). The multiple case study approach also contains the need for a series of refinement of the data categories, data coding, and emergent themes in the analysis of subsequent interview transcripts (Marshall & Rossman, 2016; Yin, 2014).

Reliability

The reliability criteria involve demonstration of the appropriateness of the research design for dependability or ability to replicate the study. Affecting the research dependability are the multiple case study processes in which the researchers' insights develop and change between the analyses of subsequent interview transcripts (Petty et al., 2012). The procedures in my multiple case studies addressed the social change contexts of two projects completed between 2010 and 2014. The audit trail showcasing how to replicate the study involved following the study routines, making notes of each decision, and the rationale behind the decision. However, as in Petty et al. (2012), I recognize that replicating the research would be problematic given the variation in the people, passage of time, and changing social contexts.

Validity

Demonstrating the study validity requires addressing the credibility, transferability, and confirmability. Applying learning from Marshall and Rossman (2016) and Petty et al. (2012), I addressed dependability in the preceding subsection (under reliability). The prerequisite techniques for facilitating the study validity included using the multiple case study approach outlined in the study and summarized under the Reliability and Validity heading.

The credibility criteria involved demonstrating that the research findings were plausible from the participants' viewpoints. The specific processes for supporting the credibility criteria included member checking and transcript review. The preconditions for the credibility criteria included the evaluation of the specific research question, and building and organizing the inquiry to be credible within the confines of the units of analysis (Hancock & Algozzine, 2011; Marshall & Rossman, 2016; Yin, 2014). Other preconditions for the credibility criteria were applying purposive selection of participants to affirm the efficacy of the interview protocol and the research questions for data collection, and applying the perspectives of the contingency theory as the conceptual framework focusing the research on project management strategies for megaproject success as the body of knowledge.

Transferability is analogous to verifying the external validity of the research findings (Marshall & Rossman, 2016). Demonstrating transferability of the research findings to similar business problems and research questions is useful for future studies, especially by others. Examples include transferring the research findings to other megaprojects' contexts such as outside the oil and gas industry in Nigeria or outside the sample population of megaproject managers. Other examples of acceptable demonstration of transferability include tying the research findings to an existing body of knowledge (Marshall & Rossman, 2016; Yin, 2014), such as the theories of knowledge management and innovation in project-based organizations. Applying the same techniques that I listed for ensuring the credibility of the research findings will facilitate transferability.

Asserting the study's confirmability and paralleling the concept of verifying the researcher's objectivity may be up to others, and suitable for future research. Given the sociopolitical changes that affect the business environment / settings / project contexts, any researcher following the study routines could confirm the findings. To facilitate confirmability, I applied my in-depth experience in project engineering to know the limits of leading the participant, and demonstrated empathy in relating participants' views. Researchers are responsible for ensuring epoché, directing personal intentionality towards perceiving, feeling, thinking, remembering, and judging participants' intentions aiming at the unadulterated interpretation of participant's in-depth understanding devoid of a researcher's personal bias and identifying / removing negative instances (Moustakas, 1994).

Transition and Summary

Section 2 contained the study outline and protocol to explore the strategies that project managers use to deliver successful megaprojects. The subsections of Section 2 included the explanations and justifications for choosing the qualitative research method focusing on the multiple case study design. The first subsection was the purpose statement. The subsequent subsections of Section 2 contained the role of the researcher, the participants, the research method and design, population and sampling, and ethical research. Other subsections of Section 2 were the data collection instruments, data collection techniques, data organization techniques, data analysis, and reliability and validity. Following the study outline and protocol in Section 2 will facilitate the reliability and validity of the research findings.

In Section 3, applying the study protocol that I described in Section 2, I reviewed and analyzed the data in the data collection, and presented the outcome of the data analysis. Section 3 also contained how applying the study findings may improve business practices, and contribute to social change. Also, I presented recommendations for actions from the study conclusions, and recommended areas for future research.

Section 3: Application to Professional Practice and Implications for Change

Introduction

The purpose of this qualitative multiple case study was to explore the strategies that project managers used to deliver successful megaprojects. All the participants in the study suggested that megaproject success is contingent on the project managers' ability to shape shared understanding of the goal and manage the solution space regardless of the complexity. Megaproject success also depends on applying optimal/remedial strategies contending with the dynamics of the business environment, deploying execution excellence, ensuring employee engagement, and achieving social performance. These findings depict the project managers' leadership roles in proactively seeking strategic tensions and synergistic potentials addressing competing demands in project delivery (Lewis et al., 2014).

Megaproject success is a factor of the ability of the project manager to skillfully steer a project, recognizing the complexity, contending interests, and the execution challenges, and tweaking the goal and solution constructs timely to optimize profitability. The findings strengthen the conceptual framework, the contingency theory that there is no single fit-for-purpose set of principles for all project contexts (Aaron & Dvir, 2007; Brown & Eisenhardt, 1997). Optimal strategies in project management are contextual (Morris, 2016) and vary with changes in the market conditions, and technology (Brown & Eisenhardt, 1997). All the participants in the study emphasized appointing project managers with commensurate skills level competency and trusting them to deliver successful megaprojects despite the internal and external controlling influences. All the

participants also indicated that project managers, of both the principal and contractor organizations, have the indisputable responsibility to deliver mega projects regardless of the complexity and contending challenges, though Badawi and Shehab (2016) observed that applying project management even in routine organizational projects is not sufficient to guaranty investment success.

Presentation of the Findings

The overarching research question was: What strategies do project managers use to deliver successful megaprojects? I used open-ended questions in the structured interviews asking individual participants the same questions. I analyzed the interview transcripts, the memos from observations of participants' body language and voice pitch, and archival project data, using NVivo 11 Pro. I derived the findings from evaluating 750 meaningful codes under 39 subthemes that I further aggregated into five emergent themes.

All four participants acknowledged the abundance of blueprint project management strategies. The documented knowledge includes project management codes and standards, procedures, and tools and techniques within the individual organizations and in international project organizations, such as the Project Management Institute (PMI), and the International Project Management Association (IPMA). All four project managers agreed that besides the blueprint knowledge, to deliver a successful megaproject the project manager should possess skills not usually taught in classrooms but acquired over the years, growing from delivering smaller and medium projects, maturing to delivering megaproject(s).

The findings contain the salient points from participants' foreknowledge (that I correlated reviewing archival project data) on the strategies the participants deployed in their megaprojects for megaproject management success. The findings from this study contain project managers' views of the definitions of success regarding megaprojects, details on the strategies and the remedial strategies used for megaproject success, and how the project managers implemented the strategies. The study findings also contained why the strategies and the remedial strategies were successful, the barriers that hindered the implementation of the strategies, and how the project managers addressed each barrier.

I grouped the findings under five themes that emerged from the data analysis. The first three themes are the project managers' views of measures of megaproject success, project managers' strategies for managing the business environment, and the project managers' strategies for achieving project execution excellence. The fourth and fifth themes are strategies for facilitating employee performance/engagement, and strategies for improving social development/performance.

The findings corroborated the project management body of knowledge from Saunders et al. (2015) that stressed the project managers' ability to unravel megaproject complexity is the key to successful megaproject delivery. The corroboration was reassuring because, several authors (Klakegg et al., 2016; Muhammad at al., 2013; Sage et al., 2014; Saunders et al., 2015) based on the high failure rate of megaprojects showed concern for the tendency towards megaprojects' underperformance. Klakegg et al. (2016) lamented the limitations of the human ability to resolve megaproject complexity.

Muhammad et al. (2013) observed that assurance of project management success appears unreal, and Saunders et al. (2015) added that there is a limit to what the project manager can do to improve megaproject performance.

Theme 1: Megaproject Success Measures

Theme 1 contained the measures of megaproject success from the participants' experience. All four participants did not differentiate between megaproject success, project execution success, and project manager's or project management success. The project managers indicated success themes measurable with the effectiveness or efficiency criteria perspectives described in Mortaheb et al. (2013) and Ika (2015) that ascribe effectiveness measures to project success/project execution success, but efficiency measures to project management success. From the effectiveness perspectives, all four participants stated that project success/project execution and project management successes involve delivery of value to the owners of the business, achieving the mandate set at the sanction gate/approval of the investment decision. Participant 1 added achieving personal professional growth to project success criteria, accentuating Khan and Rasheed's (2015) observation that every employee could have their perception of what project success is. Participant 1 said "the opportunity to develop yourself in your skills, in your experience, and so on, on top of the corporate goal, the personal development is also, a success for me as a project manager."

To Participant 2, success criteria included achieving HSE targets with minimum negative impact, meeting the quality assurance requirements, and contribution towards a bigger picture such as the company's bottom-line economic objectives. Participant 3,

representing one of the two agency organizations, described project success as delivery of overall project execution objectives, like Salazar-Aramayo et al. (2012), including meeting the profitability targets set at the bidding stage. Participant 4, the second agency representative, added “a megaproject is successful if there are no agency issues, zero incidents, and no major quality failure, because when you have a small mistake in the quality or cut corners in one aspect, it has a cascading effect.”

From the efficiency perspective, all four participants defined a successful megaproject to include delivery within cost, budget and set quality targets that Salazar-Aramayo et al. (2012) described as the traditional task related iron triangle criteria of project success. Participant 3 expanded on the iron triangle criteria of project success as meeting the project requirements, delivering within budget, the expected value, and the expected return on investment. Participant 1 extended the definition of project success to hitting the production target within the set time frame, and keeping within the parameters agreed with the society on adverse impacts. To Participant 4, success criteria included the project taking off as planned and completed within budget, and to schedule.

Krane and Olsson (2014) worried about the success factors of project management not addressing the principal’s perspective. Regarding specific project success measures from the client/owner perspectives, participant 1 stated:

Besides achieving the agreed objective at the decision gate, the project success included the successful establishment of a new hub for oil and gas production, potentially enabling the development of nearby marginal/hitherto stranded hydrocarbon assets. Other project success definitions included achieving: flawless

start-up, seamless handover to the asset operations team, and achieving high uptime beyond the design availability target. Further project success measures included growing in-house skill competencies for managing multiple interfaces, disputes from changing contract environment, labor challenges, and issues of community interferences.

Theme 2: Strategies for Managing the Business Environment

Theme 2 was the aggregation of project managers' strategies for coping with the dynamics of the business environment such as the strategies for managing the dynamics of the global economy, and proactively managing funding and cash flow challenges. Other themes for managing the business environment included managing the stakeholder relations, managing compliance with the Nigerian Content Development (NCD) Act (2010), managing security and managing HSE protection. Participant 4 stressed that the project manager should expect disruption in the project execution plans over the global market dynamics. Allen et al. (2014) observed the same concern stating that the main project success factor is the project team's ability to align with external influences. Laslo and Gurevich (2014) described material delivery failure under external control factors affecting project success. Participant 4 said:

The global economy could affect the availability of materials and some equipment used in construction that is not available locally. The original equipment manufacturer may suddenly revise the agreed delivery schedule for material or equipment module to meet other preferred priority at the expense of the project not minding the jolt on the project. This scenario happened in our project causing

delay.

Managing sudden disruptions in the project execution plan requires the project manager to provide robust contingencies in the plan such as arranging alternative sources for the supply of critical materials and construction equipment.

Participants 1 and 2 observed that in their projects, they had to address the funding gaps that resulted from the changes in the business environment. Participant 1 indicated that it is important for the project manager to confirm the project funding with all its derivatives, as the basis for the final investment decision. Participant 1 described how in the original funding structure, the members in the owner organization's joint venture contributed portions of the financing of the project until a stage when one of the partners could not provide their portion of the contributions. To address the funding bottleneck and save the project from collapsing, Participant 1 stated:

The partners in the joint venture negotiated an alternative funding approach, a carry agreement, that allowed the partners who could contribute their quota to finance the portion of the partner that could not contribute, and then recover the money later. The carry agreement model changed to the modified carry agreement later. The modified carry agreement is a financing agreement in which the international oil companies in a joint venture partnership agreed to advance loan to one partner for investing in the joint venture's project.

Participant 2, discussing issues with their project funding said:

There were occasions of failures from not probing deeply enough to ensure that the contractor is financially capable, falling into the trap of somebody getting a

job, though technically competent but not financially stable enough. The reality is that project teams underestimate megaprojects' funding. The project team underestimated the project at the initial stage to be an oil project but ended up doing a gas project that requires three to four times more money to execute than for an oil project. We worked with our existing partners to find new funding for the project over eight months, redefining the project plans and the investment proposal.

Participant 4 pointed out:

Though the funding problems that affect cash flow and project success are more with the client, both the client and the contractor must look at the issue jointly to manage the impact on the project. No matter how big the contractor is, including multinationals, all contractors need positive cash flow. Delays in payments are not unusual and break the positive cash flow impacting on successful megaproject completion.

All participants agreed that issues of interests on late payments, disruption of contractors' work plans, and standby charges associated with unplanned idle times affected the project completion. There were also instances of additional costs from contract related variations and noncontractual claims. Participant 3 explained that subcontractors' cash flow problems emanated from the high-interest rates in Nigeria, the 2009 global financial crisis, and the subcontractors refusing to borrow money to execute their scope of work.

All participants agreed some strategies that the project managers used to alleviate contractors' cash flow challenges included addressing the volatile contracting market, the

Niger Delta insecurity climate; and meeting the NCD Act (2010) in the project contract. Other strategies that the project managers used to alleviate the funding and cash flow challenges included meeting/reporting regularly and not exceeding the financial capability of the contractor. An example of how to alleviate the indigenous contractors' cash flow was involving the indigenous contractors in the project at cost premiums and bearing the indigenous contractors' additional costs. The project management team (PMT) held regular interface meetings with the joint venture partners enabling proactive engagement in support of finance related issues resolution. The PMT instituted creative financial interventions that helped the EPC contractors maintain positive cash flow especially at the peak of the 2009 global financial crisis.

Among the strategies for coping with the dynamics of the business environment were the strategies for managing stakeholders, which all four participants found invaluable for megaproject success. Participant 3 said, "Stakeholder management is a critical component of any megaproject. Usually there are lots of expectation and interests from several parties in the megaproject creating the need for skillful management of the stakeholders." All four participants stressed early involvement of both the strategic and moral stakeholders in megaprojects to facilitate their alignment to shared understanding of events, promote their participation, and commitment to providing timely support/approvals of activities. The strategic stakeholders affected the steering of the project whereas the project affected the moral stakeholders (Beringer et al., 2013). Participant 1 cautioned that some strategic stakeholders, such as the joint venture partners, are also competitors and project managers should be vigilant in sharing

information confidential to the company to the third party. Participant 3 observed that the moral stakeholder management was successful because the project team set up a dedicated team early, with the participation of the host community, to manage the moral stakeholders. The top management of the owner organization ensured the implementation of the recommendations of the stakeholder management team.

Regarding obtaining approvals, participant 1 said, “We were able to meet what the law requires, and where we could not, there were waivers, or we did something different as in training local welders to weld stainless steel.” Participant 2 raised the importance of the strategies for managing compliance with the legislation, pointing out that

There are some legislations that somebody who does not like the project can use as legal obstacles creating legal headwinds with the potential of impacting the project. An appropriate strategy for handling issues with the moral stakeholders is bringing in the NGO to assist.

Participant 2 described how he brought in the NGO to help set up two community development foundations because the project team did not have the skill set for handling such interfaces and managing it in the long run. The project manager should be capable of leveraging soft skills addressing the interface shortcomings between partners in projects (Bosch-Sijtsema & Henriksson, 2014).

About compliance to the NCD Act (2010), Participant 1 indicated that in his project, they could comply with the law. Going by the NCD Act the recommendation is to always have maximum number of Nigerians in the workforce to achieve the NCD requirement. Participant 2 explained:

The NCD Act (2010) introduced challenges involving too many Nigerian companies thinking they have a right to your work, and always at a premium, whether you like it or not. We insisted on not working with any contractor that will erode value because over 60% of the indigenous contractors we had worked with were deficient.

Participant 2 proposed a strategy to encourage the Nigerian Content Development Board to establish contractor ranking to weed out the bad ones. The key observations in dealing with the local contractors included paying cost premium to fabricate locally. The recommendation was to specify in the tender the activities for local execution, excluding schedule critical activities from the scope of the local contractors that have not demonstrated commensurate construction/fabrication capability, and planning a higher level of supervision and quality control for major items of work earmarked for local execution.

Another critical strategy for coping with the dynamics of the business environment included managing the personnel and site security. The client and contractors' personnel, and the investors may not get involved in a project that lacks adequate security cover because insecurity is a concern for everyone in the Niger Delta. All four participants agreed that project success is a function of the calibre and performance of the security intelligence, surveillance, and advisory roles in security planning and management within the main contractor scope of services. Project success is also contingent on the availability of adequate security cover and backups against the project personnel resource plan. There were significant delays caused by security issues

because of the substantial deterioration in security due to the rekindled hostilities between the Niger Delta militant activists and the government security agencies (GSA) within the project environment.

Participant 1 observed:

Following a kidnap incident, the project intensified the security approach before putting people out on site to work. The project fortified security by installing double fencing around the project installations. The security strategy included deployment of the GSA with clear rules of engagement, and use of local surveillance that assisted in gathering security intelligence; within contractors' scope of supply. The GSA provided security cover and escorted all the project related movements in the waterways, on roads, and at the worksites that spanned about 50 km radius in the Niger Delta. Regarding real numbers, the cost of security was significant running into millions of US dollars but insignificant compared to the project cost.

Participant 2 stated:

Insecurity is an overarching problem in the Niger Delta because you see it happen all the time, making security cost a burden adversely affecting the Nigerian unit operating expenses. The project benefitted from the goodwill with the host community that provided human intelligence. The community surveillance liaised with the GSA to make sure the project had adequate protection.

The GSA guarded the worksites and project installations because if you do not have that, nobody will come and work for you unfortunately. Deploying

the armed government security to the worksites for safety could be an illusion because the soldiers cannot shoot anybody. We cannot afford for a soldier to kill anybody because once that happens, the investors will pull out.

However, there are cases when the GSA shot in self-defense and investors did not pull out. Also, the fear of arrest or conflict with the GSA is wisdom that are explanations of why the GSA has a place in maintaining law and order at the worksites. Participant 4 said “The project advised personnel not to venture out unescorted by the GSA and to comply with the project security plan. Combining the local human intelligence with the GSA cover/escort has worked for our organization in the past 10 years.”

I included managing HSE protection among the critical strategies for coping with the dynamics of the business environment. Participant 1 and 3 stated that HSE management was successful because of the injury-free club innovation in which members pledged to self-respect, comply, and intervene; to keep one another safe with the common purpose that nobody gets hurt on the project. Participant 1 said:

HSE management was successful because of the visible leadership commitment to HSE evident from the presence of the project leadership from the principal and contractor sides resident on the project sites that facilitated quick decision making. The introduction of the 12 life-saving rules, the reward system, and targeted campaigns enhanced the HSE management success. Other strategies of HSE management success were mandatory inductions, launch of the construction work permit used to manage concurrent operations, and involving all project personnel in the minimum standard HSE training.

The individuals occupying HSE critical positions received exclusive HSE training. The PMT communicated HSE procedures to the non-English speaking nationals by translating HSE information/messages into diverse languages, and providing English language classes weekly to the non-English speaking citizens. The project executed the various environmental impact assessment; and the environmental, social, and health monitoring plan in line with the project schedule addressing the impact mitigation measures.

Theme 3: Strategies for Managing Execution Excellence

In this subsection, the findings related to the identified themes for achieving megaproject execution excellence. The themes included the strategies for managing project governance structure, specific strategies for managing complexity, and strategies for closing the construction knowledge-gap. Other strategies for achieving project execution excellence included the strategies for ensuring scope clarity, leveraging the modular construction approach versus stick-build, change management, and the strategies for designing and constructing for ease of operability and maintainability.

Strategies for project management governance. The key findings on project governance contain how the project managers delivering megaprojects, applied project leadership principles such as systems thinking to the blueprint control structures of the organizational project management framework. The blueprint control structures illustrate the positivism conceptualization of project management (Van der Hoorn, 2015) with the limitations to human ability in dealing with project complexity (Klakegg et al., 2016). Participants 1 (from the client/principal perspective) and Participant 4 (from the

agent/contractor perspective) described the project governance structure as a hierarchy of authority with the corporate governance sitting on top of the project management, in the project management framework. The management structure allowed the top administration in the permanent organization to set guidance, steers, and provide support to the project governance.

All participants agreed to leveraging systems thinking framing smaller projects out of the complex project, and appointing focal points to manage the internal, external, and contractor relations' interfaces. Breaking down complexity into manageable components confirmed Davis and Mackenzie (2014), who recommended decomposing a project into different levels of systems with discrete boundary interfaces between distinct levels and subsystems. Participants 1 and 3 indicated that the interface matrix management team was crucial for tying all parts together, keeping the big picture in sight, and working towards the big picture. Participant 1 said:

Each one of the smaller projects had dedicated project teams with a manager at the level reporting to the megaproject manager. We took the execution of the megaprojects in bite sizes. We had the civil engineering team that did nothing else but building roads and preparing locations for oil and gas wells. We had separate teams that built the central processing facilities, the pipelines, the field logistic base, and so on; we decomposed the complexity of the megaproject by managing the smaller projects as dedicated projects.

Participant 2 indicated:

Breaking the project into smaller units, enabled us to adapt quickly when we

discovered that the project should be a gas project instead of an oil project. We could man each unit of the project at the right level with experienced people; we could cope with the vagaries, and certain aspects of the project supervision were at micro level.

Participant 4 described a situation where every one of the units in-charge in the project was focusing on their portion of the decomposed megaproject not collaborating, and not minding the interface impact to the others. Project managers should avoid (a) working in silos within bounded schedules, (b) not focusing on addressing portions of the predictable constraints of the system, (c) making premature commitment, and (d) not adapting to changes and emergent situations, which are contrary to systems thinking (Davis & Mackenzie, 2014). The interface manager picked up and addressed situations of this nature using the remedial strategy of interface management through continuous monitoring, follow up, emphasizing openness and transparency, communicating to units in-charge to discuss issues not to debate issues, to avoid putting off issues or procrastinating on issues because sooner or later it will show up. Participant 4 advised:

Proactively bring up the problem; pose it in front of your people; your second level people to reach a shared understanding of where the problem is coming from and to assess what the problem may lead to if not addressed timely. Solve it at that level and if it is more than that, get back to your management, and get back to your client to solve it. Project managers can collaborate with their peers, supervisors, and the client in processing and understanding the problem, not covering up the problem, thinking that it will solve itself. Where we need top

management support, we go for it, and we do the same when we need the client's intervention.

A remarkable strategy in the governance approach from participants 1 and 3 was the collocation on the project site of managers of the distinct smaller projects, the project supervisors (from both the principal and agency organizations), and the interface managers. The project team used the strategy to facilitate systems thinking in managing the interface challenges, improving communication, sharing of resources, and sharing of best practices. Ika (2015) indicated that project supervision influences project management success. In the words of Participant 1:

Having the project management team of the company and the contractor resident on-site, full-time, allowed you to see problems that somebody in the head office will not see. You could take control of a problem as it is developing both in the places where we built plant modules or the other things we fabricated; we had senior project management personnel resident on site.

Participant 1 confirmed Rahman et al. (2013) by observing that being present physically on site to facilitate monitoring and proactively acting on issues was invaluable when spending over 4 billion USD of other people's money. Participants 1 and 4 emphasized that there is no substitute for being physically present on the project site. Rahman et al. shared a similar perspective about the importance of site supervision in construction projects because of the potential of less supervision to adversely impact budget overrun more than issues with design documentation, financial management, information and communication, labor, materials and machinery, and contract

administration.

In the hierarchical governance structure superimposing the corporate structure on the project structure, Participants 1 and 4 agreed provided specific strategies for alleviating the barriers potentially limiting the project manager from implementing his own decisions. Participant 1 explained:

The company's culture is collegial, involving many people contributing to decisions. It is difficult to expect one individual to unilaterally commit the organization financially when the CAPEX is more than 4 billion USD. The only situation when the project manager may exercise total control and commit the organization financially is in emergency cases involving prevention of a typical HSE and security incidents' escalation; where there is an imminent threat to life, injury, or loss of company property. Also, because the corporate major tenders' board sits fortnightly, if something occurs, even though not related to HSE and insecurity incidents, everybody waiting two weeks is not acceptable to consider a submission to commit the organization financially.

In support of securing timely commercial approvals as events requiring approval to commit the organization occurs, Participant 1 explained how the project team as part of the project sanction, obtained approval of the strategy involving using a dedicated project's tender board that was available for daily decision making. But the project manager communicated the decisions from this board quarterly for review/ratification to the corporate major tenders' board.

Participant 4 addressing the limits of the project manager, described the undue

interference from both the principal and agent organizations' head offices and from the representatives of the client. Participant 4 explained:

Supposing an EPC contractor is operating in Nigeria and the project manager is sitting on the project site working, keeping the project running, keeping the relationship with the client; and then there is one more individual in the foreign/head office, designated same project manager; it will never work. Imagine the fellow at the head office also, trying to keep the communication with the client, the suppliers, managing and engineering; invariably, the project is bound to fail but could still succeed if the person on the project site is the deputy project manager.

The best solution was appointing the man at the project site the project manager, and he can have his deputy running the engineering and procurement that could partly happen outside the country, but the incumbent project manager would be overseeing it and keeping the authority. It is critical that the project manager should have 100% authority and along with that 100% responsibility managing the project risks and complexity, and controlling the project in his way, with all the targets fixed. The project manager should be responsible for hiring his deputy with nobody questioning his authority.

Participant 4 decried the overinvolvement of the client representatives on almost every part of the day-to-day activity of the contractor because of the potential to impact project success adversely. Participant 4 suggested restricting the client's involvement in line with the contract terms and conditions; stating:

Although, the client is in charge; has the right to see what is happening; get involved in inspections and follow-up activities, reviewing, checking, and signing/approving activities; it is better the client does not get involved in micromanaging contractor's day to day activities.

The opposite to the undue interference in project management is the hindrances to project success of the client and contractors' functional managers not "walking the talk" that manifest from the less problem-solving attitude of the functional managers that in turn lead to over boarding of the project manager. The less problem-solving stance of the functional managers is a kind of illusion of control bias (Pinto, 2014), about underestimating complexity, not due to inexperience or lack of management skills (Kardes et al., 2013).

Further on the strategies for managing project governance was embedding the transparent commitment of the top-level management in projects, which was particularly effective for correcting poor work productivity. Participant 1 indicated that internally there was support and minimal organizational resistance. Participant 2 described top management commitment in his project mentioning the top level strategic commercial decision to sell gas as a loss leader, i.e., without a gas supply agreement that resulted in the overall project success. From the perspective of the contractor, Participant 3 stated that top management support was key because it provided the support and commitment required to steer the project. Participant 4, also describing the contractor's perspective, pointed out that his project was successful because of the top-level management presence and demonstration of keen interest in the daily running of the project activities. The

example from participant 4 was:

If people are not working with their correct efficiency and achieving planned targets, we establish what the issue is including verifying that the issue is not due to unavailability of materials, equipment failure, and so on. The supervisors table the issues in the daily meetings in which the project leader at the unit's level appoints action parties providing them timeline to implement solutions. Units in-charge bring lingering issues to the monthly meetings that a higher manager presides to establish confidence that things are moving as planned. If not, the unit in-charge presents the catch-up plan, and the higher-level manager helps along with the client to come up with the solution to the catch-up plan.

To be successful, the strategy is to sustain top management interest/commitment continuously, following up issues as they arise, against the activity's target schedule and budget within the project's overall schedule and budget ceiling. Participant 4 advised that there is no automatic solution to problems; the project team needs top management support and the client's support to solve problems.

Specific strategies for managing complexity. Also, I classified managing complexity under the theme on execution excellence. To solve specific complexity related barriers to project success, the pertinent strategies in the study findings included basing project planning on realistic schedule, managing risks and opportunities, and supervision and control. Other specific strategies for managing complexity barriers included improvement in communication and reporting, and knowledge management.

Further strategies for managing complexity related barriers included managing infrastructural challenges.

All four participants agreed that adequate project schedule was contingent on outlining the execution priorities detailing and phasing the activities, and matching resources' bundles (work packs) to the activities and the levels of the activities. Project managers avoided schedule slippages by robust front-end loading, building in risk management activities and contingencies, such as executing soil investigations prior to site selection, land/right of way acquisition, and before completing the structural and pile foundation designs in view of the changes in the subsoil within short distances in the swampy terrain of the Niger delta. Recovering from schedule slippage was contingent on the objectivity/subjectivity of the project manager in taking the responsibility in the planning of the roles of the support disciplines, vendor availability, and the timeliness/prioritization of implementing the feedback from progress monitoring/reporting at individual systems activity levels. Participant 3 stated that poor planning and unrealistic schedule requested by the client due to poor understanding of the complexity of the project were potential barriers to the project success. The project team (client and contractor) worked together to rectify the schedule leveraging the contractor's expertise, and scrutinizing to minimize lag time provisions.

All four participants advised first to understand/define/assess the nature, and complexity of the scope and the associated risks/opportunities for clarity at the commencement of the project, and continue the process at every phase of the project in the stage-gate process of the opportunity realization. The parallel activity was

understanding how to take control of the risks to realize the opportunities and avoid negative impact on the project and the organizations involved in the project. Participant 2 highlighted facing the realities of the commercial imperatives, readapting plans to suit the prevailing circumstances very quickly to save the project from failing. All four participants agreed that careful supervision of the day-to-day activities was vital in managing risks and opportunities. Participant 2 described how his organization took risks that other people usually do not take in the gas business, which was making the strategic decision to sell gas as a loss leader at first, spending money ahead of getting firm gas sales agreements.

Participant 3 informed that they combined the blueprint mechanistic strategies with the flexibility of the organic management in addressing issues with complexity; contingent on the stability of the market and the environment. Leveraging the experience and skills from executing megaprojects in the past was key to recognizing the complex nature of the EPC project, the project location, and in making considerations for the unstable economy, uncertain sociopolitical, and market environment. Applying the right contracting strategy, carrying out front-end engineering design (FEED) and detail design verification, performing verification surveys of both on-site and off-site structures, and attaching cost elements to the handover of documentation were enablers in managing complexity. Understanding the terrain in defining, designing, and locating facilities/utilities, field logistics base, and the access roads was necessary to eliminate interface challenges that otherwise impact on the project cost, schedule, and the HSE.

The risks and opportunities management strategies worked because of the project

control and assurance processes, early recruitment of the project services manager, and factoring in the risks and uncertainties in generating the project plans and cost estimates. Other reasons why the risks and opportunities management strategies worked included proactive communication to the project leaders of potential costs and schedule issues and revising the investment proposal rebasing the project costs and schedule to introduce reality. Again, the risks and opportunities management strategies worked because of the appointment of a risks coordinator at the assess phase and keeping one integrated risk register containing the range of costs and schedule uncertainties. More on why the risks and opportunities strategies worked included ensuring clarity of responsibility to the risk assignees/action owners, holding regular/monthly risks review meetings to track implementation progress and the recovery, and reporting progress monthly.

A key strategy for managing complexity included supervision and control.

Participant 1 observed that the primary project managers' strategies for project supervision and control leverage the standard project management tools of cost control to watch trends on a weekly basis. Participant 1 stated:

Take control immediately, not one month later when you get the monthly report in the office; be proactive; act immediately to prevent concerns from escalating. If you are going to do a project, you must have the right level skilled people to supervise it to make sure you get what you are paying for. I have heard things like "Oh it is an EPC contract, let the contractor do it"; if you do not supervise the contractor then you are stockpiling problems for yourself and your organization.

Participant 2 stated that certain aspects of the supervision in his project was at a

micro level, added that by manning the project at the right level with experienced people, they could cope with the project execution vagaries. Participant 3 explained that supervision was about putting in effective control processes in managing project resources and encouraging team working, regular meetings, and implementing actions, and keeping track of the actions, issues, and risks. Participant 3 stated that one of the strategies why the project was successful was the appointment of an effective project control team, set up with competent personnel empowered to carry out the full responsibilities regarding project planning, monitoring, feedback, and control. The team worked under the supervision of the project control manager who supported the project manager. Site management/physical supervision on site was a key strategy for the delivery of this magnitude of project.

The success recorded in the strategy was because of the involvement of the right human resources and procedures in the project delivery. Participant 4 highlighted that the process of supervision and control started early, right with the bidding process to ensure no gray areas, and during execution on a daily basis identifying issues, exercising control over the progress, and immediately attacking areas of concern without delay in weekly meetings. Participant 4 described how they reviewed every line of work item in the project schedule, reviewing the start date, actual start date, early start date, late start date, with the scheduler, and finding out the reason for any identified delay and taking corrective action immediately.

Participant 3 described how they identified the risks associated with complexities and eliminated them implementing strategies such as constant monitoring of the project's

key performance indicators to decipher early warning signs and proactively responding with solutions to ensure recovery and project success confirming Meng (2014). Meng linked early warning signs with problem solving and project performance in a cause-effect relationship, highlighting the importance of proactive management. Other strategies used to identify the risks from early warning signs included constant review of the contract management plan, regular communication with stakeholders, top management ownership of the implementation strategies, and top management commitment for the implementation.

Regarding the role of communication and reporting in managing complexity, Participant 2 mentioned encouraging people to be in constant communication with one another to know who they are, what the other person/team is doing, be aware of their own roles, and how the roles affects the other individual/team. Participant 2 added that communication and reporting strategies further included encouraging people to share awareness of the timeliness for implementing the individual/team roles, have awareness of the specifications, and the right execution of the roles to the approved quality standards as the project moves on. The strategies included ensuring that people inform each other of the progress of the project for the shared comfort that things are moving in the right direction by holding regular meetings, holding regular financial control sessions, and reporting regularly. On the communication and reporting strategies in managing complexity in megaproject, Participant 3 included to regularly communicate/cascade the progress in the execution plan, reevaluate the issues/opportunities in the resource plan, and facilitate/encourage team working. Participant 3 mentioned the expansion of the

information team introducing innovative communication tools later in the project execution, enhancing communication and reporting.

All four participants also agreed to the importance of managing complexity by using knowledge management, making available information generated in one phase of the project to a later phase. Poor knowledge management could affect procurement and construction work. Some formal knowledge management strategies included project documentation, lessons learned from past projects, projects' standards/codes, tools, techniques, and practices that are codified/digitalized. Discussion forums such as toolbox meetings, HSE meetings, and daily briefings are opportunities for sharing tacit knowledge.

Further strategies for managing complexity included provision of damaged or non-existent infrastructure. Participant 1 decried the lack of infrastructure and the potential of project cost overrun and schedule slippage. Participant 1 mentioned providing expensive access roads and bridges across waterways to remote areas for movement of heavy-duty equipment. To facilitate marine transportation, the project team also executed shore erosion control and jetty upgrade/re-construction projects in the location preparation package.

Strategies for closing the construction knowledge-gap. This subsection is about the execution excellence theme focusing on closing the construction knowledge gap for an EPC type project. From hindsight, participant 1 agreed to three strategies for closing the construction knowledge-gap. The first strategy involved the owner organization recruiting a proven megaproject manager early in the opportunity maturation phase, not

later than the concept selection phase, to play the role of the construction adviser. The construction adviser provides the construction input right from the front-end loading through the project definition phase, the tendering process, the preparation of the investment proposal, and the execution phase. After achieving mechanical completion, the construction adviser may join the integrated commissioning team.

The second strategy focused on addressing the omissions, excesses, and concerns in the construction packages, and the associated interfaces/dependencies in the tendering phase by hiring of a company skilled in construction to provide consultancy services to the owner organization(s). The consultancy company does not submit its own quotes for the job. The company's role could include supporting the owner organization(s) prepare the tender documents, support the project team in pretender meetings, bid clarifications/negotiations, bid qualification discussions, and bid evaluation up to the final investment decision.

The third strategy, which should be more of the concern of the contractor organizations according to Participant 4, was about insisting on the participation of the contractors' key project people in the tendering process or risk, depending on the bids from the contractors' business development people. Participant 4 emphasized involving the contractors' key project people in the tendering process, describing it as front-end loading for appropriate bidding. Involving the contractors' key project people in the tendering process could provide the assurance of no surprises during the execution if the winning contractor's project manager has regular control on the physical execution, and has met the requirements of the work. From the owner's perspective, involving the

contractors' key project people in the tendering process could facilitate joint exploration and evaluation of the bidding requirements for executing the main scope and the off-site works with all the interfaces and the dependencies. The key project people in the contractor organizations included the attested megaproject managers, the deputies, each with proven record of delivering megaproject(s), and the next lines of the supervision cadre.

Participant 4 expressed experience in cases when the scope was not clear to the client, and his organization served as a partner to the client from the project launch. Depending on the project contexts, the alliance/integrated project delivery approach where the partnering organizations work together using the open book strategy from the project inception could be adequate. However, Participants 1 and 3 opined that the EPC and the EPCM contracting approaches continue in relevance because the principal organizations considered the integrated project delivery approach fraught with agency issues and may not result in better project execution success.

Strategies for ensuring scope clarity. This subsection is about the execution excellence theme describing the project managers' strategies for ensuring scope clarity involving good front end loading, and managing off-site scope. Good front-end loading included ensuring data quality, understanding the risks and opportunities and the associated uncertainties and complexity, understanding the terrain, and incorporating verification of FEED and detail design in the tender. The strategies for managing the off-site scope involved detailing all the interconnected scope of work that are outside the main project scope to ensure the execution of the off-site scope. Project managers should

reflect on the fact that it may not be possible to commission and operate the main project scope without implementing the off-site scope. Participant 1 outlined the specific strategies for managing the off-site scope to include awarding all or chunks of the off-site scope to a specific main contractor or local contractor, or the main contractor may deploy a subcontractor to deliver the off-site work. Adding the typical transactional leadership measures such as the bonus and penalty clauses in the contract document could enhance the implementation of off-site scope. Also, project managers used the strategies for capturing and executing off-site work to minimize interface issues, schedule slippages, and cost escalations.

All four participants indicated that poor data quality may impact the engineering design with imminent damage/failure of the facilities to perform the desired function. The participants advised to use quality data in the front-end loading, not later than the select phase of the opportunity maturation. Participant 1 stressed to fully define the project upfront before tendering, ensuring no design input is on hold/unknown. Participants 3 and 4 described the perspectives of the agency organizations of front-end loading that commences right from the bidding stage, involving early planning and simulations/modelling of the works before mobilizing to the site. To contracting organizations, the emphasis was on competitive and realistic project costing, scheduling, and resourcing, and understanding all the activities in the tendering process to simplify the delivery of the actual work to maximize benefits. Participant 4 said “Front end loading is successful when you have done your bidding correctly such that during the project execution, there are no surprises.”

Leveraging the modular construction approach. A key aspect for achieving execution excellence was leveraging the modular construction approach versus the stick-build. Participant 1 observed that based on the project contexts, leveraging modularity of construction, designing out the constraints with respect to the terrain, operability/maintenance access requirements, and understanding the pros and cons compared to the stick-build approach, are invaluable strategies for successful project delivery. The modular construction approach was successful because the project team carried out land/swamp marine logistics routes' surveys to assess the transportation challenges that constrain the sizes of individual modules. Other reasons why the modular construction was successful included the implementation in parallel with the project site preparation, the off-site pre-commissioning of the completed plant modules, and reducing the commissioning and start-up duration. The modular construction strategy provided an opportunity for expediting the schedule, thereby reducing community interference and exposure to nontechnical risks.

Change management strategies. I classified the change management strategies under the execution excellence theme. Participant 1 explained how he used two types of technical change management approaches. One of the two technical change management approaches involved the project's internal change management panel of discipline engineers that sat over design changes, such as the rerouting of in-plot piping, not affecting the applicable standards. For changes pertaining to the applicable standards and quality specifications, the project team referred the change management to the corporate

engineering change management panel of senior discipline engineers to consider granting deviations.

Strategies for operability and maintainability. There were two other subthemes under the execution excellence theme. The first subtheme was designing and constructing to enhance operability and maintainability. Under the first subtheme, participant 1 cited examples such as providing access for operations and maintenance of equipment, prevention of soil erosion involving shore protection and site drainage, potentially enhancing the longevity of the jetties and structures like helipads on sand-filled locations. The first subtheme also included designing and constructing for the overall gas and oil systems' availability. The second subtheme regarding asset operations and maintenance was about ensuring that people with the right skills and training were available to operate and maintain the plant post execution and handover to the Asset operations. Other aspects of the second subthemes included exploring quality management and operations readiness related strategies.

Participant 1 described identifying the operators early in the project and training them, some at the factories that constructed the plant modules, and because some of the technology was new, some operators were trained in locations where the instrumentation and control were already in use. Participant 1 also mentioned that the operators participated in the precommissioning testing activities, factory acceptance tests, and site acceptance tests. To minimize staff turnover, the operators signed agreements after training not to leave the project until at least one to two years post start-up. Participant 2 mentioned that what worked for them was framing the project to have the

right people with the right skills, knowledge, and capacity to execute every phase of the project.

Participant 1 observed that the project quality management was successful because of the early involvement of the quality assurance and quality control personnel, and embracing of the flawless project delivery concept preinvestment decision. The strategies included setting up internal project assurance reviews, inspectors' involvement in early identification of deficiencies and defects, integrating the quality control and assurance activities of the contractor and the project teams to work together in work supervision, and alignment to effective inspection verification procedures. Some of the flawless project delivery aspects included proactivity in risk reduction that resulted in few issues with tightness, and cleanliness. Some examples of the flawless project delivery aspects included using acclimatized packaging to prevent water ingress in outdoor storage, deploying appropriate preservation techniques on site, keeping up with the build quality, and the testing of plant and equipment modules in the sites of their construction.

Operations readiness strategies. Participant 1 described the strategy of early deployment in the project of the key operations and maintenance personnel, skilled in operations readiness, operations assurance, and commissioning and start-up, to facilitate embedding operations and maintenance requirements from the detail design stage to post execution phase. Using the strategy of early deployment in the project of the key operations and maintenance personnel resulted in savings on startup duration. The personnel were responsible for applying the flaws and lessons learned database, and the assurance reviews covering operations readiness reviews, process startup audits, and

operations excellence review. The key operations and maintenance personnel were also responsible for the effective deployment of the project to asset transfer process, application of the statement of fitness and the technical integrity verification tools, effective information management, and setting up the project guarantee team that closed out the defects/punch list items. The project manager used the strategies under the operations readiness subtheme from the data analysis effectively because the megaproject achieved flawless startup and the operability criteria, complied with the asset integrity and process safety procedures, and sustained the nameplate production capacity.

Theme 4: Strategies for facilitating Employee Performance

In the fourth theme, I identified the strategies that project managers used successfully to enhance employee performance. Participants 1 and 3 stated that to maximize employee performance the project manager should facilitate employee satisfaction, clarify accountabilities, improve communication to avoid conflicts, enhance team performance, and encourage individuals to use the project to increase personal developmental opportunities. Participant 3 stated, “Human resource management is critical for efficient megaproject delivery. A team of human resource support experts managed the employee performance in the project team reporting directly to the project manager.”

Participant 4 explained:

Lack of employee performance manifests in the people showing they are not engaged enough; not equal to the tasks. The situation may be dangerous if the project management supervisory personnel and the next level management that

come in as skilled people, struggle, lack motivation, and everybody's goal is not the same.

Participant 4 described how his project team handled employee performance by addressing the workforce regularly, every fortnight, with the client's top-level management on the project participating.

Participants 2 and 4 provided remedial strategies they used to improve employee performance including building and sustaining interpersonal relationships, and strategies for managing behavioral impropriety, self-interest tendencies, issues with cultural differences, and adversarial cultural issues. All four participants agreed they could improve employee performance by engraining collaboration and teamwork in the project, managing language barriers, providing competency training, and minimizing staff turnover. Further strategies that all participants used to enhance employee performance included staff and team motivation, openness/transparency, recruiting the right people, and appointing the right project manager.

Managing interpersonal relationships. Participant 2 indicated that his project could have been a lot more successful if the relationship in the project had been smoother throughout the project, regretting how the relationship was very strained, leading to conflicts a lot of the time. Participant 2 said:

Self-interest behaviors that manifested in adversarial relationship; in wrangling and tussles, cost the project to lose one year. There is no replacement to joint evaluation of issues purely on technical merit and going for the optimal solution for the interest of the venture not just solely anyone's interest, which was how the

team dissipated a lot of effort.

Participant 4 stressed the importance of good working relationship with the client for a successful project delivery clarifying that:

If everybody's goal is not the same, from the client's top management to the last man on the contractors' workforce, to complete the project on time, on the budget, achieving the desired quality, then there is a chance that the situation could be a barrier to project success.

Managing behavioral issues. Participant 4 advised to handle behavioral issues on time; addressing the people along with the client, side by side, in regular meetings, imbibing transformational leadership principles on the workforce. Participant 1 mentioned instances of fraudulent behaviors in the team that the project management escalated to the government law enforcement agencies. It was normal to expect the risks of fraudulent behaviors when you have that number of people, above 4,000 when executing megaprojects.

Managing cultural differences. All participants agreed that people in megaprojects have different cultural backgrounds because megaprojects span cultures. Irrespective of making effort to comply with the requirements of the NCD Act (2010) regarding the local content, we still needed non-Nigerians in the workforce; more in the supervisory roles, and in the next level roles. There are Nigerian and non-Nigerian workforces working together, and the project manager must contend with the issues that emanate from cultural differences. Participant 4 emphasized:

The Nigerian workforce by nature is accommodating and demonstrate commitment to duty especially when addressed by persons with the right authority and the right understanding. There are instances when the local workforce does not regard instructions from a race or group; we address issues of this nature through interpersonal relationship and esteeming common understanding of the goal to benefit everyone and the local economy.

Participant 2 added:

Choosing a project manager who is multicultural in thinking and skillful in human relationship is invaluable in managing issues of cultural differences. The term project manager could be a misnomer; the right term should be project leader because the characteristics that a project manager should have is not manager but leader; because the key role is leadership.

Participant 2 presented another view of issues with cultural differences regarding opportunists that purposefully underestimate the project complexity, and admonished that project managers should guide against such individuals/associates. Participant 2 observed:

When there is the conception that a stakeholder is paying the money and the stakeholder's behavior portrays I am in charge attitude, irrespective of the contractual agreement, you will have adversity in the project. The conception can only work when the stakeholder is dealing with rent seekers that do not care about growing the company and growing value. This category of stakeholders get the project going, and after sucking in promoters, keep ballooning the project

dimensions escalating the cost and impacting the schedule.

The project managers' responsibilities include setting the right priorities, such as shared understanding through leadership. Participant 4 gave an example: "If shared understanding is lacking within the workforce, there are individuals that would prefer the project duration to stretch as much as possible for fear of being out of job at the end of the project at hand."

Managing Collaboration and Team Work. Participant 2 advised to organize the project management along the lines of how people do things, interacting and interfacing with one another, to be complimentary rather than conflicting to ensure that at every stage of the project, things are working along the defined path of the project delivery. Project managers eroded value and wasted creative energy infighting within the project each time there was lack of alignment in the project management on the same objective. The project manager must recruit the right people with the right mindset, all focused on one common objective of delivering the project value, forgetting individual egos, and it is difficult for human beings to do that. That was where the magic of a real project manager comes in, the ability to lead human beings, to get them, no matter how disparate/coming from different cultures, to mesh together in to one functional team; if there is anything that will kill a project, it is not having that.

To improve team work, a skillful project manager should also address the negligence issues within the governance structure involving not walking the talk, from the less problem solving attitude of the top and the functional managers in the permanent organization that lead to the over boarding of the project manager in the temporary

project organization (Participant 3). Participants 1 and 3 explained that besides the deliberate efforts of the skillful project manager to mesh the project management team eliminating infighting at all levels/units of the project organization and within the principal and contractors' domains, there were several all-day team building events. The clients, the contractors, and the workforce from the local communities in the team building events participated jointly in recreational activities; walking, jogging, and playing football; eating together and holding discussions that facilitated interpersonal relationships because people could get closer together, outside the work environment.

Managing language barrier. Participant 1 observed that language was a big issue because one of the contractors did not have English as native language. Participant 1 said:

The key personnel had to have spoken and written English ability, and aptitude.

The spoken and written English aptitude amongst key personnel was established from the beginning. Also, the project team had a program to translate English procedures to the local languages of the non-English speaking workers in the workforce; so, for instance, there were various languages on the safety board at the worksite.

Strategies for minimizing staff turnover. Participants 1, 2, and 4 agreed that workforce termination is not good for any project. When there is high staff turnover, corporate memory on the project disappears with it irrespective of the amount of documentation generated by the departed staffers. A skillful project manager avoids losing people, especially at the critical stages of the project. Besides motivating the

workers to remain in the team in line with the resource plan, Participant 1 described the type of contract that the organization signed with individuals identified early in the project to run the facility post start-up for a minimum of one to two years before these individuals may leave. Resourcing the project adequately during most of the execution phase and managing to retain the critical staff during periods of low activity was instrumental to the project success.

Training. Participants 1 and 3 described the strategy of seconding local welders to experienced construction contractors and paid for people from the project area to get the skills for welding stainless steel and high wall thickness piping. Considering that some of the technologies were new, the project sent operators identified early in the project to training on other continents where the control systems specified in the project were already in use. Some of the operators were trained in the factories that fabricated and assembled the process modules to also participate in the factory acceptance tests of the process module before transportation to project sites. The project also trained site inspectors to detect competency gaps and be able to close the gaps. Participant 4 explained that out of every 40 welders, they selected 15 to 20 from the company's list but trained about 100 first-rate welders, including people from the project area. All four participants indicated that the competency training was also a conscious effort to contribute to the development of the local construction capacity and empower the local community to acquire specialist skills.

Managing motivation. Participant 1 expressed that the project manager needed

to understand the motivations of the individuals in the project and know how to manage that; what motivated one person was not necessarily what motivated another person. The project manager needed to understand the people that work closely with them, what drove them, and how to lead them to bring out the best in them, leveraging transformational leadership over transactional leadership principles. Participant 2, stressing the importance of motivating the people in the project said:

You truly, truly harmonize, motivate the people to work together as one because at the end of the day, money you have, processes you have, procedures you have, you have all the objectives; but if you do not have the people working together in harmony towards one objective of project success, then you do not have anything. The job of the project manager is to align the entire energy of his team towards achieving the project success. The project manager must win the hearts and minds of his team so that they will do everything to achieve success.

The team should be able to feel that if I let my team down; no, it is not fun; if anyone can achieve that as the project manager, the project success could be inevitable. The project manager must possess the ability to mesh the team as one; define the skills properly making sure that emotionally they connect, and you solve the problems because they will go the extra mile every time, not to let the team down if you are a leader not just a manager.

Managing openness and transparency. Participant 1 described how he managed openness and transparency. Participant 1 said, “it was important to emphasize openness when reporting upwards, sideways, and out because unwanted situations occurred, and

keeping bad news was counterproductive". Whenever there was an undesirable situation, Participant 1 said he encouraged individuals to open up to people who should know immediately to find solutions. Otherwise the unwanted situation became troublesome when not addressed quickly. Participant 2 advised to engrain transparency and openness business ethics in the contracting processes and in the contracts. The project 2 lenders who were international institutions required demonstration of transparency exercising due diligence in all contracts, and stressed competitive bidding as the bottom line approach to selecting vendors/suppliers.

Participant 4 explained how to keep the client informed, advising to bring forward the problems the individuals were facing, discuss them, try catching up, and come back with the solutions; the client always intended to help get the solutions. Participant 4 described the strategy that his organization has used to minimize issues of lack of openness and transparency included tendering properly, and involving the project group, the deputy project manager, or project manager in the bidding process in order not to underestimate project complexity, and then involve the client when individuals run into problems not keeping the problems to themselves. The strategy included daily and weekly reviews of the project progress with the team leader/project manager, raising issues as they occur, and escalating immediately, not waiting until scheduled regular meeting, to the top management and to the client so that they can provide the solution if the solution is above the individual. Participant 4 emphasized continuous monitoring, follow up, not hiding the problems, proactively bring up the problems, trying to

understand the problems and your limits in solving the problems, and asking for help immediately, getting back to your management and the client for assistance.

Strategies for recruiting the right people. Participant 1 advised on the need to find and assemble the right people with the right skills and experience both in the owner's and the contractors' teams. It was vital to have at each level commensurate skills and experience level for every activity in the project team, starting from the project inception. It was important that the project manager can demonstrate soft skills required to deal with non-technical risks. Participant 2 explained framing his project to have the right people and the right skills, knowledge, capacity to execute every phase of the project.

By staffing the project at the right level with experienced people, Participant 2 stated they coped with the project vagaries, and certain aspects of the supervision were at a micro level. Participant 2 said, "The project manager could have all other resources right, but if the people are wrong, lacking the right skills and experience, the project will fail". Participant 1 indicated that the project interviewed contractor key personnel, noting those that were not skilled enough regarding English language proficiency in speaking, reading, and writing. Participant 1 described carefully selecting the people with the right skills and then building appropriate teams for each stage of the project. All participants agreed that in selecting the team, a key thing to keep in mind was minimizing staff turnover, which could be a barrier to project success. In the bidding process, Participant 4 advised to involve the project people right from the beginning to ensure understanding of the project complexity, and during the qualification discussions and clarification

meetings with the client. If the project people from the contractor side did not participate in the technical/legal clarification meetings, there have been huge costs and associated delays because of missing the details due to inexperience on both the owner and contractor sides.

Strategies for selecting the project manager. All four participants stated that although project management has become a profession requiring certification, their organizations were not looking for anybody's certification in appointing a megaproject manager; each organization rather looked for an experienced, technical person that had the relationship capability, the managerial insightfulness, and most of all the leadership quality. Participants 1 and 2 indicated that although project management had become a discipline, the project manager might have all the theoretical training but it was not going to work for him to deliver a megaproject if he lacks the commensurate experience. A project manager, despite his certifications, still needed to have started somewhere delivering smaller projects and growing into managing complex projects. Participant 1 said:

Before you get to the rarified atmosphere of managing megaprojects, you would have come from the US\$ 10 million, US\$ 50 million, US\$ 100 million, US\$ 500 million, and so on; what is important is track record. Having the right temperament is important because you are working with people. There are certain emotions you should be able to manage whether you are extremely annoyed; blowing up in people's face does not help, especially if you do it frequently. If you want to express anger, you must control your emotions; a project manager

must be a master of himself to successfully lead people; the key is to possess and demonstrate leadership capacity and possess exceptional soft skills.

Participant 2 added:

The project manager should be multicultural in thinking and skillful in human relationship management to skillfully manage issues of cultural differences. There are environmental lobbyists that fight every megaproject. The project manager should be skilled to contend with emotional stakeholders that fight the project.

Theme 5: Social Change Development/Performance

Theme 5 was the aggregation of project managers' typical strategies for the CSR initiatives, which are the social change development (SCD) and social change performance (SCP) schemes linked to the megaprojects in the study. Participant 1 stated that the funding of the SCD/SCP programs was significant considering the megaproject's CAPEX of over 4 billion US dollars. The typical funding ceiling for the SCD/SCP schemes to host communities because of a megaproject could be between 1.5% to 2% of the megaproject's CAPEX. Participant 1 gave examples of the SCD/SCP initiatives associated with the megaproject:

The SCD/SCP initiatives included several kilometers of electric power supply network, and construction/rehabilitation of several kilometers of asphalt and concrete road surfaces for the megaproject's neighboring communities. The SCD/SCP also included social infrastructures such as civic centers, town halls, apartments for school teachers, water schemes to neighboring communities, and scholarship awards to secondary and tertiary institutions. The megaproject team

successfully relocated the households that lived in the project's right of way to new apartments with the assistance of a non-governmental organization that also, participated in the supervision of the construction of the new apartments.

The megaproject supported two scaffolding companies in the neighboring communities in the megaproject area providing the resources used to train community youths in scaffolding that subsequently handled the scaffolding for the EPC contractors involved in the project.

Another insight behind supporting the growth in capacity of the two scaffolding companies in the neighboring communities was looking beyond the project execution for the provision of scaffolding services during operations and maintenance of the plant. Other aspects of the gains in the social performance included the launching of the HIV/AIDS awareness drama series, training of over 700 youths from the project area in various skills such as welding and fitting, scaffolding, and entrepreneurial skills development. Also, at the peak of the project, about 5000 community youths worked on the project, and about 1000 women benefitted from credit schemes.

Participant 1 explained that the project strategies for achieving the SCD/SCP initiatives were successful because of the transparency in using community representatives rather than the government personnel to supervise the SCD/SCP projects. Other reasons why the SCD/SCP was successful included the pragmatism in the engagement process involving all the social strata within the community, and the dialogue at the needs' framing stage involving the community representatives submitting

the projects/programs of their choice for execution to avoid duplications of projects/programs already implemented in the communities. Further reasons why the SCD/SCP initiatives were successful included the involvement/commitment of the senior project leadership in the engagement process, and the involvement of the megaproject in providing technical support to the SCD/SCP projects/programs. Other measures of the social development performance were from the less disruption of the project by the communities in the area compared to other projects in the region, successes in providing employment to the youth of the area, and the completion of many community projects. Participant 2 added, “The social performance was successful because the project brought in an NGO that helped set up two community development foundations and managed the interfaces that the project had no skills to set up and handle for a protracted duration.”

Applications to Professional Practice

The business leaders from the principal and the contractor organizations in the oil and gas industry, and other partnering organizations in future megaprojects, might apply the findings from the study to enhance megaproject success rates. Project managers may raise their awareness of how project managers might improve megaprojects’ success rates. Some project managers may begin to employ appropriate project management structures depending on project context and complexity. Some project managers may develop project management capability and perfect the implementation of systems thinking, strategic agility, innovative thinking and derivative project leadership principles beyond the mainstream project management practices. Project managers may refresh on the best-fit approach to managing sensibilities in megaprojects focusing on the five

themes that I described in the study findings. The first, second, and third themes include understanding the measures of megaproject successes, the strategies for managing the business environment, and the strategies for achieving megaproject execution excellence. The fourth and fifth themes include strategies for facilitating employee performance/engagement, and what constituted social development/performance because of the megaprojects.

A significant contribution of my study to professional business practice is identifying the strategies that project managers from the principal and contractor organizations used to deliver megaproject success. From my findings, business leaders may better understand how to support the project manager to achieve megaproject success. By evaluating the strategies for megaproject success from the perspectives of the client and the contractor, I potentially contributed to identifying and closing the knowledge gap, strengthening the partners in megaproject delivery to understand better what is important to each other to achieve mutual project execution success. By describing the project managers' strategies that resulted in megaproject success, my research is relevant to improved business practice. Also, by emphasizing the project manager's ability to demonstrate soft skills as a key factor in selecting the project manager, my research corroborated Lewis et al. (2014) regarding the strategic agility concept that I described in the study literature review.

My study findings are relevant to business practice because by applying the findings, project managers may improve megaproject success rates considering that project managers encounter low success rates delivering industrial megaprojects

(Rolstadås et al., 2014; Subaih, 2015). Despite the advancement in project management processes and systems, megaproject success rates have not significantly improved (Liu et al., 2014; Mir & Pinnington, 2014). Raising further apprehensions, Badawi and Shehab (2016) observed that applying project management even in routine organizational projects is not sufficient to guarantee investment success. The tendency towards megaproject underperformance is a concern to Sage et al. (2014), who stressed that there is a limit to what the project manager can do to improve megaproject performance. Nevertheless, my study findings are relevant to business practice by corroborating the body of knowledge such as Saunders et al. (2015) regarding understanding megaproject complexity as the key to successful megaproject outcomes.

Implications for Social Change

From the description of the SCD and SCP programs in theme 5 of my study findings, megaproject managers may become aware of the potential for implementing CSR and facilitate the provision of SCD/SCP initiatives to the neighboring communities of megaprojects. From the potential of increasing the success rates of megaprojects because of my study, project managers may reduce financial wastes executing megaprojects in the future, making more resources available for CSR, including funding SCD/SCP projects to the host communities. From my study findings, the contributions to social change included the creation of value inside and outside the oil and gas industry by developing indigenous construction capability, developing local labor competencies, and funding of community development projects under the CSR initiatives.

An important aspect of the contributions to social change was the involvement of all the community stakeholder interest groups in the SCP/SCD projects. Related to this was having the community representatives supervise the SCD and SCP projects rather than using government personnel. Another social change initiative was involving an NGO that helped set up two community development foundations that the project had no skills to set up and manage the interfaces for a protracted duration. The strategy provided opportunities for the project to directly impact individuals in the communities and for the local representatives of the host communities to develop project management skills. A significant aspect of the implications of social change was that the monies from the CSR funding of the SCD/SCP projects did not leave the communities because the contractors that delivered the SCD/SCP projects were from the neighboring communities while the megaproject provided the technical support. The potential derivative benefits from the CSR initiatives (i.e., the SCD/SCP projects) to the individuals and the communities might enhance growth in economic activities in the communities within the megaproject location, contributing to more employment opportunities, poverty alleviation, and reduction in crime and violence in Nigeria.

Recommendations for Action

The recommendations for action are from the five themes that emerged from the data analysis. The first theme contains the diverse perspectives of megaproject success. Themes two to five include the exploration of the project managers' strategies for managing: the business environment, execution excellence, employee performance, and social change development/social change performance. The key recommendation for

action is dissemination of the study findings to project managers of both the client and the contractor organizations involved in oil and gas megaprojects, especially in Nigeria, and to raise awareness of how the success rates of megaprojects might improve, using proven strategies that worked for project managers in previous megaprojects. Project managers may benefit from the study findings because of the emphasis on how to implement the strategies and why the strategies were successful. For projects under execution, project managers may learn from the experience of megaproject managers of the specific barriers that hinder megaproject success, the remedial strategies for each barrier, and why the remedial strategies were successful.

Project managers may learn, refresh, improve their project management skills, and use/adapt the project managers' strategies from the five themes that I presented in the study findings. Business leaders may better understand how to support the project manager to achieve megaproject success, and how the partners in megaproject delivery may know what is important to each other to achieve mutual project execution success. Business owners and project managers may gain the awareness of what constitutes social development and social performance of a megaproject, and how to replicate/adapt the concept in subsequent megaprojects.

A remarkable recommendation for action is about closing the construction knowledge-gap in megaprojects prior to the investment decision hiring a construction adviser early in the project, or hiring a company that is skilled in construction, to support the owner organization in the tendering process. The project manager of the owner organization should insist on involving the contracting firms' key project people in the

tendering process, or risk depending on bids from the contractors' business development people. For ongoing megaprojects, a significant recommendation for action is colocation on the work-site of managers of the individual components of the megaproject, the project supervisors, and the interface managers (from both the owner/client and agent/contractor organizations). In my study findings, the project team used the colocation strategy to facilitate systems thinking in managing the interface challenges, improving communication, sharing of resources, and sharing of best practices. Having the project management team of the company and the contractor resident on-site, full-time, enabled the project manager to see problems that somebody in the head office could not see.

Business leaders may find the recommendations for selecting the project manager invaluable regarding the need for the project manager to possess commensurate experience and learning based on having already delivered small- and medium-sized projects, and better still: having matured a megaproject in the past. This level of experience will provide the assurance that the project manager possesses the attitude that warrants megaproject success. One recommendation from the study findings confirmed Lewis et al. (2014) in requiring the project manager to possess the ability to understand paradox when addressing competing demands for innovative and potential compromise solutions. Another recommendation in the study corroborated Bosch-Sijtsema and Henriksson (2014) regarding the need for project managers to be capable of leveraging soft skills in addressing the interface shortcomings between partners and nontechnical risks in executing megaprojects.

From the experience of the indigenous contractors' high failure rate, a recommendation for action is to exclude schedule-critical activities in the tender for local execution from the scope of the local contractors that have not demonstrated commensurate construction/fabrication capability. The other recommendation is to implement micro supervision and a higher level of quality control for major items of work earmarked for local execution. My study contains a proposal for the Nigerian Content Development Board to establish contractor ranking based on contractor past performance.

The plans to disseminate the recommendations from the study include distributing copies of the study to the Ministry of Petroleum Resources, Department of Petroleum Resources in Nigeria. The organizations and individuals that participated in the study may use the study findings in creative ways. Other opportunities for disseminating the research results include publication in a peer-reviewed journal, presentation at project management conferences, and dissemination via training programs for project managers.

Recommendations for Further Research

My study might provide the first academic exploration of project managers' strategies for megaproject success from both the client and the contractors' perspectives in the oil and gas industry in Nigeria. Knowing that environmental and sociopolitical factors may impact the study confirmability (Hancock & Algozzine, 2011; Simon, 2011), the information received about megaprojects in the oil and gas industry in Nigeria may not apply to other industrial sectors. Similarly, considering that the boundaries the researcher sets may affect the study transferability (Hancock & Algozzine, 2011; Simon,

2011), the message received on megaprojects in the oil and gas industry in Nigeria may not be transferable to the oil and gas industries outside Nigeria. Recommendations for further research include exploring the project managers' strategies for megaproject success in other industries in Nigeria or the oil and gas industries outside Nigeria from the owner and contractors' perspectives.

Reflections

The DBA doctoral study process provided me the opportunity to explore project managers' strategies for megaproject success. My experience and learning in project engineering management spanning over 20 years, and my professional certifications in engineering and project management in the oil and gas industry, earned me the credibility to carry out the research. I deployed the multiple case studies research design because of the alignment with the purpose and the adequacy for exploring open-ended themes in complex business settings (Thamhain, 2014). I conformed to high ethical standards throughout the study in line with Yin (2014) and complied with the ethical principles and guidelines for the protection of human subjects of research in the Belmont Report.

To achieve valid and reliable data collection, I used the research protocol to avoid biases, informed participants before the interviews to guide against procedural issues, and followed the steps in Kemparaj and Chavan (2013) to focus on participants' views of actual events notwithstanding my in-depth knowledge of the topic. I applied the guidelines in Yin (2014) for neutrality and trustworthiness, leveraging foresight, the rules of epoché, and bracketing my experience. Data and methodical triangulations offered the opportunity for checking contrary views and evidence, helping me to avoid discrepancies.

Though completing the research was my professional development goal to strengthen my project management career and prepare me for further research activities, it felt good observing the enthusiasm of the study participants to contribute to knowledge creation from their vast experience and foreknowledge on the subject.

Summary and Study Conclusions

I explored the strategies that project managers used for megaprojects' success in the oil and gas industry in Nigeria, from the perspectives of the owner organizations and the contractors. I deployed the multiple case study design. The main source of data collection was from open-ended interview questions with four participants, the megaproject managers that I selected using the mixed purposeful sampling approach. I supported the interviews with the review of archival project data, and memos from the observation of participants' body language and voice pitch. Applying the mixed purposeful sampling facilitated data triangulation in line with Patton (1990) comparing the in-depth experience of four project managers, and methodical triangulation correlating multiple sources of data in line with Fusch and Ness (2015). Triangulation provided flexibility and avoidance of information incongruity exploring the relevant strategies for managing complexity in megaproject (Fusch & Ness, 2015; Patton, 1990).

The first, second, and third themes from the data analysis include the project managers' view of measures of megaproject successes, project managers' strategies for managing the business environment, and the strategies for achieving project execution excellence. The fourth and fifth themes are the strategies for facilitating employee performance/engagement, and the typical social change development and social change

performance initiatives to the neighboring communities because of a megaproject.

The conclusion from the aggregation of the pieces of evidence I collected is that megaproject success is contingent on the project managers' ability to unravel and address complexity. The participants agreed to leverage the organic management system when necessary despite the mainstream project management governance framework in the owner and agency organizations. All the participants agreed they aligned with the strategic tensions and proactively applied tradeoffs responding to the project contexts and culture. Participants stated they leveraged synergistic potentials addressing competing and some paradoxical demands.

Project managers of both the client and the contractor organizations involved in oil and gas megaprojects, especially in Nigeria; may raise awareness of how the success rates of megaprojects might improve, using the proven strategies that worked for project managers in previous megaprojects. Project managers may benefit from the study findings because of the emphasis on how to implement the strategies and why the strategies were successful. For projects under execution, project managers may learn from the experience of megaproject managers of the specific barriers that hinder megaproject success, the remedial strategies for each barrier, and why the remedial strategies were successful.

Project managers may learn, refresh, and improve their project management skills, and use/adapt the project managers' strategies that worked in previous megaprojects. Business leaders may better understand how to support the project manager to achieve megaproject success and how the partners in megaproject delivery may know what was

important to each other to achieve mutual project execution success. Business owners and project managers may gain the awareness of what constitutes social development and social performance of a megaproject, and how to replicate/adapt the concept in subsequent megaprojects.

The study could be the first academic exploration of project managers' strategies for megaproject success from both the client and the contractors' perspectives in the oil and gas industry in Nigeria. Business leaders may better understand how to support the project manager to achieve megaproject success and how the partners in megaproject may know what is important to each other to achieve reciprocal project execution success. By evaluating the strategies for megaproject success from the perspectives of the client and the contractor, I potentially contributed to identifying and closing the knowledge gap, strengthening the partners in megaproject delivery to understand better what is important to each other to achieve mutual project execution success.

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Appendix A: Interview Questions

The open-ended questions that I used in the structured interviews with participants are:

1. How would you describe a successful megaproject?
2. How do you deliver a successful megaproject?
3. Describe the strategies you used to deliver a successful megaproject.
4. How did you implement these strategies?
5. Why were these strategies successful?
6. What barriers prevented successful megaprojects?
7. How did you address each barrier?
8. What remedial strategies have you used to improve megaprojects success rates?
9. How did you implement these strategies?
10. Why were these remedial strategies successful?

Appendix B: Letter Requesting Cooperation to Carry Out Research Study

To protect individual organization's confidentiality, I wrote four letters of cooperation to the Ministry of Petroleum Resources, Department of Petroleum Resources of Nigeria, to obtain clearance to carry out my research study in four separate organizations. The following letter is the specimen Letter of Cooperation.

17 Chief Phillip Amaewhule Close,
Rumuodara, Port Harcourt, Nigeria.

Date: 21 May 2016

The University Liaison,
Ministry of Petroleum Resources,
Department of Petroleum Resources,
4 – 9 Moscow Road, P.M.B. No. 5103.
Port Harcourt, Nigeria.

Dear Sir,

Request for Cooperation to Carry Out Research Study

I am a postgraduate student of the Department of Management, Walden University, Baltimore, MD, United States of America. My research study (part of the requirements for a Doctoral degree in Business Administration) is on Project Managers' Strategies for Megaproject Success. I humbly apply for clearance to enable me to obtain the data I need for the study from (I insert the corporation's name).

The clearance will include authorization to:

1. Recruit a project manager (face-to-face using an invitation letter and a consent form) to participate in semistructured interview, conduct member checking, and review the interview transcript.
2. Grant me access to one megaproject completed between 2010 and 2014 by the identified project manager; for me to analyze the following archival project documents:
 - a) The project management framework/opportunity realization process used to deliver the project
 - b) The contract documents to help me understand and describe the contracting processes
 - c) The project's lessons learned document
 - d) The after action review of the project.
 - e) The project close out report to help me understand the organization's perception of the project success.

I am bound by the Walden University's Institutional Review Board (IRB) to treat the data collection with confidentiality. Apart from my supervisory faculty chair and committee, I may not provide the research data that I will collect to anyone without permission from the Walden University's IRB.

Yours sincerely,

Engr. Oputa, Nkenamchi Benedict

Email: Nkenamchi.oputa@walden.edu

Appendix C: Interview Protocol

1. Introduce self to participant.
2. Verify receipt and/or respond to participant's queries on concerns about the consent form.
3. Get participant's agreement/acknowledgement to recording the interview.
4. Turn on recording device.
5. Thank participant for accepting to participate in the study.
6. Start interview with question number 1; follow through to final question and asking some probing questions.
7. End interview and discuss the member checking process with participant clarifying participant's role in the member checking process.
8. Thank the participant for participating in the study.
9. Confirm the participant has contact information for follow up questions and concerns.
10. End protocol.