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Project Managers' Capacity-Planning Practices for Infrastructure Projects in Qatar

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This is to certify that the doctoral dissertation by

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Abstract

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MPhil, Walden University, 2019

MSc, University of Salford, 2015

HND, Federal Polytechnic Ede, 2008

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Management

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Abstract

Infrastructure project delays and cost overrun are caused by ineffective use of organizational skills, processes, and resources by project managers in the construction industry. Cost overrun and schedule delay in Qatari infrastructure projects have had damaging effects on the national economy by way of claims and litigation, contractual disputes, delays in dependent projects, and project abandonment. The purpose of this qualitative case study was to explore the perceptions of project managers regarding how they utilize capacity-planning practices to mitigate project schedule delay and cost overrun in government-funded infrastructure projects in Qatar. This study was framed by three conceptual models developed by Gill to outline the capacity management needs within a construction company: (a) the time horizon model, (b) the individual-organization-industry levels model, and (c) the capacity development across components model. Date were collected from semistructured interviews with 8 participants, observational field notes, and archival data regarding Qatari infrastructure project managers' experiences in capacity-planning practices. Thematic analysis of textual data and cross-case synthesis analysis yielded 5 conceptual categories that encompassed 15 themes. The conceptual categories were (a) resources to meet performance capacity, (b) knowledgeable and skillful staff, (c) short- and long-term planning strategy, (d) cost overrun issue, and (e) time management. Findings may be used to promote timely completion of infrastructure projects, which may benefit citizens, construction companies, and the economy of Qatar.

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Dedication

I want to give all glory to God for giving me the grace to embark and complete this doctoral study. I dedicate this study to my dear wife, Sarah Nkem Ojo, for her love, support, and understanding throughout this 3.5 years of not just providing a conducive environment for me to study by also sacrificing tirelessly for me to achieve this great milestone. I also dedicate this research to my daughters, Elizabeth Ebunife Ojo and Emma Ifeoluwa Ojo, for gracing my period of study with so much sunshine. Lastly, I dedicate this research to my mother, Mrs. Alice Ololade Ojo, for motivating me toward greater success and her endless prayers.

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Chapter 1: Introduction to the Study

Infrastructure project time delays and cost overrun are primarily caused by ineffective use of organizational skills, processes, and resources by project managers in the competitive construction field (Kangwa & Ebohon, 2019; Muralidhar, Jain, Srivasta, & Rao, 2018; Zidane & Andersen, 2018). Infrastructure project time delay and cost overrun is a major concern for the Qatari government; due to cost overrun and schedule delay in its recent $49 billion investment in infrastructure projects to meet future construction needs, the national economy has been compromised by way of claims and litigation, contractual disputes, delays in dependent projects, and project abandonment (Gbahabo & Ajuwon, 2017; Oyewobi, Jimoh, Ganiyu, & Shittu, 2016). Although researchers have identified the underlying factors leading to project cost overrun, there is a literature gap in how effective capacity-planning practices can mitigate infrastructure schedule delay and cost overrun (Miranda & Renneboog, 2017). At the time of this study, little was known about how Qatari project managers leading urban planning projects may be using effective capacity-planning practices to meet project goals and deadlines (Kangwa & Ebohon, 2019). Findings may be used to improve completion of projects within time and budget schedules, which would not only contribute to Qatar's economic growth and development but also increase the standard of living for citizens and residents of the country (Bjorvatn & Wald, 2018).

This chapter I summarize the background literature that led to the formation of the problem statement and present the gap in scholarly literature. I also describe the logical alignment between the problem statement, purpose statement, research question, and

conceptual framework. In addition, Chapter 1 presents the significance, assumptions, nature of study, definitions of contextual terms, limitations, scope, and delimitations of this study.

Background of the Study

Despite plethora of research on project management and project success, recent research indicated a significant increase in project failure arising from project time delays and cost overrun, primarily caused by ineffective use of organizational skills, processes, and resources by project managers in the competitive construction field (Kangwa & Ebohon, 2019; Muralidhar et al., 2018; Zidane & Andersen, 2018). Emphasizing adverse implications, Alfakhri, Ismail, and Khoiry (2018) identified schedule delay and cost overrun as the common underlying factor for most project failures. According to Kumar and Thakkar (2017), schedule delay and cost overrun often lead to diverse adverse effects on economic growth and huge financial losses. Although deviations are often inevitable owing to the uniqueness of each project, studies have indicated that adequate management can reduce the risk of schedule delay and cost overrun to the minimum (Zidane & Andersen, 2018). This can be achieved by identifying the underlying factors behind time delay and cost overrun and taking proactive actions to mitigate these factors (Gbahabo & Ajuwon, 2017; Muralidhar et al., 2018).

Scholars who have conducted investigations into the underlying causative factors of schedule delay and cost overrun have identified numerous factors that can be classified under the umbrella of inadequate management and capacity-planning. Gbahabo and Ajuwon (2017) found inadequate project and skills management to be the underlying

cause of project cost overrun in sub-Saharan African infrastructure projects and identified a research gap in project management capacity building and innovation control mechanism as an opportunity for future research. Empirical evidence indicated that unrealistic project duration is due to poor resource management for projects in the UAE; researchers recommended a change of practice for all project stakeholders (Mpofu, Ochieng, Moobela, & Pretorius, 2017).

Variation-order has been found to have a significant effect of 33.95% on cost and 29.45% on schedule overrun in educational building in Nigeria (Oyewobi et al., 2016). This significant effect was said to have a damaging impact on the overall performance of educational building projects in Nigeria, with an added effect on the education system of the country (Oyewobi et al., 2016). Emam, Farrell, and Abdelaal (2015) also found design change request and poor management to be the leading underlying factors of cost overruns in Qatar infrastructure projects. Nasser, Monty, and Heap-Yih (2016) found that the damaging effect of project cost overrun and schedule delay is detrimental to the economic growth and social status of any economy, and identified ineffective planning, inexperienced resources, poor site management, unrealistic estimates, and ineffective project control as the main underlying delay factors in Saudi Arabia.

Leadership failure, poor administrative and management practice, ineffective use of resources, and external factors are underlying causes of government project failure in developing countries such as Ghana (Damoah & Kumi, 2018). Agyekum-Mensah and Knight (2017) revealed that competence shortage, poor financial and commercial decisions, and poor risk management were leading project delay factors. Alotaibi,

Sutrisna, and Heap-Yih (2016) identified inadequate use of project management tool and technique as a major challenge faced by Saudi Arabia's construction industry. To overcome varying schedule delay and cross overrun challenges in construction projects, Adam, Josephson, and Lindahl (2017) emphasized that schedule delay and cost overrun should be addressed as types of risk in projects even though they are consequences of other risks that are as a result of internal and/or external factors. Zarei, Sharifi, and Chaghouee (2018) provided an approach for analyzing delay in complex projects by adopting semantic network-analysis and using the oil and gas petrochemical sector as a case reference.

The absence of effective capacity-planning from the managerial level down to the lowest employee is a crucial but underrecognized underlying factor for project failure. Bjorvatn and Wald (2018) indicated that the absorptive capacity of the team especially on complex projects is crucial for project management success. Bjorvatn and Wald argued that public–private partnership in the Gulf states of Qatar, Kuwait, and Saudi Arabia can be used to improve capacity, overcome financial strain on projects, and support complex infrastructure projects.

Problem Statement

Infrastructure project time delays and cost overrun are primarily caused by ineffective use of organizational skills, processes, and resources by project managers in the competitive construction field (Muralidhar et al., 2018; Zidane & Andersen, 2018). This issue is a major concern for the Qatari government because it was selected to host the FIFA World Cup in 2022 with plans to invest more than $40 billion in infrastructure

projects including a new airport, a metro system, a high-speed rail network, and 40,000 more hotel rooms (Biygautane, 2017). Qatar also plans to invest $4 billion to build nine new modular stadiums and renovate another three (Senouci, Al-Abbasi, & Eldin, 2018). This situation has raised many concerns about the Qatari construction industry's problems in term of project delays, overrun costs, and time completions (Zarei et al., 2018). Since the 1970s, the Qatari government and its cache of world-class engineers and project managers have attempted to implement urban planning to manage rapid urban growth, though with little success (Azzali & Tomba, 2018). The general problem is cost overrun and schedule delay in Qatari infrastructure projects have had damaging effects on the national economy by way of claims and litigation, contractual disputes, delays in dependent projects, and project abandonment (Gbahabo & Ajuwon, 2017; Oyewobi et al., 2016).

The abundance of energy resources has almost quadrupled the population size of the small principality of Qatar over the past two decades, which has grown from an undeveloped country of around 450,000 people in 1995 to almost 2 million in 2016 (Azzali & Tomba, 2018). Aside from the 2022 FIFA infrastructure projects, this rapid growth has produced an urgent need for Qataris to build modern urban infrastructures, resulting in massive project delays (Azzali & Tomba, 2018; Rizzo, 2014). Although researchers have identified the underlying factors leading to project cost overrun, there is a literature gap in how effective capacity-planning practices can mitigate infrastructure schedule delay and cost overrun (Miranda & Renneboog, 2017). Azzali and Tomba (2018) documented that little is known about how Qatari project managers leading urban

planning projects may be using effective capacity-planning practices to meet project goals and deadlines. The specific problem is that many project managers in Qatar assigned to lead infrastructure projects may be failing to apply effective capacity-planning practices to mitigate project schedule delay and cost overrun (Azzali & Tomba, 2018; Kangwa & Ebohon, 2019).

Purpose of the Study

The purpose of this qualitative, multiple case study was to explore the perceptions of project managers in Qatar regarding how they utilize capacity-planning practices to mitigate project schedule delay and cost overrun in government-funded infrastructure projects. A multiple case study design was used to meet the purpose of the study and collect data from multiple sources, including semistructured interviews, reflective field notes (see Merriam & Tisdell, 2015), and archival data in the form of government reports (see Yin, 2017). Data triangulation was conducted to establish trustworthiness of the study's data analysis and findings (see Guion, Diehl, & McDonald, 2011).

Research Question

How do project managers in Qatar utilize capacity-planning practices to mitigate project schedule delay and cost overrun in government-funded infrastructure projects?

Conceptual Framework

Scholars noted that a major concern facing the Qatari government is plans to invest more than $140 billion in infrastructure projects to be completed by 2022 (Azzali & Tomba, 2018; Biygautane, 2017) given that its construction industry faces significant challenges in term of project delays, overrun costs, and time completions (Zarei et al.,

2018). Little is known about how Qatari project managers leading urban planning projects may be using capacity-planning practices to meet project goals and deadlines (Azzali & Tomba, 2018; Kangwa & Ebohon, 2019). This study was framed by three conceptual models developed by Gill (2015) to outline the capacity management needs within a construction company: (a) the time horizon model, (b) the individual-organization-industry levels model, and (c) the capacity development across components model.

Gill (2015) developed three conceptual models in a single theoretical study using the initial assumption that a single strategy for capacity-planning is based on three separate pillars of the process needed to meet capacity management needs within a construction company: time horizon; individual, business, and industry levels; and components. To develop the time horizon model, the individual-organization-industry levels model, and the capacity development across components model, project management theory was used to provide a combination of tools, tasks, processes, templates, and resource planning for managing projects (Gill, 2015). Gill's three conceptual frameworks provide construction company owners and their project managers with a multitiered strategic plan to bid for bigger projects in partnership with prominent players by ensuring the necessary resource and capital before construction firms go solo on bigger projects (Daniel & Daniel, 2018), a problem often left unaddressed in the Qatari construction sector (Azzali & Tomba, 2018).

Construction companies in Qatar are also uncertain about project continuity; as a result, limited resources are engaged to manage projects that require more resources. The

time horizon model presents a short-, medium-, and long-range planning strategy that allows project managers to consider available resources against the time dimension (Gill, 2015). Gill (2015) developed the individual-organization-industry levels model to illustrate how capacity can be strengthened at an individual level, then at the organization level, and finally at the industry level. Gill wrote that each level of capacity must be strengthened using the action plan for that level. The capacity development across components model (Gill, 2015) evaluates capacity-planning on nine components: performance capacity, personal capacity, workload capacity, supervisory capacity, facility capacity, support service capacity, system capacity, structural capacity, and role capacity. These nine components are then individually and collectively assessed as to how each component enhances the other and collectively enhances capacity-planning. Construction companies can gain more capacity development experience on large commercial projects by partnering with bigger companies (Gill, 2015). A more detailed description of the conceptual framework is presented in Chapter 2.

Nature of the Study

To ensure that the method aligned with the purpose of this study and provided adequate data for the research question, the nature of this study was qualitative. In consideration of the fact that the purpose of the study required a comprehensive understanding of how project managers in Qatar utilize capacity-planning practices to mitigate project schedule delay and cost overrun in government-funded infrastructure projects, an exploratory multiple case study (see Yin, 2017) was employed. Qualitative research is used by researchers to explore a group of people's experiences living within a

given context (Cooper & White, 2012). According to Burr (2015), social constructivists tend to challenge the need for people to be more analytical with regard to their understanding of themselves and the world around them. Such understanding enhances the practice of objectivity when exploring the relationship between the individual and the corresponding environment (Gergen, 1973). Individual experience with the social group and dominant culture can be made known through the qualitative approach within the constructivist paradigm (Cooper & White, 2012).

The quantitative method was not appropriate to address the purpose of the study, which did not call for testing of statistical relationships, operationalization, or experimental variable manipulation (see Harkiolakis, 2017). Qualitative researchers explore issues in the real world in which observations are scrutinized without the use of numerical methods, data observations that are quantitatively scaled, and conclusions drawn from numerically coded data (Harkiolakis, 2017). To align with the purpose of this study, which was to explore perceptions of project managers in Qatar regarding how they utilize capacity-planning practices, a qualitative method provided a flexible approach to collect data and analyze the feedback.

A multiple case study investigation, according to Yin (2017), allows the researcher to investigate phenomena through replication strategy. Yin also noted that the multiple case design can entail an individual within a specific context as a separate unit of study. In the current multiple case study design, the study's central unit was the individual, and the context was Qatari infrastructure projects (see Eisenhardt & Graebner, 2007). The investigation was a study of individuals living within a community and not

the whole of the community itself; in a study such as this, the optimum qualitative design to retrieve data with the goal of theory building is an exploratory, multiple case study design (see Eisenhardt & Graebner, 2007). The unit of analysis in this study was the individual project manager in Qatar.

Purposeful criterion and network sampling strategy, as recommended by Bell, Bryman, and Harley (2018), was used to recruit participants for this study. The participants were screened using the following inclusion criteria: (a) adult over the age of 18, (b) 3 years continuous experience as a project manager in a Qatar infrastructure project, and (c) adequate knowledge regarding the topic of capacity-planning processes in project management. Schram (2006) noted that five to 10 participants are needed to conduct an in-depth investigation of the topic under study. I conducted eight in-depth face-to-face individual interviews through Skype with participants purposefully recruited for this study. Coding starting at the sixth interview and continued until data saturation was attained. I applied Yin's (2017) cross-case synthesis data analysis method to data collected for this multiple case study. Cross-case synthesis supports the study of convergence and divergence of participants' experiences within and between cases (Yin, 2017). I triangulated interview data themes with data from reflective field notes and government reports to enhance the trustworthiness of findings and made suggestions for further research (Guion et al., 2011).

Definitions

To avoid misunderstanding and/or misinterpretation of contextual terms used in the study, I provided the following definitions:

Building information model (BIM): An open data tool deployed by project designer and project management consultants to curtail underestimation and minimize error (Dat et al., 2018).

Capacity-planning: The process in which an organization determines its productivity and resource capacity required to meet its project needs (Gill, 2015).

Client-related work: Rework in a project as a result of client request for changes to design, specification, or modification to physical work, which brings about a change in project completion timeline or an increase in project cost (Amoatey & Ankrah, 2017).

Cost overrun: Unexpected additional cost incurred on a project that makes the project cost increase beyond its original budget (Gunduz & Maki, 2018).

Economic growth: An increase in inflation-adjusted market value of resources produced by an economy over a period of time often measured as percentage increase in an economy's gross domestic product (Hudson, 2015).

Gulf Corporation Council (GCC): The intergovernmental, political, and economic corporation council of the Arab States consisting of Qatar, Saudi Arabia, UAE, Kuwait, Bahrain, and Oman (Mohammad, 2019).

Infrastructure project: The basic physical system of a nation's transportation system, electrical system, water system, railway system, hospitals, and other publicly accessed and government-funded projects for the sole purpose of improving the standard of living of citizens and residents (Cole, 2017)

Project claim: An additional request in terms of time or cost between parties to a construction contract arising from issues not limited to delays, unforeseen circumstances, changes to project, and conflict (Dastyar, Esfahani, Askarifard, & MonirAbbasi, 2018).

Project delay: Deviation between the actual progress of a construction project and the planned schedule of the project (Rao, Shekar, Jaiswal, Jain, & Saxena, 2016).

Project failure: The inability of a project to meet the expected/purposed deliverables (Dastyar et al., 2018). Often, project failure is summarized into the project triple constraint of time, quality, and cost (Project Management Institute [PMI], 2013).

Project manager: The person assigned to lead the overall planning and execution of a project (Alvarenga, Branco, do Valle, Soares, & da Silveira e Silva, 2018; PMI, 2013).

Project management body of knowledge: This term refers to the collection of processes, best practices, terms, and guidelines introduced by the PMI and accepted as global standard within the project management industry (Daniela & Helio, 2017).

Socioeconomic development: The process of social and economic development within a society measured with indicators such as gross domestic product (GDP), life expectancy, and levels of employment among others (Local Socio-Economic Development through Community-Based Distributed Energy Resources, 2018).

Tender: The process of inviting bidders to bid for a project especially on large projects and often within a finite deadline (Zhang, Luo, & He, 2015).

Work breakdown structure: The hierarchical decomposition of project deliverables into manageable units (Zecheru & Olaru, 2016).

Assumptions

According to Armstrong and Kepler (2018), assumptions are unverified beliefs a researcher considers to be true that are beyond the researcher's control within a study. The first assumption was that participants would provide me with accurate and reliable information. This honest feedback would ensure reliability of the findings. Secondly, participation was assumed to be voluntary based on the consent form provided and was propelled by passion and possible personal and indirect gain to participants. Considering this, feedback was assumed to be accurate and reliable based on participants' understanding of the research purpose.

Furthermore, participants' direct involvement and experience were assumed to be adequate to provide reliable data for the study. Despite organizational policy, regulations, and participants' personal schedule, participation was assumed to be unrestricted. Finally, the selected data-gathering method was assumed to be adequate for participants to present detailed and comprehensive information about their work experience in relation to the research problem.

Purposeful criterion and network sampling strategy, as recommended by Bell et al. (2018), was assumed to be adequate to recruit the appropriate participants for this study. The following inclusion screening criteria were considered adequate to ensure reliability of data: (a) adult over the age of 18, (b) 3 years continuous experience as a project manager in a Qatar infrastructure project, and (c) adequate knowledge regarding the topic of study. Finally, I assumed that five to 10 participants, as recommended by Schram (2006), would adequate to achieve data saturation.

Scope and Delimitations

Research scope refers to the problem a researcher intends to study, and delimitations refer to boundaries set by the researcher (Greener, 2018). The scope of this study was perceptions of project managers in Qatar regarding how they utilize capacity-planning practices to mitigate project schedule delay and cost overrun in government-funded infrastructure projects. The participants were recruited from a population meeting the following inclusion criteria: (a) adult over the age of 18, (b) 3 years continuous experience as a project manager in a Qatar infrastructure project, and (c) adequate knowledge regarding the topic of capacity-planning processes in project management. These inclusion criteria were similar to those used in related studies (see Michelle & Anthony, 2016; Samiullah, Abdul, & Kaleem, 2019). Purposeful criterion and network sampling strategy, as recommended by Bell et al. (2018), were used for this research.

Schram (2006) noted that five to 10 participants are needed to conduct an in-depth investigation of the topic under study. Boddy and Boddy (2016) suggested eight to 10 participants for this type of research. Ten in-depth face-to-face individual interviews through Skype were conducted with participants purposefully recruited for this study; coding started at the sixth interview and continued until data saturation was attained. A better understanding of how project managers in Qatar utilize capacity-planning practices to mitigate project schedule delay and cost overrun in government-funded infrastructure projects may provide a platform for improved capacity-planning practice and, by extension, improved project success rate. Finally, unforeseen benefits associated to this study may be unacknowledged , yet bring about diversified effect (Greener, 2018).

Limitations

Research limitations are the design characteristics or methodology circumstances that influence interpretation of research findings and are beyond the control of the researcher (Merriam & Tisdell, 2015; Yin, 2017). Although five to 10 participants were needed to conduct an in-depth investigation of this topic (see Schram, 2006), eight participants were considered for this study. Sample size can be a limitation to a study if the maximum number of participants considered limits the chances of obtaining more participants. The eight participants considered for this study were consistent with Schram's (2006) and Boddy and Boddy's (2016) recommendations to provide enough units for multiple case study.

Purposeful criterion and network sampling were used for this study, but the sample may not reflect the actual population. Only infrastructure project managers of publicly funded projects were considered for this study; hence, the findings may not be generalized to privately funded projects and other types of projects. The accuracy of the feedback from participants can strengthen the findings of a study but can also be a limitation when compromised (Yin, 2017). To ensure trustworthiness, I triangulated interview data with data from reflective field notes and government reports (see Guion et al., 2011). The observations of individual participants may have varied based on their years of experience, knowledge of the research problem, organization, nature of infrastructure project, belief, or culture. Selection criteria helped to ensure transferability of the findings.

Significance of the Study

Scholars, policymakers, and practitioners described the detrimental consequences that cost overrun and schedule delays in Qatari infrastructure projects have on the national economy by way of claims and litigation, contractual disputes, delays in dependent projects, and project abandonment (Gbahabo & Ajuwon, 2017; Oyewobi et al., 2016). Although scholars have explored the causes of project schedule delay and cost overrun in the Qatar construction industry and have recommended strategies to mitigate delay and cost overrun (Zidane & Andersen, 2018), researchers have not explored the problem from a capacity-planning perspective. This study was significant in that the findings may be used to address the effective implementation of capacity-planning in Qatar infrastructure project management.

Significance to Practice

Findings may advance Qatari project managers' understanding of capacity-planning provide recommendations that address the underresearched area of capacity-planning in successful project delivery. Because relational engagement in research can not only avert risk and mitigate harm and losses but also bring about visible benefits (Davis & Ozanne, 2018), the knowledge gained from this study may bring about a more effective project management culture and improved infrastructure project delivery in Qatar through effective personnel and resource planning. Though this research addressed the capacity-planning gap to mitigate the risk of schedule delay and cost overrun, Qatar infrastructure project managers may also limit employee redundancy by ensuring projects are not overstaffed (see El-Sabek & McCabe, 2018). Project managers engaged in

privately owned/sponsored projects facing similar challenges may also benefit from the findings of this study.

Significance to Theory

Construction projects worldwide are often behind schedule due to various reasons (Zidane & Andersen, 2018). Despite the advanced technologies and good understanding of project management and engineering techniques, the problem with delays continues (Mok, Shen, & Ying, 2018). Over the last 40 years, significant attention has been paid to possible causes of delays among different countries, including environment, working cultures, management style, methods of construction, geographical condition, stakeholders, government policy, economic situation, availability of resources, political situation, and perspectives of researchers (Akhund et al., 2018; O'Neill, 2019; Shahhosseini, Afshar, & Amiri, 2018). To extend project management theory on the delay factors in construction projects, in-depth studies must be conducted on a country-by-country basis (Zidane & Andersen, 2018). The urgent need for Qataris to build expansive urban infrastructures has resulted in massive project delays (Azzali & Tomba, 2018; Rizzo, 2014). Although researchers have identified the underlying factors leading to project cost overrun, there is a literature gap in how effective capacity-planning practices within regional contexts can mitigate infrastructure schedule delay and cost overrun (Miranda & Renneboog, 2017).

Even though there have been studies on project failure because of schedule delay and cost overrun (Adam et al., 2017; Gbahabo & Ajuwon, 2017), none have addressed why project managers and practitioners in Qatar infrastructure projects are slow to

embrace effective capacity-planning (Azzali & Tomba, 2017; Miranda & Renneboog, 2017). The findings of this study may provide a unique contribution to the theoretical literature in the field of project management on capacity-planning adoption for infrastructure project management and may offer recommendations on how to improve project success rate. Researchers may also use the findings and recommendations of this study to develop other studies in different geographical locations.

Significance to Social Change

The infrastructure and construction industry are the means through which countries attain their economic development goals (Agyekum-Mensah & Knight, 2017). Findings from the current study may be used to improve completion of projects within time and budget schedules, which would not only contribute to Qatar's economic growth and development but also increase the standard of living for citizens and residents of the country (see Al Jurf & Beheiry, 2012). Improved infrastructure development may enable those living in areas of social disadvantage to access basic economic opportunities (Djukic, Jovanoski, Ivanovic, Lazic, & Bodroza, 2016).

Strategically located and planned infrastructure investment may also generate wealth for the State of Qatar, leading to an improved standard of living for residents (Djukic et al., 2016). Bebbington and Bajekal (2003) revealed that improving a country's infrastructure index by 10% can bring about a 5%, 3.7%, and 7.8% reduction in child mortality rate, infant mortality rate, and maternal mortality rate, respectively. Social change and a positive outlook are likely in the State of Qatar should project managers

engaged in Qatar infrastructure projects use these findings to drive project success though effective capacity-planning (see Bjorvatn & Wald, 2018).

Summary and Transition

The first chapter provided a detailed introduction to the study including the background, conceptual framework, research gap, and research question. Despite the numerous studies on the general management problem addressed in the study, no research had been carried out to understand the perceptions of project managers in Qatar regarding how they utilize capacity-planning practices to mitigate project schedule delay and cost overrun in government-funded infrastructure projects and how the findings may improve project success rate. Researchers had investigated the causes of delay in various project types and possible mitigation for the identified delay; , however, the current study addressed inadequate capacity-planning as the primary cause of project delay and cost overrun in Qatar.

In Chapter 2, I provide a critical literature review to describe the trend in project delay and cost overrun and its impact on project stakeholders and project success. This review also addresses capacity-planning as a key process in ensuring improved project success, as well as the various approaches to capacity-planning and how its implementation can improve project success rate.

Chapter 2: Literature Review

The issue of infrastructure project time delays and cost overrun caused by ineffective use of organizational skills, processes, and resources by construction project managers is a major concern for the Qatari government because it was selected to host the FIFA World Cup in 2022 with plans to invest more than $40 billion in infrastructure projects (Biygautane, 2017; Zidane & Andersen, 2018). Although researchers have identified the underlying factors leading to project cost overrun, there is a literature gap in how effective capacity-planning practices can mitigate infrastructure schedule delay and cost overrun (Miranda & Renneboog, 2017). Azzali and Tomba (2018) documented that little is known about how Qatari project managers leading urban planning projects may be using effective capacity-planning practices to meet project goals and deadlines. The specific problem is that many project managers in Qatar assigned to lead infrastructure projects may be failing to apply effective capacity-planning practices to mitigate project schedule delay and cost overrun (Azzali & Tomba, 2018; Kangwa & Ebohon, 2019).

The purpose of this qualitative, multiple case study was to explore the perceptions of project managers in Qatar regarding how they utilize capacity-planning practices to mitigate project schedule delay and cost overrun in government-funded infrastructure projects. Findings may be used to improve completion of construction projects, which would not only contribute to Qatar's economic growth and development but also increase the standard of living for citizens and residents of the country (see Al Jurf & Beheiry, 2012). This chapter presents the literature search strategy and the conceptual framework

on which the research was grounded. I also present a synthesis of the literature on the role of capacity-planning practices in project management in Qatar. I also include a critical analysis of the literature on which this study was grounded.

Literature Search Strategy

The objective of this literature review was to examine existing academic and professional literature on the global and increasing challenge of project schedule delay, project cost overrun, and the damaging effect on project stakeholders and society. This critical literature review includes detailed perspectives of project cost overrun and schedule delay from diverse studies and from unique perspectives from different geographical locations. I also review capacity-planning, its application, and how it can benefit the project management field to mitigate the risk of schedule delay and project cost overrun. The time horizon model, the individual-organization-industry levels model, and the capacity development across components model were used to provide insight while conducting the review.

Several databases were used to conduct this critical academic and professional literature review. These included Science Direct, SAGE Premier, Business Sources Complete, EBSCOhost, Emerald Management Journals, ProQuest, and ResearchGate. I also used the Google Scholar and Google search engines. Primary search terms included multiple combination of words used for retrieving relevant articles, dissertations, and professional journals related to the research problem and conceptual framework. These terms included *capacity-planning*, *project management*, *project management theory*, *infrastructure project delay*, *schedule delay*, *cost overrun, GCC*, *Middle East*, *Qatar*,

effect of schedule delay and cost overrun, *project delay mitigation strategy*, *project leadership*, *capacity-planning concept*, and *models*.

The literature review was aimed at identifying the use of effective capacity-planning in infrastructure projects to mitigate the risk of schedule delay and cost overrun. Research showed that little is known about how project managers engaged in Qatar infrastructure projects utilize effective capacity-planning to improve project success. The literature review was further aimed at revealing the increasing trend in schedule delay and cost overrun leading to increased project failure. Another objective was to reveal the literature gap on the perception of project managers regarding how they use effective capacity-planning to drive project success. The search filter was streamlined to comply with Walden University's requirement that 85% of total sources are peer-reviewed journals published within 5 years from the expected completion year, and a minimum of 60 peer-reviewed sources are included in the literature review.

Conceptual Framework

In recent studies, scholars noted that a major concern facing the Qatari government is plans to invest more than $140 billion in infrastructure projects to be completed by 2022 (Azzali & Tomba, 2018; Biygautane, 2017). The Qatari construction industry faces significant challenges in term of project delays, overrun costs, and time completions (Zarei et al., 2018). Little is known about how Qatari project managers leading urban planning projects may be using capacity-planning practices to meet project goals and deadlines (Azzali & Tomba, 2018). To this end, this study was framed by three conceptual models developed by Gill (2015) to outline the capacity management needs

within a construction company: (a) the time horizon model, (b) the individual-organization-industry levels model, and (c) the capacity development across components model.

Complex construction projects in the infrastructure sector are often beset with delays, which cause benefit shortfalls and increased costs. Project managers have mostly adopted a traditional control-focused approach, but recent research suggested that complex projects need more flexible practices to manage inevitable project change through capacity-planning (Eriksson, Larsson, & Pesämaa, 2017). Gill (2015) developed three conceptual models in a single theoretical study using the initial assumption that a single strategy for capacity-planning is based on three separate pillars of the process needed to meet capacity management needs within a construction company: time horizon; individual, business, and industry levels; and components.

To develop the time horizon model, the individual-organization-industry levels model, and the capacity development across components model, Gill (as cited in Jugdev et al., 2018) used project management theory to provide a combination of tools, tasks, processes, templates, and resource planning for managing projects. Gill's three conceptual frameworks provide construction company owners and their project managers with a multitiered strategic plan to bid for bigger projects in partnership with prominent players by ensuring the necessary resources and capital before construction firms go solo on bigger projects (Daniel & Daniel, 2018), a problem often left unaddressed within the Qatari construction sector (Azzali & Tomba, 2018).

Construction companies in Qatar are also uncertain about project continuity; as a result, limited resources are engaged to manage projects that require more resources. The time horizon model (Gill, 2015) presents a short-, medium-, and long-range planning strategy that allows project managers to consider available resources against the time dimension (Gill, 2015). Short-range planning provides a model that allows managers to retain and maintain an organization's current resources and engage them on overtime work to manage short-term peak (Gill, 2015; Patrick, Erwin, & Marco, 2018). Long-range planning provides a model that allows manager to maintain current resources at the organization's standard daily productivity rate (El-Sabek & McCabe, 2018; Gill, 2015).

Construction companies in Qatar have ignored the significance of collaborative actions between various actors along their supply chain to strengthen capacity-planning for the country's massive infrastructure projects (Biygautane, 2017; El-Sabek & McCabe, 2018). Construction company owners have failed to properly train project managers in the latest technology-based capacity-planning process or mobilize private finance for the infrastructure projects geared toward achieving Qatar's National Vision 2030 and for projects needed for the 2022 FIFA World Cup (ElGahani & Furlan, 2018). Researchers inferred that infrastructure projects in Qatar have incurred damaging effects on the local project management profession, construction companies' reputations, and the national economy by way of claims and litigation, contractual disputes, delays in dependent projects, and project abandonment (Gbahabo & Ajuwon, 2017; Oyewobi et al., 2016). Gill (2015) developed the individual-organization-industry levels model to illustrate how capacity can be strengthened at the individual level, then at the organization level, and

finally at the industry level. Gill wrote that each level of capacity must be strengthened using the action plan for that level. For example, at an individual level, the company must focus on training, incentives, and job enrichment initiatives such as job rotation to enhance capacity flexibility (Gill, 2015; Pinha & Ahluwalia, 2018). At the organization level, the efforts must be focused on waste reduction, project diversity, and capital equipment (El-Sabek & McCabe, 2018). At an industry level, the company must encourage the allied trades to take up steel framing and provide appropriate incentives (Gills, 2015).

Project managers engaged in Qatar infrastructure projects do not pay attention to the volume of work involved in the project and often fail in their commitment to deliver tasks in a timely manner (Azzali & Tomba, 2018). The capacity development across components model (Gill, 2015) evaluates capacity-planning on nine components: performance capacity, personal capacity, workload capacity, supervisory capacity, facility capacity, support service capacity, system capacity, structural capacity, and role capacity. These nine components are then individually and collectively assessed as to how each component enhances the others and collectively enhances capacity-planning. Construction companies can gain more capacity development experience on large commercial projects by partnering with bigger companies (Gill, 2015). On the internal side, scholars recommended that construction company owners need to consider public–private partnerships and delegate more authority to their project managers and empower frontline supervisors to bring projects to a successful completion (Biygautane, 2017; Klijn & Koppenjan, 2016). Gill's (2015) three conceptual frameworks outline strategic

capacity-planning process within construction companies that can be utilized as a conceptual lens to evaluate how project managers can contribute to mega construction project improvement and a construction company's long-term sustainability.

Literature Review

Role of the Project Manager in the Construction Sector

The project manager's role in construction projects can best be apprehended from the comprehensive understanding of project management in totality (Waheed, 2016). As defined by the PMI as the global regulatory body for project management practice, project management refers to planning and controlling resources to be deployed to a project and during a project life cycle, both human and nonhuman, with the aim of accomplishing a set scope, quality, time, and cost using modern management technique (Abyad, 2018). Simply put, project management is the process of using a methodological approach to attain a preidentified goal within a predefined budget, time, and quality. Project management plays a crucial role in the construction industry even though it has been said to have taken its existence from the construction and engineering industry (Zuo, Zhao, Nguyen, Ma, & Gao, 2018). As outlined by the PMI (2013), project management comprises five processes that include initiation, planning, execution, monitoring and controlling, and project closure.

Zuo et al. (2018) conducted a qualitative study on 109 project managers in the Vietnamese construction industry regarding the required soft skills for project management and concluded that project management is a form of skill and knowledge that can be acquired to ensure its effective practice. In a similar exploratory qualitative

study based on extensive secondary data including peer-reviewed journals, Gbahabo and Ajuwon (2017) found that inadequate project management skill is as detriment to project success. This understanding aligns with PMI's project management knowledge, which draws on 10 areas: integration, scope, time, cost, quality, procurement, human resources, communications, risk management, and stakeholder management (Alotaibi et al., 2016). Project management can be said to be made up of core components summarized as defining the necessity for a project, detailing the project requirements, preparing a business case, developing a management plan, leading the project team, managing project risk and issues, monitoring progress and managing changes, maintaining project budget, ensuring and maintaining communication with all project stakeholders, and closing the project (Abyad, 2019; Cha, Newman, & Winch, 2018).

Project management as a practice is often deployed in organizations to effect changes to the operation of an organization (Kerzner, 2014). This explains why projects are often referred to as temporary endeavors undertaken with the aim of creating a unique product or service (PMI, 2013). The heterogenous nature of projects requires modern techniques to achieve project goals; hence, the need for heterogenous and dynamic team members (Eriksson, Larsson, & Pesamaa, 2018). Following critical literature review and analysis of quantitative data from 73 project managers in the context of relationship management from the UK, Meng and Boyd (2017) concluded that the role of project manager in the construction sector can be likened to that of a facilitator and is grounded in the understanding of project management process and knowledge area. The project

manager is responsible for handling and managing the overall construction project from the initiation down to project closure (Damoah & Kumi, 2018).

Empirical evidence presented by Jovanovic and Jovanovic (2018) in their qualitative investigation of the roles of the traditional project manager found that beyond the project itself, the project manager's role extends to management of internal and external stakeholders including client and organization's expectations. The project manager role in construction sector can be summarized into six main categories of planning, resource distribution, staff management, creating benchmark, budget management, and communication (Dziekoński, 2017; Jovanovic & Jovanovic, 2018).

Planning role of project manager. Often referred to as the most important role of a project manager, it entails that all works are done within a defined time limit such that the comprehensive delivery aligns with the overall available project time limit (Lester, 2014). The planning phase gives direction to the entire project as it defines what needs to be done at each stage and phase of the construction process. Although planning is often stressed in project management success, only realistic project plans are achievable (Radziszewska-Zielina & Sroka, 2018). Statistical data analysis from 120 registered grade 1–3 contractors with Ministry of Works and Urban Development in Ethiopia on the relationship between project planning and project success revealed the time, cost, and risk planning role of project manager as critical for project success (Ermias, Tekalign, Eshetie & Birhanu, 2017).

Beyond the direct planning role of project manager, Cha et al. (2018) argued that the project manager does not only plan the project execution with available resource and

time constrains but is also responsible for negotiating reasonable and attainable project timelines and milestones across all project stakeholders. Project planning is a huge task for a construction project manager especially in complex projects and often requires a lot of time to integrate. Due to its complexity inputs are usually required from other project stakeholders such as the client, higher management, project sponsor, other project team members, authority and regulatory bodies among others to expedite the planning process and work out an achievable project plan (Kerzner, 2014).

Resource distribution role of project manager. It is quite unusual that a project often lacks adequate number of resources to carry out multiple tasks concurrently during project execution (Tsvetkova & Tukkel, 2017). As such, the project manager's role is to allocate resources both materials, labor and non-labor in such a way that meets the task requirement. Evaluation of the critical project success factor through a quantitative survey from 45 project managers, architects, engineers, and experts of the Malaysian construction industry carried out by Alias, Zawawi, Yusof, and Aris (2014) identified effective resource and human distribution as one of the five identified critical project success factors.

A quantitative study on 106 project managers, consultants, and engineers of the Indian construction industry reveals strong relationship between resource planning/allocation and project success (Bansal & Agarwal, 2015). The responsibility of understanding what and how many resources are required on the project lies solely with the project manager, who is also responsible for negotiating adequate resources for the project with project stakeholders especially higher management (Podolski, 2017). Poor

allocation of resources can lead to redundancy and waste of time which if not managed in a timely manner can lead to project delay, cost overrun and project failure (Denis & Rashpal, 2018).

Staff management role of project manager. Since the responsibility to deliver the project successfully lies with the project manager, managing the project team to ensure team members are working collectively towards achieving the project goal also forms part of the project manager's role (Li, Nie, Yang, & Wang, 2017). The project team are members of the project management that carry out the activities of project delivery and are under the leadership and direction of the project manager. The role of a project manager in team management is not only limited to managing the project team but also motivating the project team, managing conflict among project teams, bond with the team, give direction, play leadership role for team members, establish clear role among team members, and team building (Ling, Ning, Chang, & Zhang, 2018).

A field survey of 200 development project managers in Ethiopian NGOs by Aga, Noorderhaven, and Vallejo (2016) revealed that effective team management and team building can mediate the effect of leadership style on project success. Further critical literature review and analysis of multiple peer-review journals and articles by DuBois et al., (2015) using the electronic database of Drexel University revealed that project manager's team management technique can bring about high team performance and subsequently improve project success.

Benchmarking role of project manager. Benchmarking is used in project management to evaluate how well a project is doing and to evaluate the health status of a

project (Hanna, Iskandar, & Lotfallah, 2019). Unlike other project progress measurement matrices which are designed for process post evaluation, Yun, Choi, de Oliveira, and Mulva (2016) after critical evaluation of six project measurement matrices presented an argument that benchmarking stands out as the only progress evaluation matrix which can be used by project managers as both leading (pre) and lagging (post) process evaluation. They are points set during a project in the form of milestones to measure project progress (Yeung et al., 2013). Project benchmarking helps the project manager to understand if the effort put into the project at any point in time is adequate to meet the project constrain of time, cost, and quality or a change of strategy is required in situations where the current effort and deployment is found inadequate (Iyer & Banerjee, 2016). Project benchmarking as a project management tool helps project managers in timely evaluation of project progress to ensure timely mitigation in the event of delay to ensure project success (Cabellos et al., 2017)

Budget management. Budget management is the process of allocating how the assigned project budget will be utilized in such a manner that it accomplishes the project goal (Caffieri, Love, Whyte, & Ahiaga-Dagbui, 2018). The role of project manager in budget management as in the case of resource management starts from negotiating enough budget with the management and/or client, sufficient enough to successfully deliver the project (Nooshin, 2018). The effective management of this assigned budget to avoid overspending and financial waste rests on the shoulder of the project manager who carefully and strategically divides the allotted fund to various deliverables of the project (Tahir et al., 2018).

A real-world quantitative survey of 899 information system projects conducted by Sanchez, Terlizzi, and de Moraes, (2017) on project success factor for IT projects revealed project budget management as a key contributing factor. A qualitative study conducted with 41 London Olympics 2012 project teams by Agyekum-Mensah and Knight (2017) as to professional perspective on the underlying causative factor of project failure also revealed poor financial and commercial decisions was ranked among the top factors. This reemphasizes the importance of budget management role as key project success factor for any project type. Four steps for budget management as identified by Papadaki et al. (2014) include defining the budget, executing the budget, controlling the budget, and updating the budget. Project management software such as SaaS project management system and Oracle can be deployed to effectively manage project budget and control project expenses (Podolski, 2017).

Communication role of project manager. Although communication has been ascribed as over 90% of the role of a project manager, only effective communication can guarantee project success (Alqaisi, 2018). The role of a project manager starts from identifying the project stakeholders and developing a communication plan within and beyond the project. The project manager being the focal point in a project is responsible for maintaining effective communication with the team, senior management, client, consultant; manage stakeholders' expectation through effective distribution of information; report project performance; establish team culture; conflict resolution; and ethics (Rajhans, 2018).

Wu, Liu, Zhao, and Zuo (2017) on the relationship between effective communication and project success evaluated 310 questionnaires from construction project experts in Shanghai and Zhejiang province of China. Using structural equation modeling to test the theoretical model, they found strong correlation between effective communication and project success. Related study into the underlying causes of project failure by Yaser and Isail (2018) via effective analysis of 33 related peer-review journals found lack of effective communication as dominant. Identification of communication method and channels to meet stakeholders' expectation initiates the project manager communication role. Without a doubt, the overall success of a project is heavily dependent on how communication is being managed in a project (Loehr, Weinhardt, Graef, & Sieber, 2017).

Effective and Ineffective Management Skills in Leading Infrastructure Projects

There is no magical formula for effective management rather there are a few skills required (Carvalho, Patah, & de Souza Bido, 2015; Sabrokro, Tajpour, & Hosseini, 2018). These skills contribute to developing a continual learning process which not only makes management easier but effective as well. Valcic, Dimitric, and Dalsaso (2016) believed that positive end results can be guaranteed if proper management skills are utilized. On the other hand, ineffective management implies the absence of necessary expertise required making it less helpful for managers to give positive results in the end. This implies that the management skills being used by managers would determine the ability to get the best leadership style that meets an organization's need (Hamlin & Patel, 2017).

Thorough review of literatures and analysis of 35 questionnaire responses retrieved from top management of selected social cooperatives in Poland by Wronka-Pospiech (2016) revealed that despite the different needs and objectives of organizations, the type of skills required for effective management is somewhat similar. Related research on 108 project managers on the required soft skills for construction project management in Vietnam's construction industry found similar soft skills as a basis for effective management (Zuo et al., 2018). Despite the uniformity in the required skills, Larsson, Eriksson, and Pesamaa (2018) believed that project managers are faced with varying challenges due to the heterogeneous nature of projects. Project management is often regarded as a specialized, multidisciplinary, and cross functional discipline that combines management, strategy, and business administration towards the achievement of specific project goals (Datta, 2015). Therefore, managers leading projects are required to possess a good number of effective skills which will be helpful in achieving project deliverables (Kirkland, 2015).

A leader needs to be conscious of defining goals for their followers, introducing new directions and generally promoting an organization (Howell, 2018). Good leadership is one of the essentials skills for effective management. It requires managers to be able to make good decisions, motivate individuals, and lead by example (Datta, 2015). Following the analysis of 107 questionnaires from project managers in Australia, Sunindijo (2015) argued that although leadership skill might not negatively impact the overall performance of a project, good leadership skill is essential for project quality performance. Similar study using a sample of 70 project managers shows that leadership

competence has a direct impact on sustainable building project success criteria (Tabassi et al., 2016). Notwithstanding their conclusion, both researches emphasize on the need for a project manager to build trust, gain respect, and encourage followers to give their best towards achieving good results and ensure productivity. It is rather unfortunate that a high number of managers especially in the project management field are lacking in this essential skill as they fail to motivate and manage employees to bring about desired output (Novo, Landis, & Haley, 2017). This ineffectiveness has been attributed to the major causes of project failure both schedule and cost wise (Nixon, Harrington, & Parker, 2012).

Good communication is an important skill required for leading projects because it allows managers to efficiently and effectively support project members, encourage new ideas, and communicate accurate information and concerns to members of top management when necessary (Briere et al, 2015). Although a qualitative semistructured interview of 11 project managers of international banks on the importance of communication in project management and dialogue revealed that most project managers disagree that communication is a part of constitutive dialogue, rather they believe that its goal is to send clear and unambiguous information among project stakeholders (Ziek & Anderson, 2015). Similar research on green building project managers in Singapore, however, found that a project manager leadership style channeled towards directive and task oriented without overlooking the relationship with subordinates is crucial in driving project success (Zhao, Hwang, & Lee, 2016). The importance of technical skill in managing projects cannot be overemphasized. Technical competence go a long way in

bringing about good project results. Most managers are termed ineffective because they do not understand the general nature of projects, project boundaries, how project management tools and techniques are applied, and the extent to which they should be used (McNally, 2018; Sabokro, Tajpour, & Hosseini, 2018).

It is important to mention that there are three main effective management skills that are paramount in leading infrastructure projects; these are task execution skill, people management skill, and commercial insight (Chai et al., 2016; Hernandez & Cormican, 2016). Both authors emphasized that if competence is maintained in these three skills areas it would be less challenging managing projects with higher degree of project success. Ineffective management would most likely be manifested when one or more of these skills are lacking in a manager making it difficult to get beneficial output from people even with greater effort. Gbahabo and Ajuwon (2017) found that several project managers are still in the process of acquiring knowledge and skills through trainings in different knowledge areas even while already leading infrastructure project in sub-Saharan Africa. Similar research by Tan and Nicholas (2015) via 10 semistructured interviews on infrastructure projects in Vietnam using selected countries best practice as benchmark, attributed project schedule delay and cost overrun to inadequate people and budget management skills of project managers leading infrastructure project.

Task execution is mentioned as a major effective project management skill as it helps project managers in presenting people with a clear picture of the complex tasks involved in the proper management of projects (Hernandez & Cormican, 2016; Micnally, 2018). The complete understanding of this skill area is not only helpful in achieving

efficient operations but Maqbool et al. (2017) believed it is also helpful for the project manager in carrying out the key phases of projects planning, organizing, and monitoring project performance. A quantitative survey of 285 project experts by Bjorvatn and Wald (2018) revealed positive correlation between task execution and absorptive capacity of team member. Further analysis on same research also shows positive correlation between absorptive capacity of the team and project success (Bjorvatn & Wald, 2018). Both researches show that a project manager with task execution skills pays attention to the absorptive capacity of the team. Having in mind that projects are usually constrained by time, task execution skill gives managers a sense of urgency making it a lot easier to meet all forms of schedule deadlines without facing time pressures (Izmailov, Korneva, & Kozhemiakin, 2016).

A qualitative research carried out on 45 managerial and nonmanagerial employees of Korea firms by Chai et al. (2016) identified commercial insights as one of the core skills for effective management. Like budget management, this skill is highly recommended for gaining competitive advantage and it emphasizes efficiency which is necessary for success as well as beneficial to both private or government sector project managers. Good commercial insight provides managers with proper strategic thinking abilities that allow them to give priority to the right tasks as well as ensuring there is profitability and good return on investments (Kirkland, 2015). Additional value of possessing commercial insight skill leads to proper planning which helps project managers focus on the necessary competences required for diligent financial and resource allocation (Hernandez & Cormican, 2016).

People skills cover a wide range of competences such as being able to foster trust among employees, successful acquisition of emotional intelligence, possessing the ability to empower, coach, motivate and encouraging people to want to develop themselves (Briere et al., 2015). People skills enable a manager to easily facilitate the completion of a wide range of different tasks amongst their subordinates (Maqbool et al., 2017). This skill area if continuously developed is highly valuable in gaining effectiveness in communication, particularly good listening and reporting (Hamlin & Patel, 2017). Wronka-Pospiech (2016) identifies personal and professional skills are the core skills required for effective management with personal skills being interpersonal, communication, and motivational skills whereas professional skills include leadership, problem solving skills, and innovative capabilities. All these researches emphasized that if these skills are used regularly in managing projects, there are high chances that success in the form of positive and progressive results would be achieved. Although the project manager is responsible for managing material and human resources on a project, managing of human resources can pose more challenge in the absence of required people skills (Angiola & Bianchi, 2015; Chawla et al., 2018).

In summary, the literature records several practices for effective and ineffective management, highlighting key skills to be utilized in providing desired positive end results. Some authors have grouped relevant management skills into just personal and professional, others consider task execution, commercial insight, and people skills to be the main important management skills that can determine effective or ineffective management (Briere et al., 2015; Chai et al., 2016; Hernandez & Cormican, 2016).

Irrespective of how these skills are grouped, the focus is to execute tasks in an effective and efficient manner to achieve set goals using the resources available (Kirkland, 2015). A manager lacking in this aspect would likely have difficulties surviving in Qatar infrastructure industry. An overview of the industry in the State of Qatar is discussed in the next section, indicating the volume and complexity of projects in pipeline which requires effective management skills for its success.

Qatar Infrastructure Industry: Overview

The State of Qatar is a peninsular Arab country located along the Persian (Arab) Gulf shoreline with an estimated population of about 2.639 million according to World Bank population count as of 2017 (Alattar & Furlan, 2017). Although categorized among the smallest countries in the Middle East with land area of 11,571 km only, the small principality of Qatar is home for the third largest natural gas reserve in the world and second largest exporter of natural gas in the world of about 123.9 billion cubic meters after Russia with 197.7 billion cubic meters (Azzali & Tomba, 2018; El Gahani & Furlan, 2018). Utilizing its vast wealth from oil and gas sector, Qatar is considered as the world's richest country per capita income according to IMF report 2018 with a GDP of approximately USD 124,930 per person as of 2017 (IMF, 2018). This represents a 9.9% growth from previous year despite the siege imposed on the peninsular by its neighboring countries as reported by the country's 41st annual report by Qatar Central Bank (QCB, 2018). Qatar's 2018 and 2019 annual budget demonstrated the country's passion for improved social living through infrastructure development wherein a total amount of QR 42 billion and QR 49.4 billion respectively was budgeted for transportation and

infrastructure. These amounts represent 20.6% and 23.9% of the country's annual budget of QR 203.2bn and QR 206.7bn total expenditure as reported by Qatar 2018 and 2019 annual budget respectively (Qatar's 2019 Annual Budget, 2018). The ability of the state to successfully host the FIFA World Cup and improve its economic growth and development like any other developed nation is largely dependent on the efficiency of infrastructure projects (Senouci, Ismail, & Eldin, 2016; Zarei et al., 2018).

The construction sector is considered one of the fastest growing sectors in the State of Qatar with government plans to spend an estimated amount of $200bn on infrastructure projects prior 2022 FIFA World Cup and as part of the country's development and investment scheme (Azzali & Tomba, 2018). Although a qualitative study on post 2022 FIFA World Cup research using critical literature review, benchmark case study of London Olympics 2012 and post-event planning strategy set for Doha retrieved from the Supreme Committee for Delivery and Legacy revealed that post event urban regeneration strategies are currently under consideration and plans are at preliminary stage (ElGahani & Furlan, 2018). Similar research by Furlan et al. (2018) argued that the rapid growth in construction is because of the FIFA World Cup 2022 and expected to subside after the event. Notwithstanding the observations from these researches, rapid growth in transportation project, medical project, education, tourism, 2022 FIFA World Cup and the Qatar National Vision 2030 have set deadlines for delivery of several high-profile infrastructure projects (Zaina, Zaina, & Furlan, 2016).

High profile infrastructure projects such as Qatar Rail Network System estimated at $36bn with 100 stations covering over 350 km has its first phase original completion

schedule for 2018, though yet to be completed (Azzali & Tomba, 2018; Biygautane, 2017; Millward, 2016). Similarly, in preparation for the World Cup tournament, Qatar has placed on itself the responsibility to deliver nine state-of-the-art and historical stadiums and renovate three existing stadiums located at seven different cities within the tiny oil-rich country prior to the last quarter of 2021 (Senouci, Al-Abbasi, & Eldin, 2018). Although the state initially shows proven confidence in meeting these commitments, recent report shows that the state has reduced the number of stadiums from 12 to nine, an exercise which was said to be considered for financial reasons considering the rising cost in preparation for the tournament (Lian, 2014). Estimated between $8–$10bn according to Qatar Supreme Committee for Delivery and Legacy, these stadiums will accommodate an average capacity of 47,500 seats, with Lusail Stadium having the highest capacity of 80,000 seats (Alattar, & Furlan, 2017; Qatar Index, 2019).

Aside from the recent completion of its $17bn and 50 million capacity International airport which was ranked the best airport in the Middle East for 4 consecutive years until 2018 and fifth best in the world, the state-of-the-art airport remains the second largest international airport in the region. Though researchers consider the size and capacity of the airport as adequate to handle the current flow of passengers, Qatar has in its project pipeline an expansion plan for a second terminal estimated at $15.5bn and covering an additional 400,000 square meters (Qatar Index, 2019; Biygautane, 2017). The state's new port project ranks among the high-profile infrastructure projects in the Gulf. This project is estimated at US$7.4bn being one of the largest ever greenfield seaport projects in the world. Designed to accommodate 1.7m tons

of general goods and 1m tons of food and grains plus 500,000 vehicles, this port will be able to handle 6m containers annually making it one of the largest multipurpose ports in the Gulf region (Qatar Index, 2019). Aside from the Msherieb downtown mage project harboring one the largest train stations in the Middle East, Qatar Economic Zone budgeted at US$3.2bn and designed to accommodate industrial grade manufacturing including aviation and marine logistic, also contributes to the pace of infrastructure growth in the state (Scharfenort, 2016).

The Qatar infrastructure industry has witnessed consistent growth since 2010 as reported by the country's Ministry of Development Planning and Statistics (MDPS, 2019). Despite contrary view as reported by CEIC (2018) which shows a variable growth in the state GDP with its all-time high of 6.7% in March 2012 and a record low of 0.7% in September 2017, public infrastructure projects in Qatar remain mostly driven by government expenditure as against public–private partnerships practiced in most developing nations (Wippel, Bromber, & Krawietz, 2016). These projects are funded from the country's surplus budget and major reserves with contract awards being coordinated by the state's Central Tender Committee. Qatar Public Work Authority (ASHGHAL) was autonomously assigned the responsibility to manage the public infrastructure and public amenities related projects in the country including roads, drainages, and highway projects and often overseen by various government and semi government parastatals. Infrastructure projects are aimed primarily at raising the standard of living in the country (Scharfenort, 2016).

The state's expressway program focuses at delivery of major highways, 240 major interchange bridges including conventional traffic lights, tunnels, flyovers, and over 200 pedestrian bridges in its master plan (Ashghal, 2019). Highway projects such as the Lusail expressway, East-West Corridor, and new orbital highway are some of the ongoing and completed high profile road projects within the tiny oil-rich Gulf country. Project stakeholders, having considered the multibillion dollar projects the country has in pipeline ahead of 2022 World Cup and Vision 2030 have warned the state of the risk of "project indigestion" (Alattar & Furlan, 2017).

Construction and management of these high-profile mega infrastructure projects often come with their own challenges since their designs are often unique and mostly not a replica of any typical project (El-Sabek & McCabe, 2018). These complexities explain the underlying factor behind the multiple challenges faced by Qatar infrastructure projects leading to project delay, overrun, and project abandonment in some cases. Managing the associated fund and volume of resources required to deliver these projects is also challenging and requires high level of expertise and experience to effectively integrate (Balfe, Leva, Ciarapica-Alunni, & Mahoney, 2017). The next section will provide an overview of the challenges of mega infrastructure projects within the State of Qatar to provide detailed understanding of their complexity and insight on the management skills needed to improve project success rate.

Challenges of Construction Mega Projects in Qatar

Mega projects are mostly characterized by their sizes, complexity, duration, level of integration, and the degree of uncertainty involved (Park, Park, Cha, & Hyun, 2016).

Due to their complex nature, these high-profile projects require higher level of design knowledge, competence, technical skills, and advanced managerial capability. Similarly, owing to the high cost of constructing these mega projects and their direct and indirect social benefit and impact on the state's economy, these projects are mostly funded and owned by the government (Cui, Liu, Hope, & Wang, 2018). The challenges of construction mega projects in Qatar are not only unique to Qatar but have been found to be common challenges faced by developing countries in the construction of high-profile mega projects (Othman & Ahmed, 2013).

A research into the decision-making challenge of railway tunnel projects in Sweden using multiple case study of six railways projects and a semistructured interview with key decision-making stakeholders found that different stakeholders have great influence in the decision making process and execution of railway tunnel projects (Cedergren, 2013). Further qualitative case study research following a critical literature review into the common challenges of mega infrastructure projects in a developing country identified 45 common challenges of mega infrastructure projects which were further categorized under major headings of engineering, human development, managerial, political, and sustainability challenge (Ayman, 2013). Related qualitative research by El-Sabek and McCabe (2018) into the coordination challenges of production planning of Middle-East mega projects using 32 project experts with minimum of 15 years of experience reported the need for special treatment to address coordination issues in mega projects having identified schedule, budget, and scope change as the most challenging factor. These researches revealed and confirmed that infrastructure projects

in various countries and regions are faced with varying challenges triggered by cultural, internal, external, and political influences among others (Mok, Shen, & Yang, 2015).

These challenges seem more glaring in the case of Qatar owing to the volume of high-profile infrastructure projects being embarked on in parallel by the country in preparation for the World Cup in year 2022 and the long-term Vision 2030 of the country (Jarkas & Younes, 2014). The challenges of construction mega projects can be viewed from a diverse point of view ranging from avoidable internal problems which can be industry self-imposed problems and challenges of inaccurate or untimely decision making down to external problems (Othman & Ahmed, 2013). Externally imposed challenges such as multiculturalism in project team and political rift although cannot be avoided by the industry but can be reasonably controlled and managed. However, for the purpose of this review, construction mega-project challenges in the State of Qatar as categorized by Biygautane, Hodge, and Gerber (2018) were viewed under six categories: (a) financial challenges, (b) inadequate project technical knowledge and technology, (c) sociocultural, equality, and policy impact, (d) contractors and subcontractors related challenges, (e) resources related challenges, and (f) inadequate project management knowledge challenge.

Financial challenges. Being the driving force for any and every project, the lack of adequate and consistent financial support usually drives projects towards failure and abandonment (Gündüz & AbuHassan, 2016). Inadequate and poor financing have been identified by researchers as the major cause of infrastructure and mega-project failure in developing countries (Ayman, 2013). Although the State of Qatar declared budget deficit

in 2017 and 2018 due to unforeseen decrease in oil price and unexpected blockage by neighboring countries (El-Sabek & McCabe, 2018), funding of infrastructure projects prior and beyond these periods in the State of Qatar has not been identified as a major challenge. Unlike most developing nations where funding for infrastructure projects is financed through foreign loans from financial institutions, Qatar infrastructure projects are funded by the state government and from the country's surplus budget (Jarkas & Younes, 2014). Notwithstanding the later, contractors and subcontractors are often faced with the challenge of late payment which inadvertently interrupts the consistent flow of execution and subsequently leading to project delay and cost overrun (Gündüz & AbuHassan, 2016). In agreement with this claim, quantitative data were retrieved from 179 respondents from construction industry experts into the causes of project delay and cost overrun: 85.5% of the respondents were reported to be practitioners from Qatar construction industry and the remaining 15% were from other parts of the GCC countries. The findings using relative importance index for data analysis found that delay in payment contributes to one of the top underlying project delay factors (Jarkas & Younes, 2014).

Project technical knowledge and technology. Technical knowledge such as design knowledge, mega-project management knowledge and experience/expertise related to complex projects are paramount for successful delivery of mega infrastructure projects (Emam et al., 2014). Like any other developing nations, the State of Qatar lacks adequate technicalities and technologies required to adequately deliver mega infrastructure projects. Research by Gündüz and AbuHassan (2016) found lack of

technical know-how as one of the leading causes of project failure in Qatar. Similar quantitative survey on Qatar project experts into causes of project failure in Qatar construction industry has attributed inexperience and inadequate technical knowledge of contractors and absence of adequate technology leading to lack of clarity on technical specifications and drawings as a contributing factor (Jarkas & Younes, 2014). Both findings identified inadequate technical know-how as a challenge facing Qatar infrastructure projects. To mitigate this challenge, government organizations in Qatar have recently adopted the idea of integrating their project management team with international project management consultants to enhance the technological and technical expertise of these international consultants (Bernardino et al., 2018).

Sociocultural, equality, and policy challenge. The nature of infrastructure projects due to its complexity is such that different people from different background, culture, training, social and religious belief are involved to accomplish the task (Al-Mansoori, 2018). The problem of social and cultural complexity has significant impact on the success of mega projects especially when not effectively managed. Using partial least squared structural equation model to analyze data collected from 172 construction firms in Malaysia on the correlation between adhocracy culture and sustainability construction, Bamigbade et al. (2018) found that organizations with adhocracy culture tend to demonstrate sustainability in construction project execution. This research revealed a significant positive relationship between culture, equality, and project success. The level of diverse cultural acceptance and equality in the State of Qatar has not yet reached that of developed countries and is inadvertently affecting the delivery of mega projects.

Typical case of Qatarization in the state as one of the country's National Vision 2030 is a program development by Qatari government to increase the employment rate of Qatari citizens in public and private sectors especially in the industry and energy sector with the aim of reducing the nation's dependence on foreigners (Al-Homsi, 2016). This implies that Qatari nationals are mandatorily engaged as part of the project delivery team even when there are more qualified expatriates to do the same task. These engaged nationals are also more compensated than experts of same level, an act that can demotivate and decrease worker's morale (Al-Mansoori, 2018). Constrained policies as such define the level of acceptance of multiculturalism and equality within the state (Bamigbade et al., 2018).

Contractors- and subcontractors-related challenge. Of all the challenges faced by mega infrastructure projects in developing countries such as the State of Qatar, contractor and subcontractor challenge tops the list (Adam, Josephson, & Lindahl, 2015; Al-Hazim, Salem, & Ahmad, 2017). Most contractors and subcontractors are faced with several challenges ranging from lack of required experience, inadequate labor and manpower, inadequate resources, poor management and contract management skills, inadequate financial capability down to inadequate manpower and equipment. Investigation into the causes of project delay in Qatar by Emam et al., (2015) via an administered questionnaire to 37 industry practitioners identified ineffective planning and scheduling, ineffective progress control system, and shortage of manpower as the leading contractor related causes of project delay in Qatar. Similar research by Jarkas and Younes (2014) on project experts in Qatar into causes of project failure in Qatar construction

industry found inexperience and inadequate technical knowledge of contractors leading to lack of clarity on technical specifications and drawings as contributing factor. Although contractor related challenges have been identified by several researchers as a major contributing factor to project delay and cost overrun, client related factors have been found to be the most dominant delay factor (Damoah & Kumi, 2018; Emam et al., 2014).

Resource-related challenge. Project resources both human and material are key to accomplishing any project (Gill, 2015). Though resources are a necessity to projects, only the right, adequate, and required resources can guarantee project success. Similar to contractor related challenge, researchers have found insufficient resources and, in some cases, human resources with inadequate project technical know-how as challenges of mega infrastructure projects in Qatar (Abdelaal, 2015; Al-Hazim, Salem, & Ahmad, 2017; Emam et al., 2014). These researchers pointed out the lack of resource capacity-planning as a major challenge to delivery of mega projects in Qatar. This agrees with the assertion that organizations that lack the understanding of strategic resource capacity-planning may be limiting the organizational capability and effectiveness (Gills, 2015).

Inadequate project management knowledge challenge. Good understanding and knowledge of project management process, methodologies coupled with adequate project management skill is required for project success especially in mega infrastructure projects such as in the State of Qatar having complex interface with several powerful and influential stakeholders (de Carvalho, Path & de Souza, 2015). A study into the interaction between project management knowledge and its effect on construction used structural equation model to analyze questionnaire survey feedback from 115

respondents. The questionnaire was administered to project experts of private engineering firms in various geographical location. The authors from the findings prioritize the practice of PMBOK guide as appropriate in modern construction projects (Chou & Yang, 2012). Similar study into the Saudi Arabian construction industry has identified inadequate use of project management tool and technique as the underlying cause of project delay (Alotaibi, Sutrisna, & Heap-yin, 2016). Benchmarking on previous studies, a related qualitative exploratory research with 37 industry professionals into Qatar construction industry has found ineffective planning and scheduling, ineffective control and management as the third and fourth leading delay factor with a risk identification index (RII) of 59.7 and 59.2 respectively (Emam et al., 2015).

Challenges Facing Project Managers in Leading Urban Planning Projects in Qatar

Generally, implementing a new system has always been faced with diverse challenges (Tahir et al., 2018). In like manner, the implementation and execution of projects are faced with varying challenges due to the unique nature of projects (Adam, Joseph, & Lindahl, 2017). Aside from the challenges of infrastructure projects in Qatar which have been found to mostly frustrate project success, project managers in Qatar are also faced with similar but unique challenges which frustrate their effort toward driving project success (Jarkas, Radosavljevic, & Wuyi, 2014). Despite the lack of clarity that engulf project and program management making it difficult to ascertain general challenges for all construction and infrastructure projects, researchers have been able to identify these challenges location and project wise (Hoda & Murugesan, 2016).

An extensive investigation into the predominant demotivational factors which are found to be influencing the productivity of construction and infrastructure project managers in the State of Qatar was conducted using a structured close ended questionnaire survey with preidentified 38 potential demotivational factors. The usable 247 responses received from project managers in Qatar were analyzed using the relative importance index to determine the influence rank of the identified factors. The result found lack of financial incentives schemes, slow decision-making process by senior management and project owners, delay in RFI responses, skilled labor force shortage, material shortage, incomplete and unclear technical specifications, change order, poor quality of construction drawings and rework as the leading demotivational factors (Jarkas, Radosavljevic, & Wuyi, 2014). Similar quantitative research of 36 project managers by Yadollahi, Mirghasemi, Mohamad, and Singh (2014) into the challenges of architectural project managers in construction industry using fuzzy set theory found poor planning, inappropriate schedule, poor workmanship, unfamiliar technology, and material unfamiliarity as the leading factors. Both researches despite being conducted by different researchers at diverse locations and using different pool of participants have identified similar challenges project managers are faced with in leading urban projects. These challenges of project managers in leading construction and infrastructure projects can be viewed under four factors of schedule delay and cost overrun, client related factors, contractor and subcontractor related factors, and consultant/client/ Program Management and Construction Management (PMCM) related factors (Remington, 2016).

Schedule delay and cost overrun. Identified by various researchers as the most

challenging block stones for projects across the globe (Alotaibi, Sustrisna, & Heap-Yin, 2016; Damoah & Kumi, 2018; Gbahabo & Ajuwon, 2017; Mpofu et al., 2017; Nasser et al., 2016; Zarei, Sharifi, & Chaghouee, 2018) including the State of Qatar (Emman, Farrell, & Abdelaal, 2015), project schedule delay and cost overrun stands as the reoccurring and dominant challenge facing project managers in leading urban planning projects in Qatar (Senouci, Ismail, & Eldin, 2016). Schedule delay refers to time overrun beyond the contractual completion period or beyond the milestone completion date as agreed between project parties (Sohu & Chandio, 2019). In like manner, cost overrun refers to spending beyond the allotted project budget (Seddeeq, Assaf, Abdallah, & Hassanain, 2019). Although these challenges of schedule delay and cost overrun are mostly consequences of other types of delay from varying project stakeholders, the construction project managers are often held liable for these delays. This is because the responsibility of coordinating all project resources and relating with all project stakeholders towards achieving the project goal rests solely on the project manager (Al Jurf & Beheiry, 2012).

Project managers in Qatar often struggle with completing the project within available project time and budget mostly due to unforeseen risk and circumstances which were not accounted for in the initial phase of the project (Albhaisi, 2016). Research by Senouci, Ismail, and Eldin (2016) on 122 public projects using ANOVA method for analyzing feedback recorded that 54% of projects in the State of Qatar are faced with the challenge of cost overrun and 72% are faced with time delay. Related quantitative survey of 37 project experts into the challenges of infrastructure projects in Qatar also found that

81% of infrastructure projects suffer from schedule delay with an average 25% (Gündüz & AbuHassan, 2016). This implies that 72–81% of project managers in Qatar infrastructure projects are faced with the challenge of managing projects facing schedule delay and cost overrun. Although Senouci et al. found that schedule delay and cost overrun were not significant with respect to project type, category, and size, and neither was cost overrun significant with respect to project duration, both researches found project delay and cost overrun as challenges project managers are faced with in leading urban projects in Qatar. Although these challenges have been found preeminent in Qatar construction industry, research has established that the challenge is dominant in most developing countries (Othman & Ahmed, 2013).

Client-related factors. The project client is the key primary stakeholder whose expectation the project manager and every other stakeholder is expected to manage (Sharifi & Chaghouee, 2018). While managing these expectations which sometimes are preliminary, vague, and unclear, the project manager is faced with diverse client related challenges while trying to uphold the client's expectations. These client related factors range from change order request, changes to design down to delayed payment from client (Adam, Joseph, & Lindahl, 2017). An investigation into the causes of change order and its impact on Qatar construction project delivery analyzed 1122 variation orders from selected 22 numbers of Qatari construction industry using Pearson correlation coefficient analysis and ANOVA single-factor model. The research found design error has the highest correlation followed by design and scope change by the client (Albhaisi, 2016).

The research concluded by attributing change order and design change request

from client as the main cause of project delay and cost overrun in the state. Researchers have also identified delayed payment by client as a major challenge confronting construction and infrastructure projects in Qatar (Jarkas, Radosavljevic, & Wuyi, 2014; Senouci, Ismail & Eldin, 2016). Despite this delayed payment which has been identified to slow down contractors and subcontractors' work progress, project managers in Qatar are still required to manage the situation to ensure projects are delivered within the available project time constrain (Abyad, 2019; Cha et al., 2018). Similar to schedule delay and cost overrun, researchers have found that client related factors are one of the most challenging factors project managers in developing countries are faced with. For instance, a survey of 49 infrastructure projects in Saudi Arabia found average delay to be 39% and attributed the most underlying factors of re-design and change request as client related (Elawi, Algahtany, & Kashiwagi, 2016).

Contractor- and subcontractor-related factors. Being the responsible party for the physical execution of the urban planning projects, project managers are often challenged with various shortcomings arising from the contractors and subcontractors (Sharifi & Chaghouee, 2018). Researches on the subject of project challenges have identified varying contractor related challenges which project managers are faced with. Shortage of material, late delivery of material, shortage of skilled manpower, labor absenteeism, poor site management, and site accident due to poor site safety were a list of contractor/subcontractor related challenges identified from analyzing feedbacks from questionnaires investigating the causes of delay in the Cambodian construction industry (Durdyev, Omarov, & Ismail, 2017). A similar model of research into the Gulf countries

including Qatar through a structured questioner has identified ineffective planning and ineffective control by contractors and subcontractors have a major contributing factor (Emam et al., 2015). Because the project manager is responsible for the delivery of the project within the available project constrain, the integration and managing of these identified contractor and subcontractor challenges in such a manner that it does not affect the overall project success or jeopardize the client's expectation lies heavily on the project manager.

Consultant/PMCM-related factors. Usually appointed as client representatives on projects, the consultants which are either design, supervision, or a combination of design and supervision consultant are mostly responsible for taking major design and construction decisions for and on behalf of the client. Similarly, the PMCM team are client representatives usually assigned to oversee the delivery of a complex program or portfolio. While carrying out these assigned critical decision-making duties, researchers have found that project managers are often faced with huge delays due to the time taken by consultants and PMCM in providing feedback. Adam, Josephson, and Lindahl (2017) investigated the factors leading to project failure in large construction projects based on analysis of 40 journal articles and found delayed responses in RFI from consultants and PMCM as one of the leading factors.

Similar research in Kenyan road construction projects through administered questions to 15 consultants and 16 contractors revealed that time taken to respond to missing information had an RII of 0.414 making consultant/PMCM related delay second in the list of 25 identified factors (Seboru, 2015). Although related research on Qatar

construction industry found consultant/PMCM challenges less significant to client and contractor related challenges (Emman, Farrell, & Abdelaal, 2015), all the researchers identified consultant and PCMC related issues as one of the challenges facing project managers in leading urban planning projects in developing nations (Adam, Josephson, & Lindahl, 2017; Seboru, 2015) and driving project success in the State of Qatar (Emman, Farrell & Abdelaal, 2015).

Mitigation Practices for Schedule Delay and Cost Overrun

In recent times, every nation is seeking to develop economic growth by engaging in construction projects that meet the essential requirements of transportation, housing and social infrastructure (Alotaibu, Sutrisna, & Chong, 2016; Prasad et al., 2018). It is rather unfortunate that most construction projects of such kind are faced with a global phenomenon of excessive schedule delays and cost overruns (Asiedu, Adaku, & Owusu-Manu, 2017; Ullah et al., 2019). The State of Qatar is indeed part of this economic growth seeking to achieve rapid infrastructural development owning to the upcoming FIFA 2022 and their Vision 2030 but construction projects in Qatar are not left out of the challenge of time and cost overruns and will continue to suffer this if appropriate mitigation practices are not introduced and adopted (Emman, Farrell, & Abdelaal, 2015).

Investigations carried out by researchers in India, United Kingdom, and other parts of the world to determine the root causes of different construction project schedule delay and suggest mitigation measures have found financial related factors, stakeholders factors, capacity deficiencies, and work variation as the most critical causes of delay using importance index (II) ranking delay factors from relevant literatures (Olawale &

Sun, 2015; Prasad et al., 2018). The authors conducted interviews with a good number of senior professionals within the construction industry to identify mitigation practices for the major causes of project delays identified. Preventive, organizational/ predictive, and corrective measures are the three categories of mitigation measures some of these researchers have suggested (Asiedu, Adaku, & Owusu-Manu, 2017; Prasad et al., 2018).

In a study carried out in the Kingdom of Saudi Arabia (KSA), Alotaibu, Sutrisna, and Chong (2016) suggested that the critical factors of ineffective project planning and scheduling by contractors, lack of experience, poor qualification of contractors, work variation, delay in payments by client, and slow decision-making process contributing to construction project delays can be managed by using principles of project management. Their study presented a detailed review of previous studies on public construction project delays as it pertains to KSA and developed a process model that can be used to mitigate the occurrence of public building project delays. The guidelines established by the authors highlighted the potential project delay factors, possible practices for mitigation that could be valuable to practitioners in promoting a better understanding and management of public construction projects (Alotaibu, Sutrisna, & Chong, 2016).

Recommendations from previous research studies identified that the inadequate capacity to manage critical project delay factors may be linked to the poor implementation of project management principles and called for further research effort to address the current practices of project management applications to effectively mitigate project schedule delays and cost overruns (AlMobarak et al., 2013; Ullah et al., 2019). Also, a study by Motaleb and Kishk (2015) identified a knowledge gap in developing the

significant measures of project performance, risk management, and stakeholders' management which are considered necessary for controlling project delays. They argued that project delay is one of the greatest hindrances to project success in the Middle East region. Using over 30 scholarly articles published between the years 2000 to 2011, the authors conducted a literature review to identify potential related measures for delay risk control.

A literature review done by Shibani and Arumugam (2015) identified the main causes for construction project cost overruns in India and suggested critical success factors that can be applied to avoid cost overruns. Adequate planning at the initial project phase, good skill set of contractors, hiring proficient suppliers and subcontractor, good relationship and regular coordination between client and contractors were identified as some of the effective critical success factors useful in mitigating construction cost overruns (Shibani & Arumugam, 2015). Similarly, an analysis of the critical factors of cost and schedule overruns of construction projects revealed that several key strategies and mitigation practices are required to avert the occurrence of project overruns (Asiedu, Adaku, & Owusu-Manu, 2017).

In general, several researchers have argued that project management tools and methods, proper planning at the initial stage of projects, good coordination between project stakeholders, risk management, and subcontracting to efficient contractors are keys practices that could mitigate cost and schedule overruns in construction projects (Asiedu, Adaku & Owusu-Manu, 2017; Olawale & Sun, 2015; Prasad et al., 2018; Shibani & Arumugam, 2015). Despite these research findings, a few other researchers

have identified a knowledge gap and recommended a more advanced and modern means of mitigating project cost and time overruns (AlMobarak et al., 2013; Motaleb & Kishk, 2015; Sepasgozar, Razkenari & Barati, 2015).

Finally, it is important to mention that having in place mitigation measures serves as a checklist for best practices and aids project managers and practitioners to monitor and control delay causes to ensure improved construction project delivery (Prasad et al., 2018; Ullah et al., 2019). Over 80% of the critical project failure factors identified in the literature can be attributed to inadequate capacity or resources thus emphasizing the need to address capacity-planning as an effective mitigation practice for schedule delays and cost overruns in Qatar infrastructure projects (Alotaibu, Sutrisna, & Chong, 2016).

Current Capacity-Planning Practice and Strategy in Qatar Infrastructure Projects

Capacity-planning defines the process of identifying the production capacity required by an organization to not only uphold the current resource need of the firm but also meet changing resource needs of the firm over a defined timeframe (Gill, 2015). In the context of construction and infrastructure, this implies the need for an organization represented by a project manager to identify the current resource need in terms of material, labor, and equipment required to complete all projects (Cherkaoui et al., 2017; Gocmen & LaGro Jr, 2016). Although several factors were identified by researchers as risk to project success, ineffective capacity-planning has resurfaced in several findings yet under-researched (Abdelaal, 2015; Emam et al., 2014; Al-Hazim, Salem, & Ahmad, 2017; Gunduz & AbuHassan, 2016; Senouci, Ismail & Eldin, 2016).

The importance of capacity-planning in project success cannot be overemphasized considering resources is the driving force for any project (Gill, 2015). An investigation by Damoah and Kumi (2018) concluded that capacity-planning and management go beyond employee and equipment resource deployment and management but extends to higher management's knowledge and understanding of its importance in project management. Further investigation into the lean capacity-planning for tool room concluded that an organization's capacity defines the level of the organization's achievement and effective capacity-planning and management can help an organization meet their current and future business need in a timely and cost-effective manner (Haider, Mirza, & Ahmad, 2015).

Although there are limited researches on global current capacity-planning practices in developing countries (Gbahabo & Samuel, 2017), there are likewise limited researches on current capacity practices in Qatar infrastructure projects (Azzali & Tomba, 2018; El-Sabek & McCabe, 2018). It can be opined that this aspect of capacity-planning practice has been neglected and less researched despite its influence on project success. Notwithstanding the aforementioned, it can be deducted from research findings on the underlying factors of project delay and cost overrun that the inadequate/ineffective use of capacity-planning practices by project managers in Qatar have contributed greatly to most project failures. This is made evident in a research into the demotivational factors of infrastructure project managers in Qatar via the analysis of 247 retrieved questionnaires where skilled labor force shortage and material shortage were identified as the leading demotivational factors (Jarkas, Radosavljevic, & Wuyi, 2014).

Similarly, a survey designed to investigate the causes of delay in Qatar infrastructure projects, having analyzed 37 questionnaires from project experts in Qatar has identified shortage of manpower as one the leading contractor related factors with an RII of 51.2%. Cherkaoui et al. (2017) argued that capacity-planning is not limited to identifying the quantity of resources required but also the type and quality of resources required to complete a project. Emphasizing on the inadequate use of capacity-planning technique in Qatar, a qualitative research by Gündüz and AbuHassan (2016) has identified lack of team technical know-how as one of the leading causes of project failure in Qatar. Similar quantitative survey of project failure in Qatar has attributed inexperience and inadequate technical knowledge of contractors as a contributing factor (Jarkas & Younes, 2014).

Aiming to unveil the Qatari infrastructure industry and explore perceptions of subject matter experts (SMEs) in the state, Kangwa and Ebohon (2019) investigated the perceptions of SMEs in Qatar on appropriate national policies they believe should be put in place by Qatari government to enhance their growth and development towards improving their effective participation in construction, delivery, and procurement of infrastructure and services for 2022 World Cup and which they believe will also serve as a capacity building strategy in the construction sector. The selected SME companies are as per OECD and QDB definition. The authors deployed a quantitative approach using a questionnaire survey to allow for cross sectional data. A total of 146 completed and useable online questionnaires were obtained and analyzed using SPSS. The factors which were identified to be hindering the effectiveness of SMEs' participation were further

ranked using Kruskal-Wallis test. Common themes in the research revealed that aside from limited scope of technology and absorption between SMEs and larger construction firms that tops the list of limiting factors, inability to invest in human capital and human capital development was mentioned by 102 respondents (Kangwa & Ebohon, 2019). Although the findings of this study may not be generalized as it only focuses on SMEs, the study provided a list of major challenges faced by contractors which inadvertently affect the progress and success of infrastructure projects in the State of Qatar. Finally, the study calls for Qatari government invention to help build capacity for SMEs, an implementation which was forecasted will help improve Qatar infrastructure construction projects (Kangwa & Ebohon, 2019).

Resource Planning Analysis in Infrastructure Projects

The problem of project failure around the world has been directly attributed to poor resource planning analysis and accrued resources related challenges by researchers (Bjorvatn & Wald, 2018). Resource planning is a very important step especially in large construction projects to identify the volume of resources required to successfully deliver a project within its available constrains (Li, Chan, Skitmore, & Huang, 2015). An investigation by Méxas, Quelhas, and Costa (2012) into the enterprise resource planning criteria in Brazil's construction industry noted from its analysis of 75 responses from industry experts that understanding capacity measure often referred to as productivity rate and creating a unified measure of capacity is paramount to accurately estimate required resources for any project and drive such project towards success. This understanding of capacity measure will help project managers to forecast their resource requirement at

each point of the project and over the entire project duration (Chen, Chen, & Chang, 2012).

Though resource planning is not a strenuous task, carefully thought-out steps are required to ensure the right amount of resources and right quality of resources are available for the project and at the right time (Pocebneva, Belousov, & Fateeva, 2018). Due to the complex nature of this exercise, Li et al. (2015) recommended this exercise should be done alongside the project team and transparently with all management and nonmanagerial levels of the organization. Chen, Chen, and Chang (2012) conducted a research on simulation and analytical technique for construction and infrastructure resource planning and scheduling and presented an intelligent scheduling system which can assist project managers to generate their near optimum resource schedule plan with respect to their project objective and constrain. Integrating the important factors in construction not limited to schedule, cost, manpower, equipment, ISS adopted simulation technique to allocate and distribute resources to different activities in the simulation cycle. Steps recommended by Chen et al. to adequate analyze and plan project resources include capturing quantity takeoff, developing driving resources production rate, what-if analysis for possible project constrains, and resource adjustment based on unforeseen events.

Further investigating into the resource budget for workforce planning in construction industry, Siu (2019) advanced on the regular practice of the project planner determining the work package resource based on experience or information given at project level by introducing a novel approach to characterize the resources of

construction work packages driven by the field installation work package schedule with certain and uncertain activities using resource scheduling approach and theory of probability. The author found from literature review that work package technique is not enough to accurately determine project resources as such schedules only consider high level activities at project level but do not factor uncertain activities at workface level. New analytical approaches to resource planning were proposed and summarized in four steps: determining field installation work package with certain and uncertain activities, using scheduling approach to formulate the feasibility of field installation work package, estimate probability of occurrence and lastly, identify resource budget considering the probability theory (Siu, 2019).

Further to the above and as deducted from Tran, Cheng, and Pham (2016) and Carvelho, Oliveira, and Scavarda (2015), the steps required to effectively plan and analyze project resource capacity are summarized as follows:

Evaluating organization's state and barrier: This entails studying the organization's structure, available resources, available resource support, and working culture before planning resource capacity as these will influence project readiness and delivery.

Capacity-planning tool leverage: Due to the complex nature of resource planning, the availability of resource planning tools within the organization will go a long way in presenting a complete picture of resource requirement especially in complex projects with multiple activity overlap.

Factor all active and planned projects: This is important to understand currently utilized resources and potential need for resources based on upcoming projects. Project managers can understand what resources are available or will be potentially available and accordingly plan for their resource usage only after they have a grasp of current and upcoming projects within the organization.

Project and objective alignment: Alignment with organizational objectives determines project priority. Project manager should be able to evaluate project importance and alignment to understand how resources will be distributed on the project without risking business critical projects.

Project prioritization: This step entails identifying projects based on their priority. This priority could be based on the project constrains or based on their alignment with business goals. Highly prioritized projects or project milestones should be given first resource allocation preference.

Identify resource usage: Misidentification, underallocation, and sometimes overallocation of resources are common challenges of organizations when it comes to planning their resources. Hence, this step entails defining resource usage based on resource need and productivity in the case of manpower and equipment resources keeping allowance for uncertainty and subsequently allocating adequate and required type of resources to projects.

Establish organization's best practice: This step recommends establishing a standard practice within the organization which can be used repeatedly for subsequent

projects in understanding available resources, current and potential resource usage, planning resource capacity and onward allocation of resources for projects.

Although there are several factors which might influence resource planning in an organization not limited to organization structure, active and planned projects, available resources, client's commitment and resource support, adequate resource planning can aid the improvement of project success (Carvalho, Oliveira, & Scavarda, 2015) and avoid the risk associated to its inadequacies such as budget overrun, schedule delay, project abandonment, waste of resources, team burnout, and missed objective (Gill, 2015). The use of established, tested and trusted capacity-planning strategies and models can also help project managers to adequately and effectively plan for required project resources (Hait & Baydoun, 2012).

Effective Capacity-Planning Strategies and Models

Emphasizing on the understanding of organizational capacity, researchers refer to organizational capacity as the maximum output an organization can achieve or maximum input an organization can process based on the current/existing resources within the organization (Cherkaoui et al., 2017). This agrees with Gill's (2015) definition where he attributed capacity-planning as the process of identifying the production capacity required by an organization to not only uphold the current resource need of the firm but also to meet changing resource needs of the firm over a defined period. Cherkaoui (2017) went further to evaluate the proactive tactical approach to capacity-planning where he refers to tactical planning as project planning at the bidding phase of a project. Due to lack of detail at this phase of the project, a rough-cut capacity-planning approach was presented

by Cherkaoui where he further recommended and re-emphasized the need for frequent update. The rough-cut approach entails a rough estimate of required resources based on generated work packages within the contract. This approach has been characterized as mostly inaccurate and unrealistic to estimate daily and immediate capacity need based on the assumption that the work package comprises clusters of unidentified activities which might extend for a very long period (Baydoun et al., 2016; Cherkaoui, Pellerin, Baptiste, & Haït, 2015).

Building on the rough-cut capacity-planning approach by Cherkaoui (2017) and *mixed integer linear-programming model* by Hait and Baydoun (2012) which were found inadequate to address the challenge of immediate and long-term capacity-planning requirement in large engineering projects, Baydoun et al. (2016) proposed a *mixed-time mixed integer level programming MILP model*. To bridge the gap in the resource-constrained project scheduling problem of the rough-cut capacity-planning approach and mixed integer linear-programming model, this model of project capacity-planning was built on different possibilities of level overlap among work packages. This was achieved by dividing the planning time horizon into several time buckets used in evaluating project resource usage while work packages are continuous (Baydoun et al., 2016). These five sets benchmark includes continuous variable constrain, duration over period, scheduling constraints, definition related constrain, and workload and intensity constraints. A validation test to benchmark five sets of 450 theoretical instances found more than half of the instances solved (Baydoun et al., 2016).

Despite several researches based on rough-cut capacity-planning and integer linear-programming model (Baydoun et al., 2016; Carvalho et al., 2016; Cherkaoui et al., 2015), this approach and model have failed to factor project resource uncertainties which are usually inevitable in complex construction and engineering projects. Bridging the limitation of previous models, three conceptual models were developed by Gill (2015) to outline the capacity management needs within a construction company, namely (a) the time horizon model, (b) the individual-organization-industry levels model, and (c) the capacity development across components model (Gill, 2015). These models by Gill were developed in a single theoretical study using the initial assumption that a single strategy for capacity-planning is based on three separate pillars of the process needed to meet capacity management needs within a construction company (Gill, 2015). This was achieved by first developing a capacity strategy across varying demand timeline of low, medium, and high demands. Furthermore, capacity strategy at individual, organizational, and industry level was developed. Lastly, capacity strategy under the nine components of performance, personal, workload, supervisory, facility, support service, system, structural, and role capacity were developed (Gill, 2015).

The time horizon model by Gill (2015) is built on the assumption that effective strategic planning must factor the available resources alongside time dimension of short-, medium-, and long-range planning. The model recommends maintaining an organization's current resources during the short-range plan and proposed overtime to manage near term peak. While creating awareness to enhance demand for an organization's service, the model further recommends subcontracting of some task to

release some internal capacity in the event of increased demand during the medium-range plan. During the long-range plan, the model recommended partnering with organizations with adequate capital resources to meet the long-range resource requirement while the organization in parallel works towards building bigger resource base (Gill, 2015).

		Time Horizon		
		Short Range	**Medium Range**	**Long Range**
Strategy During	**Low Demand**	• Price reduction • Advertising	• Product Promotion • Training	• Product awareness • Bid for bigger and diversified projects
	Medium Demand	• Core competency • Subcontracting	• Process flexibility • Utilize worker flexibility	• Build sub-contractor pool
	Excessive Demand	• Subcontracting	• Subcontract on a priority order basis	• Build resource base • Partner with big players • Go solo

Figure 1. The time horizon model. From "Strategic Capacity-Planning Process in Construction Business," by A. Gill, 2015, *Journal of Applied Business & Economics*, *17*(4), p. 100. Reprinted with permission.

The individual-organization-industry levels model by Gill (2015) presented action plans for strengthening the individual, organizational, and industry levels. Training, incentive, and enriched job incentive was recommended as an action plan to strengthen the individual level; resource waste reduction, project diversity, and investment in capital equipment was recommended for the organizational level; and industry skill development and incentives were highlighted at the industry level.

Strategy Level	**Individual**	• Train employees on steel framing • Provide incentives to workers • Job rotation to achieve worker's flexible capacity
	Organization	• Release capacity through waste reduction • Capital equipment acquisition • Flexible operations • Achieve diversity of projects
	Industry	• Skill development for the steel industry • Provide incentives to allied trades

Figure 2. The level model. From "Strategic Capacity-Planning Process in Construction Business," by A. Gill, 2015, *Journal of Applied Business & Economics*, *17*(4), p. 100. Reprinted with permission.

Finally, the capacity development across components model evaluated how the nine components suggested by Potter and Brough (2004) can help strengthen capacity. Performance capacity ensures equipment capital and tool availability, personal capacity evaluates the technical know-how of staff, workload capacity ensures employees availability against the workload, supervisory capacity evaluates the organization's managerial and supervisory resource capacity, facility capacity evaluates the operational capacity of the organization, support service capacity evaluates the level of support available to the staff and the work, system capacity focuses on the effectiveness of information flow within the organization, structural capacity evaluates the accountability structure, and role capacity ensures authority and responsibility delegation among project team and committee.

Attribute	Component	Company Position	Capacity Plan
Tools ⇧⇩	• Performance capacity	• Lack for bigger projects	• Subcontract or locate partners for bigger projects
Skills ⇧⇩	• Personal capacity	• Adequate in-house skills but lack in sub-contractors' skills	• Train & motive subcontractor trades
Infrastructure ⇧⇩	• Work load capacity • Supervisory • Facility capacity • Support staff capacity	• Adequate for smaller projects but lack for medium to bigger projects	• Subcontract • Form Partnerships • Gain experience on larger projects
Structure and Systems Roles ⇧⇩	• Systems capacity • Structural capacity • Role capacity	• Efficient systems • Unclear lines of authority • Lacking employee & committee empowerment necessary to expedite projects	• Develop clear organizational chart • Delegate work to subordinates • Employee empowerment and build quality circles

Figure 3. The component model. From "Strategic Capacity-Planning Process in Construction Business," by A. Gill, 2015, *Journal of Applied Business & Economics*, *17*(4), p. 102. Reprinted with permission.

Summary and Conclusions

In this literature review, I covered subjects on project delays and cost overruns in construction projects focusing on the factors that cause such delays, the impact of these delays on project success, the important role project managers play in managing projects, and possible mitigation suggested by previous researchers (Cui, Liu, Hope, & Wang, 2018; Gbahabo & Ajuwon, 2017; Waheed, 2016). Most findings from relevant research

studies revealed the increasing trend in schedule delay and cost overruns which accounts for the high rate of project failure recorded (Damoah & Kumi, 2018; Gbahabo & Ajuwon, 2017; Mpofu et al., 2017; Zarei, Sharifi & Chaghouee, 2018). Gaps existing in the literature show that little is known about how project managers leading Qatar infrastructure projects utilize effective capacity-planning to improve project success (Azzali & Tomba, 2018). This review contributed to providing evidence to ground the general management problem of schedule delay and cost overruns.

The literature review by several researchers revealed that previous mitigation practices to avert cost and schedule overruns in infrastructure projects are insufficient with a few other studies recommending more advanced and modern means of mitigating project cost and time overruns (Asiedu, Adaku & Owusu-Manu, 2017; Motaleb & Kishk, 2015; Prasad et al., 2018; Sepasgozar, Razkenari & Barati, 2015; Shibani & Arumugam, 2015). Most findings have attributed the reasons for project failure to inadequate resource and capacity management and emphasized the need to address capacity-planning as an effective mitigation practice for schedule delays and cost overruns (Alotaibi, Sutrisna, & Chong, 2016). Notwithstanding, the outcome of the use of effective capacity-planning to mitigate the risk of schedule and cost overrun in Qatar infrastructure project remains unknown and calls for further research.

In Chapter 3, I will discuss the methodology for this qualitative, multiple case study that aided in achieving the aim of the research study. Also, the sampling rationale, approach, data collection method, and logic for the study will be discussed.

Chapter 3: Research Method

The purpose of this qualitative, multiple case study was to explore the perceptions of project managers in Qatar regarding how they utilize capacity-planning practices to mitigate project schedule delay and cost overrun in government-funded infrastructure projects. Cost overrun and schedule delay in Qatari infrastructure projects have damaging effects on the national economy by way of claims and litigation, contractual disputes, delay in dependent projects, and project abandonment (Gbahabo & Ajuwon, 2017; Oyewobi et al., 2016). Scholars called for a deeper understanding of how Qatari project managers leading urban planning projects utilize effective capacity-planning practices to meet project goals and deadlines (Azzali & Tomba, 2018; Kangwa & Ebohon, 2019). I conducted an exploratory multiple case study (see Yin, 2017) to answer this call. This study was important in that the findings may address the gap regarding effective implementation of capacity-planning on Qatar infrastructure project management. The findings may be significant for theory building through utilization of the multiple case study method to enable broader explorations of research questions and theoretical extension (see Bonett, 2012; Yin, 2017).

In this chapter, I provide detailed information on the research method and rationale for conducting an exploratory multiple case study. The central research question (CRQ) guiding this empirical investigation is presented along with the participant selection strategy, data collection strategies and data analysis, the role of the researcher, ethical considerations, and a summary of the main points of Chapter 3.

Research Design and Rationale

Developing effective research questions enables better understanding of real-world situations (Morgan, Pullon, Macdonald, McKinlay, & Gray, 2017; Yin, 2017) and allows the researcher to provide answers that lead to meaningful discoveries within the empirical context in theory-building case research (Baxter & Jack, 2008; Ketokiyi & Choi, 2014). Given that the purpose of this study was to explore the perceptions of project managers in Qatar regarding how they utilize capacity-planning practices to mitigate project schedule delay and cost overrun in government-funded infrastructure projects, the central research question was formulated as follows:

How do project managers in Qatar utilize capacity-planning practices to mitigate project schedule delay and cost overrun in government-funded infrastructure projects?

The nature of this study was qualitative, which aligned with the purpose to gather appropriate data to answer the central research question (see Yin, 2017). I utilized an exploratory multiple case study design (see Yin, 2017) with the constructive paradigm using well-structured interviews to explore a group of people's experiences living within a given social context (Cooper & White, 2012). According to Burr (2015), social constructivists tend to challenge the need for people to be more analytical in their understanding of themselves and the world around them. Individual experiences with social groups and a dominant culture can be made known through qualitative research within the constructivist paradigm (Cooper & White, 2012). Deploying the social constructivist paradigm in research gives room for knowledge to be constructed through social interaction and gives voice to groups of people with diverse experiences within the

management profession (Eriksson & Kovalainen, 2015). Contrary to quantitative research, which requires that researchers emphasize objective measurement using statistical, numeric, or mathematical analysis of data obtained through questionnaires, surveys, or manipulation of existing data, qualitative research is self-discovery oriented and requires that researchers emphasize the meaning participants attribute to a given phenomenon and make an interpretation of what is seen, heard, or understood (Merriam & Tisdell, 2015).

A multiple case study design is deployed to provide an in-depth understanding of phenomena and allow researchers to investigate experience through replica strategy (Yin, 2017). Although the case study method involves a small data set compared to quantitative research designs, in which researchers must recruit a large number of participants (Eisenhardt & Graebner, 2007), the case study method requires that the researcher conduct an in-depth, futuristic, and holistic investigation into all aspects and provide industry-related data that are not anticipated in the literature (Yin, 2017). Rooted in a natural setting with the aim of understanding the underlying process behind a phenomenon under research, a multiple case study design allows the researcher to gain a holistic understanding of social phenomena (Merriam & Tisdell, 2015). Unlike a single case study, in which a researcher provides data analysis across a single situation, a multiple case study allows the researcher to conduct data analysis within each situation and across different situations to understand similarities and differences between cases (Yin, 2017). Although the multiple case study has been criticized for requiring less observation time on each case compared to single case study (Siggelkow, 2007), the

multiple case study allows the researcher to gather strong and reliable evidence from similar or contrasting data (Yin, 2017). This study design also allows the researcher to provide convincing theory through comprehensive discovery of research questions and theoretical evolution (West, Zhang, Yampolsky, & Sasaki, 2017).

The multiple case study design was selected for this study, as opposed to other qualitative designs such as narrative, ethnography, and phenomenological, because the multiple case study requires that the researcher focus on a social phenomenon within a real-life setting and not just events or units of analysis (Merriam & Tisdell, 2015). Phenomenology was not appropriate for this study because it requires that the researcher focus on the basic structure of experience and not the experience (Merriam & Tisdell, 2015). Phenomenology is deployed in academic research to understand how a group of people experience a certain phenomenon (Merriam & Tisdell, 2015). Ethnography and narrative require that the researcher focus on stories, culture, and human society (Merriam & Tisdell, 2015). Due to the nature of this study, which was characterized by inadequate or lack of preliminary research, an exploratory approach was used to explore participants' perceptions (see Eisenhardt & Graebner, 2007). The study's central phenomenon was the individual, and the context was Qatari infrastructure projects (see Eisenhardt & Graebner, 2007). The investigation was a study of individuals living within a community and not the whole of the community itself; in such a study, the optimal qualitative design to collect data with the goal of theory building is an exploratory multiple case study (see Eisenhardt & Graebner, 2007). The unit of analysis in this study was the individual project manager in Qatar.

Role of the Researcher

Unlike a quantitative study in which participants function independently of the researcher and the researcher's role is theoretically nonexistent (Collins & Cooper, 2014), qualitative research requires assessing the researcher's personality and identity for the purpose of determining accuracy and trustworthiness (Peredaryenko & Kruass, 2013). This process entails a thorough understanding of the research phenomenon to aid the meaningfulness of the research inquiry and making a conscious effort to not influence the participants (Marshall & Rossman, 2014). The researcher's role also encompasses understanding the principles of social constructivism with reference to the relationship between body of knowledge and individual self-discovery when gathering data from participants (Merriam & Tisdell, 2015).

Ravitch and Carl (2006) emphasized the need for the qualitative researcher to disclose personality, assumptions, and bias reflexivity to enhance the dependability of the research. My views of project delay and cost overrun in Qatar infrastructure industry were influenced by my experience in the industry, and knowledge gained through my education was fundamental to my role within the phenomenon, setting, and context. Although I did not have direct experience as a project manager, I have been exposed to claim evaluation from contractors, consultants, and PMCMs because of various delay circumstances related to infrastructure projects in Qatar. My education and professional qualification as a certified project management professional also exposed me to acceptable practices in the industry. Although these biases may have impacted data collection and analysis, objectivity was given top priority. To ensure that the findings

from this study were informed by participants' experience and not my personal judgment, these identified biases were managed by disclosing the strategies adopted for data collection and analysis (see Ravitch & Carl, 2016).

To enhance the perspective and offer more insight to the social context, interactive dialogue was developed with the participants (see Merriam & Tisdell, 2015). Each participant's uniqueness was also sustained to ensure each participant represented an independent and unique case study, which provided opportunity for case comparison (see Yin, 2017). Finally, diligent and careful verification of interview questions and data analysis methods was conducted to ensure thorough data collection and analysis.

Methodology

In a multiple case study, a researcher can perform a within-case and cross-case analysis within the same context when investigating a social phenomenon as well as viewing each participant as different entities (Merriam & Tidsdell, 2015; Yin, 2017). To comprehend the social and behavioral interconnection of elements within a broader system, it is necessary to examine the contextual complexities of the specific social setting (Stake, 2013). Using a qualitative approach provides an understanding of relationship dynamics and helps to address why and how they exist (Tsang, 2013). A multiple case study design follows replication logic emphasizing context-bound details that can be used to design data analysis across cases and to draw theoretical conclusions (Eisenhardt & Graebner, 2007). The possibility of achieving these involves the use of a qualitative method that can offer originality of data from multiple sources (Eisenhardt & Graebner, 2007).

I interviewed eight participants. In qualitative research, main themes and practical applications can be identified with a minimum of five and a maximum of 10 participants (Merriam & Tidsdell, 2015). According to Boddy and Boddy (2016), eight to 10 participants is considered ideal to thoroughly investigate a phenomenon. The research and interview questions were designed to explore the perceptions of project managers in Qatar regarding how they utilize capacity-planning practices to mitigate project schedule delay and cost overrun in government-funded infrastructure projects. Meticulous records and a systematic chain of evidence were maintained throughout the study, which enabled me to identify similarities and differences among participants' experiences (see Yin, 2014).

Triangulation is useful in providing a comprehensive in-depth inquiry including multiple sources to ensure a synergistic, credible, and rigorous study (Ravitch & Carl, 2016; Wilson, 2014). The data collection method for the study involved multiple sources of interviews, peer-reviewed journal articles, and other relevant document reviews. The study design focused on the purposeful selection of participants to provide relevant data to answer the research question (Ritchie, Lewis, Nicholls, & Ormston, 2013).

Although qualitative studies provide rich information through intense investigation and provide the researcher with real-life and field-related firsthand information (Yin, 2017), adopting the multiple case study approach offers comprehensive and deeper insight into a *how* and *why* question constrained by time (Ravitch & Carl, 2016). Multiple case studies allow for in-depth, futuristic, and holistic investigation and provide industry-related data that are not anticipated in the literature (Yin, 2017). Cross

case synthesis in a multiple case study enhances validity, dependability, and trustworthiness of the findings. Finally, this method helps researchers to enhance the reliability of the research findings because the case study design entails outlining the processes and participants involved in the research (Yin, 2017).

Participant Selection Logic

Population. The aim of this study was to explore the perception of a selected sample of participants from a population of approximately 1,000 proven project managers fully engaged in managing government-funded infrastructure projects in the State of Qatar (MDPS, 2019). The selected population was appropriate for this research because these populations are directly impacted by the general management problem and might be responsible for creating the specific research problem. Also, the chosen sample was considered adequate to represent the overall population as they are involved with similar projects, funded by the same client and relatively similar stakeholders. It is hence assumed that they share similar experiences and challenges irrespective of the uniqueness of each project (Jarkas, Radosavljevic, & Wuyi, 2014).

Considering the need to accomplish the state's massive infrastructure plan towards FIFA 2022 work and fulfilling the state's National Vision 2030 of which an estimated spending of $40 billion is expended and tentative $200 billion prior 2022 (Azzali & Tomba, 2018), it is significant to note that the successful implementation and integration is largely depended on infrastructure project managers' knowledge and skills given that the responsibility of deploying infrastructure project resources and managing

their capacity rests on the project manager (Senouci, Ismail, & Eldin, 2016; Zarei et al., 2018).

Sampling criteria. To uphold the high-quality research integrity of this qualitative study, I utilized the purposeful criterion and network sampling strategy as recommended by Bell, Bryman, and Harley (2018) to recruit participants for this research. The participants were further screened using the following inclusion criteria: (a) adult over the age of 18, (b) 3 years continuous experience as a project manager in a Qatar infrastructure project, and (c) adequate knowledge regarding the topic of capacity-planning processes in project management. Purposeful sampling as used in qualitative research entails identifying and selecting participants or group of participants who are considered specifically experienced or knowledgeable with the phenomenon of interest (Duan, Bhaumik, Palinkas, & Hoagwood, 2015). In addition to knowledge and experience with phenomenon of interest, willingness, availability, and ability to communicate opinion and experience in a professional, expressive, and reflective manner are further considerations (Suri, 2011). The network sampling also helped in reaching rear population of infrastructure project managers leading infrastructure projects in the State of Qatar (Bell, Bryman, & Harley, 2018).

Researchers deploy in-depth interview when attempting to collect detailed information about participants' thoughts and behaviors or attempting to explore participants' experience about a selected phenomenon (Cooper & White, 2012). Schram (2006) noted the critical element of a small participant sample size for qualitative interviews, from five to 10 participants, is needed to conduct an in-depth investigation. A

total of eight face-to-face interviews were conducted by the researcher with infrastructure project managers in Qatar who met the inclusion and exclusion criterion and until data saturation is achieved (Fusch & Ness, 2015). Schram (2006) noted that five to 15 in-depth interviews are adequate to identify themes and research credibility can be upheld provided researcher strictly conforms to participant selection and sampling criteria (Merriam & Tisdell, 2015).

Sampling selection. This study was based on purposeful selection of project managers in Qatar and leading government-funded infrastructure projects. The participants were selected based on common inclusion and exclusion criteria and hence assumed to have common understanding and possibly share similar opinion on the phenomenon of interest (Guetterman, 2015). A total of eight in-depth interviews were conducted involving project managers leading infrastructure projects in Qatar where in-depth information was collected and diverse perceptions on how project managers in Qatar utilize capacity-planning practices to mitigate project schedule delay and cost overrun in government-funded infrastructure projects in "real world" setting was presented (Ritchie et al., 2013). According to Merriam and Tisdell (2015), a sample size of five to 10 is adequate to generate themes and provide adequate insight on unified practice. It is believed that a sample size of up to five is adequate to generate themes whereas samples of 10 and above give insights of common practice (Boddy & Boddy, 2016). Theme enhancement can also be achieved through participant and researcher's self, social, and cultural mindful collaboration (Merriam & Tisdell, 2015).

The unit of analysis in this study was the project manager leading government-funded infrastructure projects and in-depth interviews were conducted with each unit of analysis until saturation was achieved to provide comprehensive perception from each unit and cross-case analysis among units, linking retrieved data to conceptual propositions (Yin, 2017). It is worthy of note that the sample size of eight units is determined by the study's focus, resource availability, and assumed dependability of information to be provided by the participants (Guetterman, 2015). To ensure this study is based on ontological and epistemological understanding and the findings provide unbiased answers to the research question and toward achieving the aim and purpose of this study, the selected method focused on the participant's cultural and social system (Ravitch & Carl, 2016).

Sampling strategy. Though the scope of this study is limited to the population of project managers leading government-funded infrastructure projects, the interviewees selected using purposeful criterion and network sampling strategy (Bell, Bryman, & Harley, 2018) were practitioners in the State of Qatar, have 3 years of continuous experience as a project manager in a Qatar infrastructure project, and have adequate knowledge regarding the phenomenon of study (Duan et al., 2015). Semistructured interview usually deployed in qualitative study to explore opinion and perceptions was used for data collection to generate insight from rigorous conversational engagement between the interviewer and the interviewees and allow researcher's ease of evaluating overlapping ideas and perception devoid of fragmentation (Yin, 2017). Finally, to ensure the dependability of the findings of this study, the strategy of the study was such that the

interviewees offered their perceptions and views regarding their work experience as to how they use capacity-planning practice to mitigate the risk of project delay and cost overrun in Qatar infrastructure projects. Dialogue was used to capture rich data and rigorous and collaborative engagement allowed for deeper insight to interviewees' responses (Rubin & Rubin, 2012).

Instrumentation

This study's interview guide (see Appendix C) consisted of semistructured questions on the topic of exploring the perceptions of project managers in Qatar regarding how they utilize capacity-planning practices to mitigate project schedule delay and cost overrun in government-funded infrastructure projects. The goal of utilizing specific instrumentation in a case study is to collect data from multiple sources and provide enough data collection instruments to answer the research question (Yin, 2017). Considering the diverse forms of question developed by the researcher and emanating from the research concept, examining all responses in line with the participant's attribute and selection measure during the data analysis process became essential. Because changes to instrument calibration during data collection can lead to bias and threaten the validity of the study (Chenail, 2011), it is very consonant to ensure that the choice of instrument and instruction protocol aligns with the research purpose and contributes quality data to the research concept. Rigorous and careful choice of instrumentation allowed for emergence of themes which aided perceptions that emanated from studying the perceptions of project managers in Qatar regarding how they utilize capacity-planning practices to mitigate project schedule delay and cost overrun in government-funded

infrastructure projects. Three sources of data were utilized throughout this study: (a) a semistructured interview protocol (see Appendix C) whose items have been designed and standardized by previous researchers, (b) archival data in the form of government reports on the Qatari construction sector (Yin, 2017), and (c) reflective field notes (Merriam & Grenier, 2019), which were kept by the researcher throughout the entire data collection process.

Interview protocol. This study's interview guide (see Appendix C) involved semistructured questions grounded in the three conceptual models framing this study and developed by Gill (2015) to outline the capacity management needs within a construction company: (a) the time horizon model, (b) the individual-organization-industry levels model, and (c) the capacity development across components model. Gill developed the three models forming the conceptual framework of my study and grounded in the extant literature within the body of knowledge specific to capacity-planning processes in the construction industry. Gill developed his three conceptual models in a single theoretical study using the initial assumption that a single strategy for capacity-planning is based on three separate pillars of the process needed to meet capacity management needs within a construction company: based on time horizon; based on individual, business, and industry levels; and finally, based on components. My semistructured interview questions were grounded and validated in Gill's three conceptual models, providing construction company owners and their project managers a multitiered strategic plan by delineating the resource needed before construction firms go solo on bigger projects (Daniel &

Daniel, 2018), a problem often left unaddressed within the Qatari construction sector (Azzali & Tomba, 2017).

A semistructured interview technique within the multiple case study design structure supported my capability to understand the participants' experiences with the study's central phenomenon (Yin, 2017). Hence, in the case of this study, interviews were valuable in gaining an in-depth understanding of the perceptions of project managers in Qatar regarding how they utilize capacity-planning practices. Each section, as well as eliciting facts, utilized prompts to facilitate conversations around the facts, such as "Can you give me an example of that?" and "Please tell me more about that." While asking probe questions, generic questions can encourage in-depth examples and details of actions from participants. In asking about specific details, probes were customized to the specific dialogue with participants (Merriam & Tisdell, 2015).

I reflected to my understanding of what participants said to ensure accuracy and clarity. This process helped minimize potential interviewer-induced bias and provided participants with opportunities to correct any inaccuracies in the transcripts. As an extra validity check, this interview protocol was field-tested by two SMEs for proper alignment with the purpose of the study and whether the interview questions can provide answers for the central research question: Prof. Nicholas Harkiolakis, an SME in the fields of technology adoption and project management and currently on the faculty at New England College in Henniker, New Hampshire, USA and at Ecole des Ponts Business School in Paris, France; and Dr. Darren Allen, Senior Project Manager in the construction

industry based in United Arab Emirates and the United Kingdom and an SME in construction project management for developing economies in the MENA region.

Archival data. Triangulation is a core part of case study research and an investigative approach that is used during field study in addition to the subsequent detailed examination of data. (Yin, 2017). The role triangulation plays during the qualitative research process is highly important: it contributes to giving depth to the data collected because it is a systematic approach for confirming or contradicting data (Guion et al., 2011). The outcome of the qualitative interviews was triangulated with a few archival documents. Archival data in the form of government reports on the Qatari construction sector were used. Also, I examined a few databases relating to updated capacity-planning practice of infrastructure projects in Qatar. These two archival data sources were utilized for triangulation that answered the research question and gave credibility and trustworthiness to the findings of the study. Related qualitative multiple case study research questions by Neubert (2016) and Komodromos (2014) have also been answered using archival data to triangulate interview data.

Reflective field notes. The nature of the research question and the model supporting a qualitative research determines how observation is used in a research. The interpretivist paradigm nature of this research allows for unstructured observation using reflective field notes for data collection (Merriam & Grenier, 2019). Reflective field notes from semistructured interviews conducted for this research and online data were the third instrument used for data collection for this research (Merriam & Tisdell, 2015). Researcher's personal reflexivity can be eliminated during a face-to-face interview and

interview through Skype can aid the replication process (Janghorban, Roudsari, & Taghipour, 2014), sustaining an unbiased atmosphere (Yin, 2017) and allowing ease of access to distant prospective participants (Seitz, 2016).

Online data collection may constitute of interviews, interaction, and self-observation (Kozinets, 2017; Merriam & Tisdell, 2015) considering the majority of online data are documented and saved as they transpire. Nevertheless, because reflective notes offer more insight on how interaction may detect perception as against regular descriptive recording (Kozinets, 2017), reflective notes were prioritized over observational field notes in this study. Respondent's observation with reference to personal emotions, pretext, and other body language were recorded throughout the face-to- face and Skype interviews to capture nonverbal clues (Yin, 2017).

Aligning with common practices in researches driven by qualitative study and research method, and as deployed in related multiple case study researches (Neubert, 2016), a netnographic field note prompt developed during the interview process by the researcher was used as triangulation prompt during the process of data analysis (Kozinets, 2017). Transferability determines the strength of this study's instrumentation, it is similar to external validity as they both concern how a study can be beneficial in a different context or setting (Merriam & Tisdell, 2015). Transferability can motivate future researchers to carry out further investigations and highlight the possibility that the findings of this research study could be valuable to other individuals beyond the population of participants (Fusch, Fusch, & Ness, 2018; Shenton, 2004)

Procedures for Recruitment, Participation, and Data Collection

The intent of this study was to explore the perceptions of project managers in Qatar regarding how they utilize capacity-planning practices to mitigate project schedule delay and cost overrun in government-funded infrastructure projects. Data collection for this study was through in-depth, semistructured face-to-face interviews with project managers of government-funded infrastructure projects in Qatar. This was to ensure that information collected is based on respondent's experiences, observations, and opinions as against structured, defined, and restructured questions formulated by theoretical proposition (Yin, 2017) and that nonverbal and contemporary dispositions are captured and analyzed (Rubin & Rubin, 2012). Providing further insight into the phenomenon of study and to strengthen the research's validity and reliability, similar case study input using data sources like observation, participant's recollection, journals, seminars, and previous research was gathered (Yin, 2017). Ensuring clear and unambiguous understanding of the phenomenon of study was provided by the findings, varying data retrieved from diverse sources were merged while personal notes and observations were electronically recorded, analyzed, and coded to develop concept and theme (Baxter & Jack, 2008). This also strengthened the research validity and reliability and ensured consistency across the research (Yin, 2017).

In relation with Institutional Review Board (IRB) approval by Walden University, the data collection method for this research was face-to-face interview. Ten project managers of government-funded Qatar infrastructure projects were selected for this research through LinkedIn professional network website using purposeful criterion and

network sampling and meeting the inclusion and exclusion criteria for this study. Although this method of recruitment is often condemned for salient ethical issues of respect for privacy and interest of social media users and investigator transparency (Gelinas et al., 2017), participant recruitment through social media broadens the population scope and provides access to populations who may be difficult to access (King, O'Rourke, & DeLongis, 2014). The LinkedIn platform was appropriate for recruiting participants for this research because the platform is mainly used for professional networking and the nature of this research requires respondents who are professional (project managers) of Qatar infrastructure projects. The network sampling was also deployed to ensure adequate number of participants is achieved for the research (Yin, 2017).

The research purpose and Recruitment Letter (see Appendix A) was shared to candidates on the LinkedIn online professional platform who met the inclusion criteria of the study. This introductory letter oriented the candidates to the research purpose and design. Those who indicated that they wish to participate in the study after reading the Letter of Introduction and Recruitment (see Appendix A), received the Informed Consent Form (Appendix B). Informed Consent is a voluntary agreement to participate in research which describes in detail the research process, so that the participants will have an understanding of the research and its risks (Merriam & Tisdell, 2015). Informed consent is essential before enrolling a participant and ongoing once enrolled. Thus, the participants may be fully informed of the research design and their legal rights as study participants according to Walden University's IRB-approved standards.

When the initial eight sample participants were successfully recruited, I emailed to each a copy of the Informed Consent Form (see Appendix B). Once the Informed Consent Form was signed and returned to me, I engaged with participants through their preferred contact method to make an appointment for their interviews, which marked the initiation of the data collection process. The participants were engaged in a semistructured interview process of 30-45 minutes in length. I began data analysis when six participants had completed the interview process, and interviews continued until reaching the point of data saturation (Rubin & Rubin, 2012). Thematic analysis characterizing the phenomenon of study which entailed examining, pinpointing, and recording patterns within the multiple cases was presented (Yin, 2017). Further interviewing was truncated when no further details emerged relevant to the phenomenon of study (Yin, 2017).

Project managers leading government-funded infrastructure projects were the interview respondents selected for this research study. Exploring their opinion, experience, and perception as to how they utilize capacity-planning practices to mitigate project schedule delay and cost overrun in government-funded infrastructure projects was the intent of the interview. The selection of multiple project managers of government-funded infrastructure project managers in Qatar meeting the inclusion and exclusion criteria strengthens reliability, ensures variability, and allows for convincing theory because the findings were grounded in varying empirical evidences (Yin, 2017). The LinkedIn social media platform allowed for ease of access to the required and appropriate number of participants (King et al., 2014). Using the same LinkedIn social media

platform, the use of snowballing sampling was not required as proposed given that the initially proposed sampling method was adequate to generate the required number of participants (Sadler et al., 2010)

Interviews were conducted through face-to-face interaction and Skype. The results were recorded electronically, documented, and coded using Microsoft Excel software. Although Skype interview method has been criticized for higher potential of interruption, internet connection issues, and response time limitation (Cheng, 2017), Skype interview allows the researcher to contact participants irrespective of the location and in a time- and cost-effective manner, allows for screening remote candidates, assess communication skills and effect less pressure on candidates (Seitz, 2016). Microsoft Excel sheet was deployed for organizing questions, collecting data, storing data, and coding/categorizing data thematically (Bree & Gallagher, 2016). Collected data were stored in a biometrically secured location with private password exclusive to the researcher.

Interview transcriptions were accurately conducted to ensure precise and explicit recording of interviewee's responses to allow for thematic analysis (Yin, 2017). To ensure accurate transcription which presents deeper insight of participant's view, handwritten notes were used to capture body language cues (Seitz, 2016). Research validity through triangulation can be achieved when evidences are drawn from the combination of researcher's notes and other data collection methods (Lub, 2015). A transcript of the interview for each participant was shared with them for data source triangulation to confirm content and underlying social behavior accuracy (Yin, 2017).

The dissertation Chairperson and other research partners were given open access to the established protocol to address any distress from respondents although this research is not of a sensitive nature and informed consent was signed by participants to confirm voluntary participation despite subject's understanding of the research, its purpose and associated risk (Sadler et al., 2010). Confidentiality terms were communicated to participants which entailed protecting participant's information from being accessed by a third party or unauthorized parties, eradicating participant's attributable labels, and storing discernible information separately from data (Yin, 2017).

To ensure the resources deployed for this study are available for replicating similar research by future researchers, a safe and secured database was created for peer-review journals, seminars, history and transcription review and analysis for this study (Yin, 2017). Participants were also informed that all collected data and information is strictly for the purpose of research only and that all materials will be destroyed after 7 years. The findings of this research were shared independently with participants and published for stakeholder's ease of access and benefit.

Data Analysis Plan

Empirical and detailed exploration of data was transparently conducted throughout the phases of this study towards reasonable and practicable data analysis framed by the conceptual proposition and consistent with the research phenomenon (Ravitch & Carl, 2016). Related "how" and "why" research questions evolved around the research phenomenon to provide further insight on the phenomenon of study (Yin, 2017). Semistructured interview with open ended questions was deployed to collect data for this

research towards achieving the aim of this study with data stored and organized using suitable techniques. The data collection process which spanned across a period of 3 weeks entailed that an average of three interviews were conducted per week. Cross-case study was further conducted to develop emerging themes (Cooper & White 2012) whereas data triangulation with related literature and evidence from research findings enhanced the dependability and reliability of the findings (Ravitch & Carl, 2016).

Data analysis process which entails triangulating interview data was conducted while similar and common thoughts grounded in defining words and established opinion were documented to unveil emerging ideas and themes (Merriam 2014; Yin, 2017). Content analysis started off after organized ideas/concept had been coded into identifying patterns (Saldana, 2016). The data collection method, the collected data, the reviewed data and process of data review underwent quality audit and triangulation enhanced the reliability and validity of the research findings (Yin, 2017). Thematic analysis which entails searching for patterns or themes in the codes across different interviews was mainly dependent on identifying, examining, and pinpointing of similarities, relationship, and differences in the data (Ravitch & Carl, 2016).

I used manual coding to develop the splitting up or categorizing of common codes, phrases, and words within the participants' responses. It was my intention to use the cross-case synthesis analysis strategy (see Yin, 2017). I, additionally, applied content analysis techniques for primary data. The first step was to identify codes in the main content through information coming from in-depth interviews, and then create categories from the identified codes. I continued to analyze content from primary and secondary

data using a cross-case synthesis technique and then triangulation by exploring patterns of similarity or difference among themes generated by the analysis (Yin, 2017).

The identified themes represented recognized patterns, reasonable and practicable agenda of the researcher, commonalities as well as the research questions; these core elements aided in determining whether repetitive and nonrepetitive insights were examined for both within-case and cross-case analysis (Yin, 2017). Several themes were classified using coding analysis that recognizes similar relationships within several cases with codes that connect data collections and combines themes across a few methodologies such as journals, interviews, and discussions (Ravitch & Carl, 2016; Saldana, 2016). Triangulation of data collection sources improved the study quality and ensured a more thorough evaluation of the data collected (Yin, 2017). Attitude is usually passed across using signs that are conveyed verbally, with their body language and so on (Stake, 2013). These signs were recorded in several ways to enhance the development of context-based reports of unspoken character which allowed for a more comprehensive memory (Ravitch & Carl, 2016). Records of the electronically transcribed research participants' responses were shared individually with the respective participants to examine and verify the accuracy of interpretation and assess the researcher's reflexivity and perspective (Berger, 2015; Merriam & Tisdell, 2015).

The data evaluation approach was centered around a cross-case method to synthesize the main outcomes of within-case analysis and further develop themes for a multiple case analysis (Yin, 2017). Studies involving many cases often use meta-analysis to identify cross-case sequence, but this study made use of Microsoft Excel because of

the relatively low number of cases involved in this study (Yin, 2017). The issues of complexity and difficulty in identifying links and patterns associated with the investigation of real-life experiences can be controlled by carrying out a cross-case correlation which enhances the validity and generalization of the study (Yin, 2017). In addition, the use of cross-case technique helps in achieving an organized analysis of the reasoning connecting the research data to the study's concept. The trustworthiness of data was strengthened by using a fact-based logical reasoning based on data homogenization, reduction, and clarification (Cooper & White, 2012; Yin, 2017)

Issues of Trustworthiness

Establishing a suitable and compactible methodology based on the research purpose is as important as establishing a conscientious research design and procedure for research objectivity and reliability (Korstjens & Moser, 2018). Trustworthiness in qualitative research defines the credibility, transferability, confirmability, and dependability of qualitative research findings given that qualitative research does not use instruments with established metrics (Merriam & Tidsell, 2015).

Credibility

Data credibility defines the extent to which the researcher is confident in the research findings (Merriam & Tisdell, 2015) and often time interpreted as an assessment of whether or not the findings of a research represent a convincing conceptual exposition of the data (Korstjens & Moser, 2018). Credibility of this study was achieved using several approaches aiding data trustworthiness not limited to data triangulation, multiple analyst triangulation, and member checks. Although participants and readers are the best

judge of data credibility (Ravitch & Carl, 2016), prolong observation, saturation, consistency, cross-case synthesis, participatory research, digital recording, and audit trail were deployed by the researcher to aid data conclusion credibility (Cooper & White, 2012; Yin, 2017)

Deploying a research design that aligns the research question and research aim can also aid research credibility (Stake, 2013). The use of multiple case study for this research helped in consolidating multiple respondents' opinion and extract of unified theme and diverging opinion from in-depth understanding of an extensive population aided the credibility of this study (Morse, 2015). The use of multiple case study with relevance fitting sample meeting the inclusion and exclusion criteria for the study and convincingly representing members of larger population also improved the credibility of the study (Flick, 2009)

Transferability

Transferability explains the degree to which the research can be transferred or replicated to other contexts (Yin, 2017). Often defined by the readers, specific details of the research method and phenomenon are compared to similar situation readers are familiar with and when specifics are comparable, the said research is deemed as credible and transferable. The transferability of this study was aided via provision of comprehensive and thorough description of the situation and methods. Detailed contextual description of fieldwork and all-inclusive application of findings was also provided by the research design, aiding the research transferability (Morse, 2015). Comprehensive and detailed respondent's data description with full account of their

experience, thoughts, and opinion alongside conscious selection of participants meeting the inclusion criteria drives the transferability process (Yin, 2017).

Dependability

Dependability in qualitative research ensures that the findings of the study are consistent and can be repeated and often measured by the standard with which the study is administered, scrutinized, and presented (Yin, 2017). To enhance the dependability of this study, comprehensive detail of the research design and the data collection process and strategies were documented to allow for ease of study replication. Data collection process, strategies, and methodologies including semistructured interview questions, field notes, and journals for within and cross-case comparison alongside multiple sources used to triangulate themes were comprehensively documented. Finally, code analyses based on observations and buttressing the phenomenon of study strengthens the dependability of this study (Morse, 2015).

Confirmability

Confirmability in qualitative research, often judged by external researchers, questions the relationship between the data and the research findings (Ravintch & Carl, 2016) and establishes researcher's bias during the study (Stake, 2013). Adequate demonstration was provided to prove that the research findings are informed by the participant's opinion and not because of researcher's bias. Confirmability of this study was also enhanced via audit trail deployed throughout the study including the study proposal, field journal, research design procedure, raw data, and instrumentation among others to indicate how each finding was made (Ravintch & Carl, 2016). Deploying design

instruments that are not manipulated by the researcher, triangulation of data source and theoretical perspective to validate the potency of the study concept also helped in strengthening the confirmability of the study (Morse, 2015). Overall, any researcher's predisposition and beliefs underpinning decision as well as any negative instances was documented (Flick, 2009).

Ethical Procedures

Since the adoption of regulation governing human research by the United States in the 1970s set off by varying scientific practices with serious ethical issues during World War II, ethics in research involving human subjects have become a major concern for governing and academic bodies up until now (Glenna et al., 2019). Although most of the ethical debate has focused on clinical research related questions as in the case of Tuskegee Syphilis study, Nazi experience and HIV research in developing nations as it pertains to risk management, randomization, reporting of adverse effect, research using vulnerable population and informed consent, ethical issues remain a growing concern among researchers (Yin, 2017). The three primary ethical principles as provided by *The Belmont Report: Ethical Principles and Guidelines for the Protection of Human Subjects of Research* to govern scientific research and guide IRB deliberation and as published in 1979 include autonomy, beneficence, and justice.

Autonomy often referred to as "respect for person" is the first ethical principle which refers to the fundamental right of individual to choose what activity they will or will not be engaged in (Yin, 2017). Autonomy requires individuals to have detailed understanding of what they are requested to be engaged in to allow them to make

reasonable judgment of its effect on them and subsequently make a noncoercive decision to participate or not (Roth & von Unger, 2018). Respect for person in human research gives regard to the natural ability of individuals to do what they so choose to do because not every individual has the intentional application of independence and control (Yin, 2017). This therefore calls for exercising care to ensure participants' responses are not influenced by coercion or external interference (Glenna et al., 2019).

Beneficence being the second ethical principle refers to researcher's obligation to maximize benefit for participant and society while minimizing risk (Honig, Lampel, Siegel & Drnevich, 2017). This ethical principle ensures the well-being of participants and society at large with respect to the research study given that the researcher is not only responsible for guiding participants against physical and psychological harm, but also responsible for ensuring the research benefit outweighs the anticipated risk (Glenna et al., 2019). Justice is the final ethical principle which demands equitable selection of research participants (Roth & von Unger, 2018). Justice demands avoiding participants or populations whose participation might be unfairly coerced and demands that participants must like benefit from the research (Yin, 2017).

Although this research does not entail participants or populations whose participation might be unfairly coerced, informed consent process was strictly adhered as participants were provided with full disclosure about research nature, intended use of the study, what their participation entails, associated benefit, risk and giving opportunity to participants to ask questions prior to confirming whether to participate or not. Although oral consents are acceptable in research (Glenna et al., 2019), the informed consents for

this research were obtained in writing after participants were given adequate time to consider the risk and benefit associated with his or her participation (Yin, 2017). Participants' safety and confidentiality is key in qualitative research (Roth & von Unger, 2018). This study used available information to identify and disclose potential risk to participants and abstained from disclosing data or unauthorized data that can be linked to participant's identity.

Also, because participants' feedback which might contain revealing personal details can hardly be screened owing to the nature of qualitative research which entails obtaining interviewee's testimony through dialogue and direct engagement, participants were informed with regards to the purpose of the research, term of agreement, participant-researcher data access, and ethical/legal responsibility among others, guiding the research study. Walden University's IRB approval was pursued prior to data collection to fulfill the rigorous scientific review requirement of qualitative research such that the benefit is established on sound experimental design, and potential risk is minimized. The research also ensured adequate actions are in place to address ethical issues with compromising participant's privacy and trust (Honig et al., 2017). The research design was designed such that it empowers participants and encourages them to express their experience and representation of responses done towards a power balance (Yin, 2017).

Finally, this research ensured aggregated data and report over individual contextualization such that aggregation of individual voices contributes to the process (Ravitch & Carl, 2016). Also, intrusion was prevented to streamline the information

gathered for this research by not engaging in information which is disconnected from the phenomenon of study (Glenna et al., 2019) and research findings were evaluated to minimize risk and maximize benefit to participants and society at large.

Summary

In Chapter 3, I elaborate on the role of the researcher in term of critically accessing the researcher's personality and identity issues to determine accuracy and trustworthiness of research findings (Peredaryenko & Kruass, 2013). Design and rationale, participant selection criterion, procedure for recruitment, and data analysis plan were also detailed in this chapter. The chosen qualitative multiple case study design was informed by the nature and phenomenon of study to allow for collection of data informed by participants' experience and opinion while the participant selection criterion, instrumentation, and recruitment procedure were consonant with the research purpose. The issue of trustworthiness in term of the credibility, transferability, dependability, and confirmability of this research were also covered using the three primary ethical principles as provided by *The Belmont Report: Ethical Principles and Guidelines for the Protection of Human Subjects of Research*, namely, autonomy, beneficence, and justice. Finally, and to ensure ethical guidelines and principles are strictly adhered to without compromise, the need for IRB approval was additionally discussed in the chapter.

In Chapter 4, I will describe the data collection and data analysis processes, and will present the research findings and results in detail. Findings from each data source, detailed data analysis, and procedures of coding will also be covered in this chapter as well as justified answers to the research question with comprehensive evaluation of the

findings. Finally, the impact of the study to research and the field of management will be presented.

Chapter 4: Results

The purpose of this qualitative, multiple case study was to explore the perceptions of project managers in Qatar regarding how they utilize capacity-planning practices to mitigate project schedule delay and cost overrun in government-funded infrastructure projects. The central research question for this exploratory multiple case study was developed to retrieve data from empirical settings on the phenomenon of study (see Stake, 2010). From data collected to answer to the central research question, I was able to gain a deeper insight and understanding of how project managers in Qatar utilize capacity-planning practices to mitigate project schedule delay and cost overrun in government-funded infrastructure projects. The study's central research question that guided the interview protocol and guided this study was the following: How do project managers in Qatar utilize capacity-planning practices to mitigate project schedule delay and cost overrun in government-funded infrastructure projects?

A gap in previous research regarding cost overrun and schedule delay in Qatari infrastructure projects having damaging effects on the national economy by way of claims and litigation, contractual disputes, delays in dependent projects, and project abandonment (Gbahabo & Ajuwon, 2017; Oyewobi et al., 2016) led to the development of the central research question. A literature gap was identified, which indicated that many project managers in Qatar assigned to lead infrastructure projects may be failing to apply effective capacity-planning practices to mitigate project schedule delay and cost overrun (Azzali & Tomba, 2018; Kangwa & Ebohon, 2019).

This study was framed by three conceptual models developed by Gill (2015) to outline the capacity management needs within a construction company: (a) the time horizon model, (b) the individual-organization-industry levels model, and (c) the capacity development across components model as. Supported by project management theory to provide a combination of tools, tasks, processes, templates, and resource planning for managing projects (Jugdev et al., 2018), Gill's three conceptual frameworks can offer construction company owners and their project managers a multitiered strategic plan to not only manage current projects toward defined success but also bid for bigger projects in partnership with prominent players. Although the challenge of capacity-planning is often left unaddressed within the Qatari construction sector (Azzali & Tomba, 2018), this limitation according to Gill (as cited in Daniel & Daniel, 2018) is achievable by ensuring necessary resources and capital. The findings of this study are aimed at addressing the implementation gap of capacity-planning on Qatar infrastructure project management as well as advance Qatari project managers' understanding of capacity-planning. Findings may be used to promote a more effective project management culture aimed at improving Qatari infrastructure project delivery through effective resource planning.

A detailed description of the results for this multiple case study is presented in this chapter. These data were analyzed and presented in two steps: thematic analysis and cross-case analysis. The thematic analysis for collected data was based on the study's multiple data sources: (a) a semistructured interview protocol (see Appendix C) that contained items designed and standardized by previous researchers, (b) archival data in the form of government reports on the Qatari construction sector (see Yin, 2017), and (c)

reflective field notes that were kept by me throughout the data collection process (see Merriam & Grenier, 2019). Thematic analysis is followed by a cross-case analysis in which findings from initial thematic analysis of data are synthesized to answer the study's central research question. Although a variety of approaches can be deployed in using thematic analysis and generate similar rigor, these approaches have similar relevance in qualitative data analysis (Boyatzis, 1998). Because thematic analysis is flexible, its use by researchers differs based on the research purpose, aim, and analysis process (Boyatzis, 1998).

Rooted in a natural setting with the aim of gaining understanding of the underlying process behind the phenomenon under research, a multiple case study design provides the researcher with a holistic understanding of social phenomena (Merriam & Tisdell, 2015). The study's central phenomenon was the individual, the context was Qatari infrastructure projects (see Eisenhardt & Graebner, 2007), and the investigation became a study of individuals living within a community. In such a study, the optimal qualitative design to retrieve data with the goal of theory building is an exploratory, multiple case study design (see Eisenhardt & Graebner, 2007).

Following the replication strategy by Yin (2017), I attempted to replicate similar findings within each case and across cases giving room for understanding similarities and differences between cases. Multiple case study allows the researcher to gather strong and reliable evidence from similar or contrasting data (Yin, 2017). Aside from being chosen for multiple reasons such as filling of theoretical categories, replicating previously selected cases, and extending emergent theory, this study design also allows the

researcher to provide convincing theory through comprehensive discovery of research questions and theoretical evolution (West et al., 2017). Because this study was an extension of previous research, I not only provided a replication strategy but broadened the findings of previous researchers in a contemporary and significant theoretical direction (see Bonett, 2012). To ensure deeper understanding of the phenomenon under study, I limited the number of cases between eight and 10 because each case may increase the generalizability of the findings (see Schram, 2006).

The unit of analysis in this study was the individual project manager in Qatar, and each case considered for this study was defined by the unit of analysis. Because this study was individually based, the central phenomenon of the study (in this case the individual project manager leading a government-funded infrastructure project in Qatar) was the context and not the study's target (Yin, 2017). The investigation was therefore not the study of an organization, but the study of individual employees; the exploratory multiple case study design was suitable to retrieve data with the aim of theory extension (see Eisenhardt & Graebner, 2007). In this chapter, I provide detailed recurring theme and main conceptual categories supported by participants' voices. Further information such as participants' demographic table, coding categories and themes, and synthesis within cases and across cases are also detailed in this chapter.

Research Setting

Data for this study were collected via semistructured interviews with eight government-funded infrastructure project managers in Qatar meeting the inclusion criteria for this study: adult over the age of 18, 3 years continuous experience as a project

manager in a Qatari infrastructure project, and adequate knowledge regarding the topic of capacity-planning processes in project management. The participants were recruited using the professional LinkedIn network platform. After participants were recruited, follow-up contact through their respective e-mail was made. A consent form was sent to each participant, which included the confidentiality agreement that was acknowledged by each participant. Although the scheduling process was somewhat challenging, an interview date and time was agreed via e-mail. Recorded Skype interviews were conducted one-on-one with participants on the mutually agreed time and date and at participants' choice of private settings with minimal interruptions. The semistructured interview protocol was structured such that participants were fully engaged throughout the interview process and openly expressed their view on the phenomenon of discussion without incident.

Demographics

The interviews were recorded using the MP3 Skype recorder, a free software program that captures audio recording via Skype, and a backup Galaxy S6 handheld digital audio recorder. The average duration for the interviews was 33 minutes, 26 seconds; the interview times ranged from 22 minutes, 31 seconds to 51 minutes, 34 seconds. Eight government-funded infrastructure project managers ranging in ages from 37 to 65 took part in the interviews. All of the participants has at least 3 years of continuous experience as a project manager in a Qatari infrastructure project, and adequate knowledge regarding the topic of capacity-planning processes in project management.

I considered the following demographic issues that were relevant variables in defining the study's conceptual framework: gender, age, nationality, years working in the Qatari construction sector, nature of infrastructure project, and years working on that project. The assigned pseudonyms were in XY format in which X was presented by the letter P, which indicated infrastructure project manager, and Y was the identifier number assigned to each participant. Table 1 shows the details of participants' demographics.

Table 1

Participants' Demographics and Characteristics

Participant	Gender	Age	Nationality	Years working in Qatar construction sector	Working on which Qatari government-funded infrastructure project	Years working on Qatari infrastructure project
P1	Male	51	British	10	Hospital	10
P2	Male	38	Croatian	11	Pedestrian bridges	11
P3	Male	38	Portuguese	6	Road bridges	6
P4	Male	39	Egyptian	8	Road	4
P5	Male	44	Lebanese	8	Portable water & treatment sewer	8
P6	Male	37	Jordanian	13	Women's hospital	7
P7	Male	65	Egyptian	4	Sea port	4
P8	Male	54	Indian	11	Pedestrian bridges	5

Data Collection

Collection of data for this qualitative multiple case study started on July 4th, 2019, after receiving IRB approval from Walden University on the 28th of June 2019 (IRB Approval # 06-27-19-0676851). The data collection process was finalized on July 9th, 2019. Data transcription was conducted simultaneously with data collection and finalized on July 9th, 2019. I concluded that data saturation had been attained on the seventh semistructured interview when data analysis and reflective field notes did not yield any new themes and all of the participant's responses were similar to one or more responses from P1 to P6. In the eighth interview conducted with P8, no unique themes emerged that differed from those that emerged from P1 to P7. As a result, I chose to halt further interviews.

The method and instrumentation used for this qualitative multiple case study including the number of interviews was similar to qualitative multiple case study research by Neubert (2016) and Komodromos (2014), who relied on in-depth interviews. Evidence of data saturation was confirmed in the raw data, which included government-funded infrastructure project managers' capacity-planning practices. Research validity through triangulation can be achieved when data are collected from the researcher's notes and other data collection methods (Lub, 2015). Data triangulation was deployed for this study to uncover data points that indicated similar conclusions (Yin, 2017). Data were triangulated between cases using archival data in the form of government reports, observations from literature review, field work, and participants' and interviewers' subsequent reflections. Emerging patterns from the data analysis were organized into

themes and categories to address the research purpose, answer the research question, broaden the theoretical foundation, and make an original contribution to the study's conceptual framework.

Within 15 calendar days, the following activities were conducted in parallel and sequentially where applicable: (a) participant recruitment; (b) signing of consent form by participants; (c) scheduling, conducting, and recording of interviews; (d) recording of reflective journal notes; and (e) interview transcript validation by participants to establish rigor. Data analysis commenced after these processes were concluded. I relied on interview questions that were framed using the study's conceptual framework to establish content validity.

A total of eight in-depth face-to-face interview were conducted over a period of one week starting July 4th, 2019 to collect data using the Skype telecommunication platform. The interviews which were preceded by signed consent form by participants were scheduled based on participant's preference and conducted as scheduled in participant's private settings. I kept a reflective journal note with me from the date of receiving IRB approval and throughout the interview proceedings to record my thoughts, emotions, reflections including participant's nonverbal cues such as emotions and behaviors. Participants' reactions and responses to the data collection process were also captured in the reflective journals note.

The interview process and proceedings went as expected except for few and expected challenges in response time and scheduling of interview time due to diversities in availability and which explains the infrequent login cycle. Participants willingly and

openly expressed their experience and perceptions on their use of capacity-planning to manage their government-funded infrastructure project. Capacity-planning definition was provided for each participant during the interview by me to establish a common understanding and interpretation of the concept of capacity-planning. The interview question addressed the experience and perception of infrastructure project managers in Qatar regarding how they use capacity-planning to mitigate the risk of project delay and cost overrun in their government-funded infrastructure project.

Initial Contact

Contact with prospective participants was initiated on the 29th of June 2019 following receipt of IRB approval on June 28th, 2019 through the LinkedIn professional platform using the inclusion criteria as established for this study. The search yielded project managers in Qatar who are engaged in infrastructure projects in Qatar and from their respective LinkedIn career profile, I was able to establish how long they have been engaged in managing similar projects. Alternatively, the participants were informed of the inclusion criteria for this study which include adult over the age of 18, 3 years continuous experience as a project manager in a Qatar infrastructure project, and adequate knowledge regarding the topic of capacity-planning processes in project management which they willingly consent to. Letter of introduction and recruitment was sent to several prospective participants meeting the inclusion criteria.

Five responses were received from initial contact with prospective participants within 5 days confirming their interest in participating in the study. Formal consent form was immediately sent to the five confirmed potential participants which they responded

to formally within 3 days giving their consent. A follow up message was sent to others who were yet to confirm their interest without feedback. More letters of invitation were sent out to additional participants and three additional confirmations were received within 24 hours; the formal consent form was immediately sent to the additional three confirmed interests which they responded to formally giving their consent. Final consent from the last participants was received on July 9th, 2019 and further search for participants was immediately halted.

Interviews

Date and time for the interview was scheduled with the participants after receipt of official consent confirmation. My Skype ID was shared with the participants and I collected their respective Skype ID making it very easy to locate each participant on the Skype platform. Interviews were recorded using the MP3 Skype recorder, a free software program that captures audio recording via Skype and a backup Galaxy S6 handheld digital audio recorder as consented by participants. Although interview was done face-to-face through Skype, no video recording was done as only audio recorders were used during the interview.

Because the interview timing and locations were at participant's convenience, there were no interruption during the interview. The participants were experienced project managers engaged to manage varying types of government-funded infrastructure projects in Qatar. Participants were encouraged to openly express their opinion and perception regarding how they use capacity-planning to mitigate the risk of project delay and cost overrun in their government-funded infrastructure project. Using Skype platform

made it convenient with their chosen location and time aiding replication (Yin, 2017). The conversional nature of the semistructured interview allowed for quality data collection regarding their experiences and emergence of nonverbal cues. Triangulation using the reflective field notes also helped to improve the validity of the study (Guion et al., 2011).

Reflective Field Notes and Journaling

I kept reflective field notes with me from the date of receiving IRB approval on June 28th, 2019 where I drafted my plan, and the processes of recruiting participants, summarized records of feedback to keep myself updated to progress prior to data collection and record any contextual information relevant to the phenomenon under study. These reflective field notes were also maintained throughout the interview process to record my thoughts, emotions, and reflections including participants' nonverbal cues such as emotions and behaviors. Participants' reactions and responses during the recruitment process, data collection process, tones and attitude during the interview were also adequately captured in the reflective journal's note. During data analysis, the reflection I made on the field note and interview transcript gave me the opportunity to mirror participants' responses in the context of their sentiment (Merriam & Grenier, 2019).

Few observations were written down by me during the face-to-face interview with the participants. I did further reflection on the interviews with participants for inference by repeatedly listening to the interview audio recordings (Merriam & Grenier, 2019). These reflections which were done continuously from one interview to the other further

aided in establishing pattern and theme within and across data. I observed the passions attached to the participants' responses and how some participants were quick in drastically attributing failure in capacity-planning to others including department, organization, and team members. All the participants discussed firmly their perception on how they utilize capacity-planning practices to mitigate the risk of project delay and cost overall in their government-funded infrastructure project.

Transcript Review

Interview transcriptions were done after each interview and I forwarded a copy of the transcript with individual participants through email for data source triangulation to confirm content and underlying social behavior accuracy as well as eliminating concerns over data accuracy. This process called member checking also helps to improve the accuracy and credibility of this research as thoughts which participants felt are not clearly expressed are cleared and corrected as appropriate (Yin, 2017). Generally, a small number of changes were made from one interview to unify understanding although the initial transcript and the proposed content changes by the participants signifies the same meaning. Nevertheless, these changes were incorporated to the satisfaction of the participants.

Responses to interview transcripts were received within 72 hours of sending the transcripts to the participants, where seven participants confirmed the content as consonant with the interview. The confirmation for the one corrected transcript was received within 24 hours of sending the revised transcript which was also confirmed to be in accordance with the interview. The confirmed transcriptions were compiled in a

secured file and stored according to the data security plan in Chapter 3 and were then used for data analysis and hand coding.

Data Analysis

I commenced data analysis after accurately confirming the transcribed data with all the participants. Descriptive coding strategy as recommended by Saldana (2016) was adopted to assign meaning to segments of raw data collected for this study. Emerging words from the descriptive coding were then used for categorization and thematic analysis. The raw data from the interview as contained in the transcript presented the detailed experience of project managers in Qatar regarding how they utilize capacity-planning practices to mitigate the risk of project delay and cost overrun in their government-funded infrastructure project.

Because coding drives data collection process in a qualitative exploratory multiple case study prompting the qualitative research to reshape the instruments (Saldana, 2016), reshaping of analysis for this study led to emergence of themes regarding how project managers in Qatar utilize capacity-planning practices to mitigate the risk of project delay and cost overrun in their government-funded infrastructure project. Considering that case study involves in-depth, futuristic, and holistic investigation into all aspects and provides industry related data which are not anticipated by literature (Yin, 2017), this study provided detailed information on the grey area of capacity-planning practices in Qatar infrastructure projects as comprehensive understanding of the phenomenon of study unveiled.

Given that multiple case study allows for data analysis within each situation and across different situations giving room for understanding similarities and differences between cases (Yin, 2017), I made comparison between the findings between and among the eight cases used for this study to understand similarities and differences in participants' perceptions. Also, because inductive approach is used in qualitative research to generate or broaden theory and allow themes to emerge from data (Saunders et al., 2018), inductive approach was deployed as a strategy for this study which allowed for themes to emerge.

Considering that thematic analysis emphasizes identifying, examining, and taking record of meaningful patterns within data, propelled by systemized raw data coding process (Yin, 2017), thematic analysis for this study examined meanings and provided description of the social reality of government-funded infrastructure project managers in Qatar regarding how they utilize capacity-planning to manage their projects. The accuracy of thematic analysis lies on the set of techniques deployed by the researcher while analyzing textual data towards developing themes, such that the emerged themes can be used to answer the study's central research question. Recording, transcription, member checking, and categorizing of similar thoughts using keywords and deeply rooted sentiments help validate the accuracy of the data base for this study (Yin, 2017).

Hand coding of data via systematic process as framed in the descriptive coding method was used for thematic analysis for this study (Saldana, 2016). Descriptive coding strategy as recommended by Saldana (2016) was adopted to assign meaning to segments of raw data collected for this study leading to emergence of word lists and/or phrases for

indexing and data categorization. Hand-coded interview data were done using Microsoft Excel software to code the participants' transcribed interview responses. Word coding and data triangulation led to substantial recognition of patterns while improved dependability for the study was achieved by paying more attention to similarities and differences across multiple cases (Yin, 2017).

Adopting the *ground up* data analysis strategy as detailed by Yin (2017), I was able to generate codes from raw data using an indictive approach a recommended by Boyatzis (1998). Inductive analysis is a process of coding the data without trying to fit it into a preexisting coding frame or the researcher's analytic preconceptions. By using an indictive approach to generate codes, the thematic analysis of the study is data-driven (Braun et al., 2019).

I utilized thematic analysis by searching for themes important to the depiction of the phenomenon (Meier et al., 2017). This process entails identifying themes over a careful reading and understanding of the data, a form of pattern recognition within the data in which the evolving themes become the classifications for analysis. In this case, I used cross-case synthesis analysis to integrate both the data-motivated inductive methodology and the empirical priori prototype of codes approach defined by Yin (2017).

I categorized common codes, phrases, and words within the participants' responses. It was my intention to use a cross-case synthesis analysis strategy (Yin, 2017). Additionally, I applied content analysis techniques for primary data. The first step was to identify codes in the main content through information coming from in-depth interviews and then to create categories from the identified codes. I continued to analyze content

from primary and secondary data using a cross-case synthesis technique and then triangulation by exploring patterns of similarity or difference among themes generated by the analysis (Yin, 2017).

I highlighted key words and phrases which I considered consonant to answer the interview questions as soon as the data were entered, and my thematic analysis was carried out by recognizing, identifying, and recording patterns from the interview discussion. Words and phrases which I considered pertinent to answer the study's central research questions were highlighted and extricated from participant's transcribed interview. I set apart identified themes and patterns while conducting content analysis and attributed nonrecurring evidences to their respective individual case compositions. Codes were assigned to extracted and evaluated data segments and recorded against each interview question. Codes were further accrued into themes by identifying and distinguishing similarities across cases (Yin, 2017). Finalized conceptual categories and themes for this multiple case study are further presented and described below to exemplify the coding process for each category and theme.

With the use of manual descriptive coding, I was able to get much deeper with the data (Cronin, 2014) in such a way that it helped get a more contextual understanding of the data (Finfgeld-Connett, 2013). Being a novice researcher, the descriptive manual coding method was more effective and suitable for me to use than Computer Assisted Qualitative Data Analysis (CAQDAS) software programs for my study's data analysis process. The data analysis considered all data obtained from the study's archival data in the form of government reports on the Qatari construction sector. I kept my reflective

field notes throughout the data collection process. I used my notes to reflect on participants' responses during the within-case and cross-case data analysis. The data analysis of the study was structured using Yin's (2017) five phases of analysis and their interactions used to assemble, collect, interpret, disassemble, and conclude data. The sources of data were through interviews, journaling and archival data as in Qatari government reports, or methodological triangulation to enhance the dependability of the results.

The five conceptual categories are based on the conceptual framework and 15 themes gleaned from the thematic analysis.

Themes for Resources to Meet Performance Capacity

1. lack of long-term planning for resources,
2. inconsistent monitoring of resource flow, and
3. communication issues between management and customer.

Themes for Knowledgeable and Skillful Staff

1. challenge of unskilled workers,
2. shortage of professional personnel, and
3. challenge of managing a multinational workforce.

Themes for Short- and Long-Term Planning Strategy

1. inconsistent long-term planning strategy,
2. contractor's poor site management, and
3. inadequate accounting of time-shortened activities.

Themes for Cost Overrun Issues

1. communication on cost issues with management,
2. lack of budgeting for unexpected changes, and
3. project complexity.

Themes for Time Management

1. local economic conditions,
2. slow correction of mistakes in the construction phase, and
3. delays caused by contractors and subcontractors.

The five conceptual categories are grounded in the study conceptual framework. This includes three conceptual models developed by Gill (2015) to outline the capacity management needs within a construction company: (a) the time horizon model, (b) the individual-organization-industry levels model, and (c) the capacity development across components model. Gill (2015) developed his three conceptual models in a single theoretical study using the initial assumption that a single strategy for capacity-planning is based on three separate pillars of the process needed to meet capacity management needs within a construction company: based on time horizon; based on individual, business, and industry levels; and finally, based on components. To develop the time horizon model, the individual-organization-industry levels model, and the capacity development across components model, Gill's study was supported by project management theory to provide a combination of tools, tasks, processes, templates, and resource planning for managing projects (Jugdev, Mathur, & Cook, 2018). Gill's three conceptual frameworks provide construction company owners and their project managers

a multitiered strategic plan to bid for bigger projects in partnership with prominent players by ensuring the necessary resource and capital before construction firms go solo on bigger projects (Daniel & Daniel, 2018), a problem often left unaddressed within the Qatari construction sector (Azzali & Tomba, 2018).

Presenting case study research findings can be done in different style according to the purpose of the work, the kind of analysis undertaken and the intended readership. In this case the personation of category and themes is by participant quotes since a goal of the research was to give voice to a previously unheard population through this purposive sample (Corden & Sainsbury, 2006). The following is a description of the finalized categories and themes of this multiple case study, along with respective examples of participant quotations (Table 2) to represent each of those categories and themes.

Table 2

Category and Theme Examples

Participant	Interview Excerpt	Category	Theme
Participant 1	"The key thing in Qatar is that anything that needs to come from outside has an extremely long wait, and that includes labor, plants and materials. So, first thing is to talk to the contractors about the project, and we do this before the design, to look at what materials can we use here in Qatar or, not necessarily here in Qatar, but that we can get hold of quickly, okay, that won't put the project at risk"	Resources to meet performance capacity	1) Lack of long-term planning for resources; 2) Inconsistent monitoring of resource flow; 3) Communication issue between management and customer;
Participant 2	"The good people are always under the loop. So, they may or may not come to you. I cannot say I ensure that, I always have the risk to start the project with people which I count on, but half of them might not be suitable or fit for purpose; Mostly in Qatar, the challenge that some companies like ours which are more on management and special works have is that we don't have enough people always at times"	Knowledge and skillful staffs	1) Challenge of unskilled workers; 2) Shortage of professional personnel; 3) Challenge of managing a multinational workforce
Participant 3	"One, we outsource some of the work only then to find that we don't have capabilities for these capacities and it might not be worth it after three or four months to recruit all these people and then fire them again afterwards, if there's no sufficient projects to sustain it. Or, even get a manpower agency and tell them I need these people with this profile and that people with that profile, and they just get you those people from outside."	Short and long term planning strategy	1) Inconsistent long-term planning strategy; 2) Contractor's poor site management; 3) Inadequate accounting of time-shortened activities;

(continued)

(continued)

Participant	Interview Excerpt	Category	Theme
Participant 4	"But part of the overall challenges that we meet in design, and construction of infrastructure projects, are client changes during construction leading to huge time delay and massive cost variation. This is challenging because project managers do not have the ultimate decision making on some issues especially when there are financial implication and often times, it's difficult to relate such to management since the management expect you to manage the resources and sometimes variation to construction with available funds"	Cost Overrun Issue	1) Communication on cost issue with management; 2) Lack of budgeting for unexpected changes; 3) Project complexity;
Participant 5	"The challenges basically can be summarized as some type if we do some activity which we don't have previous experience in, that might be a challenge. There was one project we did in 2011, it was a six bay apron in Doha International Airport, and we didn't have any experience, we had to go with a subcontractor who's very well knowledgeable and has experience. To be truthful, we rely solely on the experience he has in the execution of airplane concrete aprons even though it ended in huge delay"	Time Management	1) Local economic condition; 2) Slow correction of mistake in the construction phase; 3) Delays causes by contractors and subcontractors

(continued)

(continued)

Participant	Interview Excerpt	Category	Theme
Participant 6	"Generally, the most challenge is the language. Because you have different nationalities for the labor. They are not all speaking same language. Sometimes they go in to the safety induction, and they shake their head that they understand, but they actually don't know what has been said. So this is a big challenge. We have to make sure that each and every one understood the induction. So, if possible, to provide different tutors with different languages, to translate, and communicate with the complete staff, but comes with additional cost.	Knowledge and skillful staffs	1) Challenge of unskilled workers; 2) Shortage of professional personnel; 3) Challenge of managing a multinational workforce
Participant 7	"We rely only on initial project planning which is done, that lays out a complete baseline of what stages, what workers are required? What skills, what competencies? Although not always consistent across all project, since it depends on the planner's experience"	Short and long term planning strategy	1) Inconsistent long-term planning strategy; 2) Contractor's poor site management; 3) Inadequate accounting of time-shortened activities;
Participant 8	"Sometimes the materials go missing from the site. We would have purchased it and when we need it is not there. Where it is gone, it's gone missing. The workers would've smuggled it out from a security'	Resources to meet performance capacity	1) Lack of long-term planning for resources; 2) Inconsistent monitoring of resource flow; 3) Communication issue between management and customer;

Brief Description of the 15 Themes

Lack of long-term planning for resources. This term refers to the absence of long-term planning for resources including manpower, material, and equipment required on infrastructure projects.

Inconsistent monitoring of resource flow. This term refers to the absence of continuous and uniform measure to monitor resources including material and equipment used on infrastructure projects.

Communication issues between management and customer. This term refers to gap in communication between management and client.

Challenge of unskilled workers. This term refers to the availability of unskilled workers within Qatar labor market.

Shortage of professional personnel. This term refers to the scarcity of technically and professionally qualified personnel required to meet project needs.

Challenge of managing a multinational workforce. This term refers to the challenge faced by project managers in managing labor workforce from different nationality with different languages.

Inconsistent long-term planning strategy. This term refers to the absence of continuous and uniform measure to make long-term planning for infrastructure projects.

Inconsistent site management by contractor. This term refers to the absence of continuous and uniform measure used by contractors and subcontractors to manage and measure the progress on construction sites.

Inadequate accounting of time-shortened activities. This term refers to the absence of detail record and plan for activities with limited duration within the construction timeline.

Communication on cost issues with management. This term refers to the challenge faced by project managers in communicating construction cost related issues with management.

Lack of budgeting for unexpected changes. This term refers to the absence of adequate budgeting for unforeseen changes in construction.

Project complexity. This term refers to the compounded nature of infrastructure projects making it challenging to identify the project management process and technique required to accomplish such projects.

Local economic condition. This term refers to the economic condition of the State of Qatar.

Slow correction of mistakes in the construction phase. This term refers to elongated time taken to correct mistakes on construction sites.

Delays caused by contractors and subcontractors. The term refers to the excessive duration taken by contractors and subcontractors to complete tasks or projects beyond the schedule/planned duration.

Evidence of Trustworthiness

This multiple case study research reflected evidence and data of a real social phenomenon within its natural environment. A study of this nature requires the researcher's competence to ensure data analysis findings and conclusions can be viewed

and requirements are considered met with methodological rigor (Yin, 2017). To uphold the trustworthiness of a qualitative multiple case study, the processes must align with typical processes as recommended by qualitative methodologists and established guidelines by seminal case studies (Stake, 2013; Yin, 2017). This section presents evidence of trustworthiness for this research as evidence of consistence with qualitative multiple case study process is provided. Evidence of trustworthiness based on credibility, transferability, dependability, and confirmability are detailed in this section.

Credibility

Data credibility points to the extent to which the researcher is confident in the research findings and the implementation of multiple strategies to validate data trustworthiness (Merriam & Tisdell, 2015). Often time interpreted as an assessment of whether the findings of a research represent a convincing conceptual exposition of the data (Korstjens & Moser, 2018). Following the established and tested processes by seminal methodology scholars, I was able to reach a tenacious conclusion for this study (Stake, 2013; Yin, 2017). More revealing responses were achieved because participants were interviewed at the location of their choice after being enlightened on the confidentiality of the study and their right of choice of participation, creating a more comfortable atmosphere for the interview. Credibility for this study was further achieved using member checks strategy to aid data trustworthiness as interview transcripts were reviewed and corrected by respective participant (Merriam & Tisdell, 2015).

Prolong observation, saturation, consistency, cross-case synthesis, participatory research, digital recording, and audit trail were also deployed to aid data conclusion

credibility (Cooper & White, 2012; Yin, 2017). The inclusion of participants meeting the inclusion criteria of adult over the age of 18, 3 years continuous experience as a project manager in a Qatar government-funded infrastructure project, and adequate knowledge regarding the topic of study, also helped in improving the credibility of the study (Merriam & Tisdell, 2015; Yin, 2017). Also, cross case synthesis used to identify, and pinpoint similarities, differences, and redundancies helped in ensuring rigor and further strengthens the study credibility. Finally, the findings of this study were further strengthened though the use of face-to-face Skype interview to collect data from participants, which enhanced consistent observation and recording of nonverbal cues that could have been omitted pursuing other methodologies or data collection approaches.

Transferability

Transferability in qualitative study explains the degree to which the research can be transferred or replicated to other contexts (Yin, 2017) and evidence provided by the researcher to readers which makes the study replicable for those seeking to replicate the study using a different context. To aid the transferability of this study, comprehensive and thorough description of the situation and methods were detailed by the research design to allow for ease of maneuverable judgment probable for future researchers seeking to replicate this study within a different context (Morse, 2015). Also, the interview questions were developed based on the conceptual framework, selected based on high probability of transferability.

The use of LinkedIn professional platform to recruit participants for the study offers a broad view on the phenomenon of study, thereby improving the study's

transferability. Also, the use of face-to-face Skype interview for this study aided the transferability of this study by eliminating researcher's personal reflexivity, aided the replication process (Janghorban et al., 2014), sustained unbiased atmosphere (Yin, 2017), and allowed ease of access to distant prospective participants (Seitz, 2016).

Dependability

Dependability in qualitative research ensures that the findings of the study are consistent and can be repeated and often measured by the standard with which the study is administered, scrutinized, and presented (Yin, 2017). Comprehensive detail of the research design and the data collection process and strategies were documented to allow for ease of study replication, thereby aiding the study's dependability. Also, data collection process, strategies, and methodologies including semistructured interview questions, field notes, and journals for within and cross-case comparison alongside multiple sources used to triangulate themes were carefully and comprehensively documented. Purposeful criterion and network sampling strategy as recommended by Bell, Bryman, and Harley (2018) was used to recruit participants for this research using the LinkedIn professional platform also sustain dependability.

Dependability was further enhanced by reiterating participation criteria in the introduction and recruitment letter, consent form and during the interview with confirmed responses from participants. This was then followed by interview using an interview protocol which was previously field-tested by two SMEs for proper alignment with the purpose of this study. Dr. Michael Neubert being the methodology expert of my committee and serving as the outside auditor of research audit trail inspected the audit

process stages to aid dependability of the study including the pre-entry, auditability, formal agreement, trustworthiness determination, and closure (Barusch, Gringeri & George, 2011). Finally, materials used to demonstrate findings that imitate previous seminal literature included audio tape, reflective field note, verified interview transcript, and report.

Confirmability

Confirmability questions the relationship between the data and the research findings and establishes researcher's bias during the study (Stake, 2013). Generally, it is the application of measures to justify that the findings are evidence based and are extracts from data collected for the study (Ravintch & Carl, 2016). Dr. Michael Neubert being the methodology expert of my dissertation committee and serving as the external auditor for my study audited the study process to ensure alignment between the collected data, data analysis, research findings, interpretation and recommendation. The study's confirmability was enhanced by deploying design instruments that are not manipulated by the researcher, although my credence and idiosyncrasy as the study analyst forms an instinctive part of the research study.

Also, triangulation of data source, the use of deliberately selected and purposeful sample (Ravintch & Carl, 2016) and theoretical perspective was used to validate the potency of the study concept which further strengthens the confirmability of the study (Morse, 2015). Audit trial also captured the researcher's background and knowledge of the subject which were helpful in deriving commonality of assertion (Stake, 2013). Finally, reflective field notes were maintained by me throughout the study where I

recorded my observation and interpretations to eliminate researcher's bias during data analysis thereby upholding the study's confirmability (Morse, 2015).

Study Results

The specific research question for this multiple case study was developed to provide answers emerging from within the context of the natural empirical setting. Recording the experience of infrastructure project managers in Qatar, detailed insight on how a project manager in Qatar uses capacity-planning practice to mitigate project delay and cost overrun on their government-funded infrastructure project was gained. The central research question used to explore this study is as follows: How do project managers in Qatar utilize capacity-planning practices to mitigate project schedule delay and cost overrun in government-funded infrastructure projects? This multiple case study unveiled the perception and behavior of project managers in Qatar with regards to the phenomenon of study which became apparent from the data analysis accredited to themes and patterns that emanated from the raw data gathered from semistructured interviews. Theme and pattern identifiable traits were unveiled in two phases of thematic analysis of contextual data and cross-case synthesis analysis.

Cross-case synthesis is used in qualitative multiple case study to synthesize evidence from multiple cases by examining the similarities, differences and generating themes across cases (Yin, 2017). As in this study where the unit of analysis is a case with each case representing an individual project manager, cross-case synthesis is deployed when the unit of analysis is a case which is a bounded unit such as individual, place, event, or group (Merriam & Tidsdell, 2015). To ensure consistent basis for data

comparison, uniform comparative approach was used for data analysis throughout the entire study to compare patterns across multiple cases (Yin, 2017), with the aim of creating rich and solid commentaries from participants to reveal their experience on the phenomena of study.

The overall data including the interview, member checked interview transcript, my reflective journal note as the researcher, internal auditor's reflections, findings from research articles, and archival data in the form of government reports were taken into consideration during data analysis (Yin, 2017). Cross-case synthesis was further conducted for familiarities, similarities, redundancies, and crystallization of compiled data such that emerged themes from thematic analysis were classified and their findings were cross referenced for graphic representation. This process grounds this study in cross-case analysis being a major component of qualitative multi case study design such that the researcher's power to act is elevated and findings are generalized (Yin, 2017)

To ensure a common and uniform basis for cross-case comparisons and thematic analysis, I ensured that a common procedure was followed while collecting data from all eight participants and during data analysis. Data analysis was done using both within-case content analysis of data from individual participant and cross-case synthesis of data where emergent themes among the eight cases were compared (Yin 2017).

Phase 1: Thematic Analysis of Textual Data

Varying scholarly articles and literature suggested the acceptable procedures and steps for conducting a rigorous thematic analysis which entails providing incisive, insightful, logical, well organized, nonrepetitive, and compelling account of data across

and within themes (Vaismoradi, Turunen, & Bondas, 2013; Nowell, Norris, White, & Moules, 2017; Clarke, Hayfield, & Terry, 2019). Detailed documentation and clear representation of the step-by-step process of how findings evolve is essential in an accessible way to the critical reader such that findings from the data set are considered credible and dependable (Nowell, Norris, White, & Moules, 2017). To aid the understanding of points of interpretation and reveal the extensiveness of themes, direct quotes from participants are included in this thematic analysis (King 2004). To support the trustworthiness of data results, I also included extract of raw data in this thematic analysis to demonstrate the complex story of data (Braun & Clarke, 2006).

I referred to the literature to build a valid argument for chosen themes and entwine findings with literature. I further used the data to aid the main point to build a convincing explanation to readers and ensure analytic credibility (Starks & Trinidad, 2007). I presented detailed meaning of each theme and its implications as well of unpinning assumptions such that the final analysis creates an overall story of what each theme reveals about how a project manager in Qatar utilizes capacity-planning practice to mitigate their government-funded infrastructure project in Qatar (Braun & Clarke, 2006). Finally, to ensure credibility of the study, all relevant results including unexpected results and results which do not correspond to the phenomenon of study were discussed (Starks & Trinidad, 2007).

Below are the themes which were analyzed in relation to the central research question and supported by insights and direct quotes from the in-depth interview:

Lack of long-term planning for resources. This term refers to the absence of long-term planning for resources including manpower, material, and equipment required on infrastructure projects. Researchers have found that the absence of long-term planning for resources, both material, equipment, and labor resources, can bring about unimaginable delay to infrastructure projects and subsequently lead to project cost overrun (Emam et al., 2014; Senouci. Ismail, & Eldin, 2016). Participant 6 when asked how he ensures there is enough and adequate resources to manage current and future capacity need responded that

> So usually I'm not going to lie to you, we don't plan that much. We don't keep that much resources for future projects because we never know what future projects are coming. So, what I can tell you is we keep a very small percentage of resources as spare parts. For the current projects which we are working. So, in case future projects comes in while the current project is in parallel, we can utilize those spare parts as a little bit of a push back up to that future project until we can equalize it with more tools.

Participant 8, although noted that there is a plan in place based on the schedule of work and project, emphasized the inconsistency in the plan as summarized below:

> We rely only on initial project planning which is done, that lays out a complete baseline of what stages, what workers are required? What skills, what competencies? For example, in the initial stages of excavation, the machinery work, the excavators, the surveyors are required. Although not always consistent,

> as it depends on the planner's experience and unfortunately, that's the only strategy we have to plan our long-term resources.

Participant 3 although mentioned their long-term strategy for resource planning which is based on resources loaded and cost loaded program of work, however, noted that this is not practical. He was quoted saying:

> Trying to prepare tentative cost loading program, which is again aligned with the general baseline program and from the cost and the schedule, program, we'll give tentative resource requirements of this project. Okay. This is again, theoretically and theoretically doesn't mean what you have practically. You need to start with certain amount of people and then monitor whether this is efficient and I mean on weekly basis you have to have the control over the productivity and increase. Usually you never start with too much people because the top management never agree give you immediately the people you need

Inconsistent monitoring of resource flow. This term refers to the absent of continuous and uniform measure to monitor resources including material and equipment used on infrastructure projects. Participant 4 summarizes his experience as follows:

> Although we usually have challenges with monitoring and managing the materials. So most of the labor don't care about the material, so they throw block works, they throw plaster boards. Materials might be broken, and they don't use it. It's a loss for the contractor, and a loss for the environment. You have to have your staff on site. Your safety staff, your QA/QC staff, your supervision engineers, and inspectors, monitoring at all times

Communication issues between management and customer. This term refers to gap in communication between management and client. Researchers have established that the success of projects is heavily dependent on open communication with client and project stakeholders and how this communication is being managed. Participant 8 summarized his concern as below:

> You see the project manager is not the ultimate decision maker. You have the client, the owners you're reporting, you have group directors, group CEOs, which are all decision makers. A project manager is only at a certain level and certain limitations with him where he is not allowed to do major visionary decision making. Again, if constant communication line is opened with client and the support from the client or other top brass or the higher management is guaranteed, it's good and smooth, then the project manager is able to give a lot more in terms of cost effective and value engineering, enhancing designs and delivering a project much better.

Participant 1, however, believed that clients are always open to communication but often times, people and management are scared to communicate with the client. He said,

> …and I think also it's where our clients have felt frustrated because often a lot of our guys from project managers and even to the management staffs can be scared of the client, but actually a lot of them are highly educated in the field that we're working in, actually want to engage, want to discuss, and we've found by actually

> going and engaging with some of our clients, we get a much better direction of where they want to go and we can try and avoid those traps that crop up later on.

Although Participant 1 believes this has improved over the years saying,

> I genuinely think Qatar has massively improved over the last few years as a result and it's good. And I think it's because, as I say, when I first arrived here the client was there at the top, and all this stuff was happening down here, and nobody knew it. Now, the clients and the project managers are encouraged to get involved right the way through, prequalify everybody, ask everybody for their policies on what they're going to do etc.

Challenge of unskilled workers. This term refers to the availability of unskilled workers within Qatar labor market. Supported by research where inexperienced and unskilled resources have been attributed to the challenges of mega infrastructure projects (Masser, Monty, and Heap-yin, 2016), the challenge of unskilled labor was emphasized by all the participants. Participant 1 summarized his on ground everyday challenges as below:

> There's a lot of labor here brought in from overseas that isn't skilled, and so plumbers, for example, people fitting duct work, etc., they can be quite poor and you lean far more heavily upon your site supervision and your guys onsite than you would normally do on another project. Again, we're in this, take this project for example. We're working with Hyundai, very good firm, so as these guys have been engaged, they have a quality management structure already in place, they're good people, understand the market, that side of things, but they will admit

> themselves openly that as you go down through to the guys on the ground, it's, that quality, it's very difficult to get that quality down there.
>
> Participant 2 facing similar challenge expresses his experience as follows:
>
> This might be always challenging because the good people is always under the loop. So it might come to, or might not come to you. I cannot say I ensure, I always have the risk to start the project with people which I count on, but half of them might not be suitable or fit for purpose.

As a mitigation plan, Participant 2 reflecting on his experience noted that

> So usually it's two options, one is to train them up to your satisfactory which is costly, which we are currently doing. And in certain percentages, we succeed to train them up to the satisfaction through the internal training, alternatively for the one which are not fit for purpose, we just have to stop working with them and try to approach with the other one.

Shortage of professional personnel. This term refers to the scarcity of technically and professionally qualified personnel required to meet project need. Scholars have attributed not just insufficient resources but shortage of resources with technical know-how and skill as the major challenge of infrastructure project success in Qatar (Salem, & Ahmad, 2017; Abdelaal, 2015; Al-Hazim; Emam et al., 2014) Participant 3 expresses his recent experience on shortage of professional personnel as below:

> So, right before I just moved to my current company, we won a big job with a new client and when I look at the number of professional staff and labour

> resources required to deliver the project, and what I had available at the time, it seems like we're missing more than 50% of the people.

Participant 5 also captures the regular challenge of shortage of professional when he noted that "now the second part is in case you are not able to find skilled personnel which are required for a certain task on the project I want to be embarked on which isn't quite unusual."

Participant 7 also expresses delay he often experiences on his project due to unavailability of professional personnel required for some expert task in his project. He voiced out saying:

> Challenge, we face challenge of technical resources quite well. If you have some special kind of activities, like, if you go to activity inside your project like some processes need some specialist which you would not find in the local market, you have to make some calls or some contacts again outside, abroad to try to collect one person. This expert who maybe is in India, maybe in China, something like that, I have to request him which might take a lot of time to get him on my project.

Participant also captures his experience as,

> …challenge of good resources is that, they are not always available. Yes, we have to import them at more cost. Outsourcing them. Not just outsourcing them, if they're not available in the country, so you have to get them from out of the country, which is time taken.

Challenge of managing a multinational workforce. This term refers to the challenge faced by project managers in managing labor workforce from different nationality with different languages. Qatar demographic report shows that the tiny oil-rich Gulf country comprises 15% Qatari nationals and 85% foreigners from over 100 different nationalities (Qatar Index, 2019). This explains the cultural diversities of the multinational workforce within the tiny peninsular. Participant 1 expresses his challenges with working with multinational workforce. He said,

> Actually, one of the biggest challenges, I will tell you, is this. I was on the Sidra hospital and we did health and safety training there, and the problem is, you've got a big room with people that speak probably 60 different languages. So, what we found there was that everything had to be visual, everything had to be demonstrated, and also I think the, we forget that culturally, there are some big issues. Indian workers in particular, they struggle to say, "I don't understand" or "I don't know" probably more than- I know and that can be a big issue for a lot of cultures, but the tendency is to just go "Yes" and walk off. Then we had this at Sidra, they'd go and have an accident doing the exact thing that we would train them not to do.

Participant 6 also expresses similar challenges faced in managing multinational workforce. He summarized his challenge as:

> This is a little bit difficult due to the fact that the nationalities, that there are many different nationalities in this country and each one having his own language. The common language here is English, but most of the times, especially in

> construction, you find that people, especially labors or just staff like junior engineers, foreman, they do not know the language 100%, where sometimes they face difficulty to understand exactly your requests.

Participant 6, however, noted some step taken by his team to mitigate this challenge. He summarized their action saying:

> So what we tend to do, we tend to find people like medium who knows the English language as well as knowing their native language where this people can basically translate and make sure that the other side of the site understands 100% that the requests from the management team or the requests from the engineering team. And of course I can tell you that we keep trying to train them to understand the common English language.

Inconsistent long-term planning strategy. This term refers to the absence of continuous and uniform measure to make long-term planning for infrastructure projects. Inadequate long-term resource planning strategy has been identified by scholars as one of the leading causes of project failure (Li, Chan, Skitmore, & Huang, 2015; Bjoryatn & Wald, 2018). On timing dimension and for effective project delivery, Gill (2015) recommended that capacity should be planned for both short, medium, and long range while defining capacity-planning as the process of identifying the production capacity required by an organization to uphold current and changing resources need over a period of time. Participant 2 when asked how he ensures adequate and enough resources are available to manage future and current capacity need, responded saying “I cannot say I

ensure, I always have the risk to start the project with people which I count on, but half of them might not be suitable or fit for purpose."

Participant 6 also expresses similar concern on inconsistent long-term planning saying:

> While there is no assurance these resources will be available for you when required, we always keep track of the suppliers and we know what tools they have, the amount of resources and quantity. So, in case we just require, it's very easy, we can just source them out quickly and then purchase from them if available.

Inconsistent site management by contractor. This term refers to the absence of continuous and uniform measure used by contractors and subcontractors to manage and measure the progress of construction sites. Research has revealed that only continuous and consistent management of site by both contractor and subcontractors guarantees continuous productivity (Sharifi & Chaghouee, 2018). Participant 1 when asked how he ensures effective and consistent performance while managing his site summarized his conditional possibility as below:

> Well, I think you can, it is completely results-driven, in terms of what's happening, and that's at every level, now, that can be quite tough on some of the guys onsite, particularly when they're working with people that are not particularly skilled or, but it's the only way to, if you like, measured performance is by what productivity's been made. Where are we in terms of those milestones that we've set for ourselves in terms of installation, etc. I think also the key is

> you've got to have a sort of mitigation plan in the back of your mind. It's all very well things go wrong on sites and areas, you have areas which are not progressing as well as you wanted to or it may be that that particular area's not being managed well, or it could be that as simple as somebody underestimated the resource to do it.

Noting that site management and performance management is human driven, Participant 3 also shared similar concern noting that

> …people are the most difficult thing because a machine you know how much it produces. You put it on a certain speed, it's more or less. People depends on the people, and if they're happy, they're not happy". While addressing this site management and progress management challenge, Participant 3 also made mention of this strategy to manage such challenge; "So, this is one of my main preferred subjects. So, then normally what I do, whenever I join either a new project with a different scope or a new company than I'm used, understand how can I measure the people's performance? How can I measure how much work they should be able to do, and how much work they are really producing.

Inadequate accounting of time-shortened activities. This term refers to the absence of detail record and plan for activities with limited duration within the construction timeline. Participant 7 made a reference to a typical challenge faced when time-shortened activities are omitted by the technical team and such resources are not planned for. He summarized the typical challenge and mitigation plan as:

> This technical team must put his plan about what we need to comply with our requirements in our projects. Sometimes there are omissions in the activities when developed by the technical team, activities with small duration but require expert to execute them. Resources for some activities which are omitted may not be planned for. When such problem happened, we then need to try and find the resource locally or if not, we source them abroad. Okay, if this is achieved between the technical team and our project management, and satisfactory to them, then we plan how and when we will mobilize to resources.

Communication on cost issues with management. This term refers to the challenge faced by project manager in communicating construction cost related issues with management. Due to communication gap between management and project manager, cost related issues affecting capacity-planning are often kept away from management.

Participant 4 while talking on variation and changes to project by client noted that "The bitter truth is client do not like to hear cost related variation even when they propose changes so we are usually skeptical communication cost issues with client."

Lack of budgeting for unexpected changes. This term refers to the absence of adequate budgeting for unforeseen changes in construction. Although several researchers have attributed variations and unforeseen events as some of the underlying delay factors of infrastructure projects in developing countries like Qatar, lack of budgeting for unexpected changes has surfaced as a challenge faced by project managers in managing

government-funded infrastructure projects in Qatar. Participant 1 captured this when he said:

> I did that at Rayyan Stadium, for example, and I was looking after the external works and we thought, "No problem, 6 to 9 months, we will absolutely, we'll finish all this stuff." As soon as we started breaking the ground, we got to about 2 to 3 meters below grounds and hit absolute solid rock. Now, nobody foresaw that. We'd actually managed to miss this big lump of rock and in the end we, the mitigation there was we literally had to throw additional contractors at it and, just to actually get that complete.

Participant 4 sharing similar challenge noted the following:

> But part of the overall challenges that we meet in design, and construction of infrastructure projects, are client changes during construction leading to huge time delay and massive cost variation. This is challenging because project managers do not have the ultimate decision making on some issues especially when there are financial implication and often times, it's difficult to relate such to management since the management expect you to manage the resources and sometimes variation to construction with available funds.

Project complexity. This term refers to the compounded nature of infrastructure projects making it challenging to identify the project management process and technique required to accomplish such projects. Infrastructure projects are mostly characterized by their sizes, complexity, and level of integration and often entail higher degree of uncertainty (Park, Park, Cha, & Hyun,2016). Participant 4 when asked how

communication is managed on the project highlighted the complex nature of infrastructure projects as a challenge. He said "The nature of our project is complex. To ensure communication flow…". Participant 1 also touched on the complex nature and size of infrastructure projects when addressing availability of functional facility. He said "But again, on a lot of the projects here, because of the size and complexity of the project…". While addressing the resource requirement for infrastructure project, participant 1 also talked about breaking a complex project into smaller and achievable prices. He said

> So, from Day One, we will then start to look at, okay, we've won the project now, there's a lot of complex component, let's look at, what's the end date for this project, what do we need to do. Start to carve the project up into milestones so that we can look at what we need to achieve by when…

Local economic condition. This term refers to the economic and atmospheric condition of the State of Qatar affecting resource planning. Participant 1 emphasized on the economic blockade on the State of Qatar by neighboring countries as a challenge to resource planning. He said:

> If I was doing this in Europe, okay, it would be a completely different approach. I know that pretty much, in Europe, I can get whatever I want, and the approach I would take is I would drive the, you know, what I want, set up the policies early on as to what's required. In Qatar, it's different, and particularly with the embargo as well, which has brought in additional restrictions, actually it's meant that we have to flip it through 180 degrees.

Participant 4 also mentioned how the economic condition of the country affects the availability of resources in their project saying; “about the market itself, because of course, you know that Qatar now has a little problem with the blockade. So, parts of the materials are now mostly delayed, than planned.”

Slow correction of mistakes in the construction phase. This term refers to the elongated time taken to correct mistakes on construction sites. Although mistakes are inevitable in construction projects especially complex infrastructure projects, a proactive measure can help mitigate the impact of such uncertainty. Participant 1 shared his recent experience on a project saying:

> We’ve got some limitations at the moment relating to what we’re doing. I’ve spoken to the client about this, that actually guys, we’re better off going ahead. I know you don’t think this is necessarily what you want to know about, but at the moment we’re holding the contractor up, we’re holding up this, this and this, it’s going to end up escalating into a phenomenal cost for, and actually, let’s just get it done now. And do you know what, in 6 months’ time, if you want to change that to that, it’s probably going to cost you a few thousand dollars, whereas if you don’t make that decision now, it’s likely to escalate into a big claim and a delay.

Delays caused by contractors and subcontractors. The term refers to the excessive duration taken by contractors and subcontractors to complete tasks or projects beyond the schedule/planned duration. Due to the complexity and size of infrastructure projects, project managers often rely on the expertise of contractor and subcontractors to deliver a part or whole of the project (Durdyev, Omarov, & Ismail, 2017). Participant 5

shared his experience while executing a project and the need to lean on the expertise of a subcontractor. He was quoted saying:

> There was one project we did in 2011, it was a six bay apron in Doha International Airport, and we didn't have any experience, we had to go with a subcontractor who's very well knowledgeable and has experience. To be truthful, we lean on the experience he has in the execution of airplane concrete aprons even though it ended in huge delay.

Participant 3 also shared a similar experience of delay by this document control team:

> So, it was maybe four years ago, or less, that we had a big docking control team working on one of the big projects for Hamad ports, and they were always delayed. Always delayed. So, then, we will receive more than 1000 documents per week to review. There was a lot of processing. But, they were always late and we had plenty of people, everyone working overtime, and still, regardless of the number of people I was putting, there was always an issue

Phase 2: Cross-Case Synthesis and Analysis

The cross-case synthesis method was used as data analysis technique for this study considering the issues of complexity and difficulty in identifying links and patterns associated with the investigation of real-life experiences can be controlled by carrying out a cross-case correlation which enhances the validity and generalization of the study (Yin, 2017). In addition, the use of cross-case synthesis technique helps in achieving an

organized analysis of the reasoning connecting the research data to the study's concept (Cooper & White, 2012; Yin, 2017).

Thematic analysis was followed by cross-case analysis being a continuous process because each of the eight cases was separately analyzed. Recurrence of emerging themes from data was unveiled using cross-case synthesis to achieve the study purpose of exploring the perceptions of project managers in Qatar regarding how they utilize capacity-planning practices to mitigate project schedule delay and cost overrun in government-funded infrastructure projects. Convergent and divergent data across cases were identified whereas data which were considered unrelated to the study's purpose were removed (Yin, 2017).

Figure 4 below illustrates the cumulative frequency of theme occurrence by participants where I present a combination of thematic analysis results from each case such that readers are provided with graphical representation of how numerous themes converged across cases from the findings of this multiple case study.

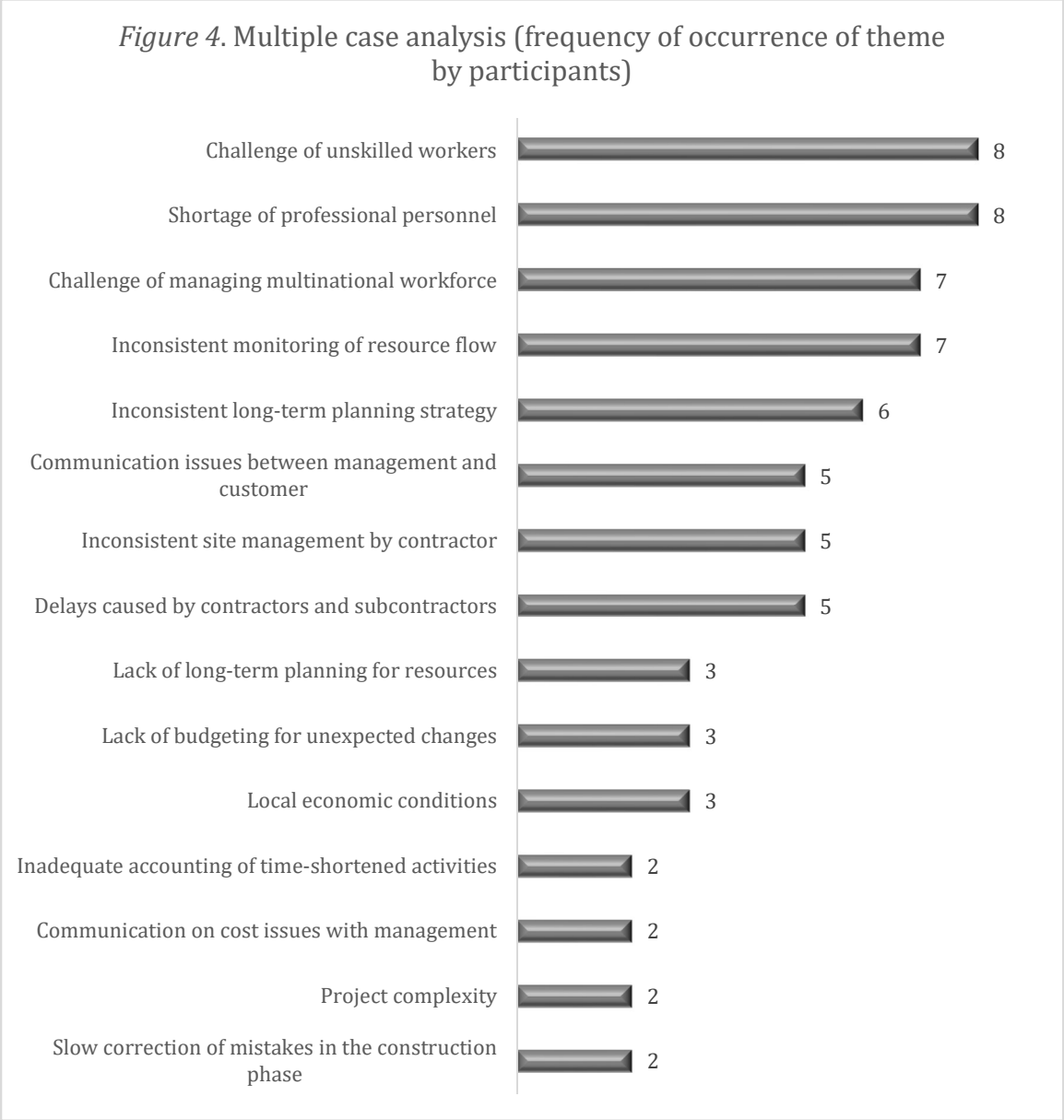

Figure 4. Multiple case analysis (frequency of occurrence of theme by participants).

The iterative cross case analysis was done after I had separately analyzed each case. I identified recurrent themes across the data that achieve the purpose of the study which is to explore the perceptions of project managers in Qatar regarding how they utilize capacity-planning practices to mitigate project schedule delay and cost overrun in

government-funded infrastructure projects. Themes' cumulative frequency of occurrence as I have graphically presented in Figure 4 shows how I combined data analysis from each case and how I analyzed convergent and divergent data across the eight cases. The graphical representation as I have shown in Figure 4 represents a visual analysis of multiple cross case analysis on project managers' perception of capacity-planning practices in government-funded infrastructure projects in Qatar.

Challenges of unskilled workers and shortage of profession personnel are the two themes that reoccurred prominently across data collected from all eight case. This generally implies that shortage of professional personnel and the challenges of unskilled workers are recurring challenges faced by infrastructure project managers in Qatar to derive project success using capacity-planning practices. Project managers are unable to adequately plan their resources towards mitigating project delay and cost overrun because adequate skilled workers and professional personnel are not readily available within the Qatari market. This leaves project managers with deploying the little available professional personnel and unskilled workers to manage the massive and complex infrastructure projects considering that planning these resources across the project and throughout the project duration is not feasible.

Two others prominent themes that reoccurred across data collected from seven out the eight cases include challenge of managing multinational workforce and inconsistent monitoring of resource flow. Seven out of the eight participants mentioned the multicultural nature of manpower across the country as a block stone to adequate capacity-planning due to limitation in language barrier. Given that project success and

adequate capacity-planning success is heavily depend on communication, achieving this becomes a huge challenge since project managers are faced with the challenge of communicating tasks to the workers. Similarly, seven out of the eight participants expressed inconsistent monitoring of resource flow as their challenge in managing resource capacity. This includes inconsistent monitoring of resources availability within the Qatari market down to inconsistence monitoring of resources deployed on site, leading of loss of materials.

Inconsistent long-term planning strategy reoccurred across data collected from six cases to demonstrate the uncertain nature of long-term resource planning in Qatar infrastructure project. Whereas the reason behind this has been attributed to several other challenges such as shortage of professional personnel with good knowledge of long-term resource planning strategy down to the uncertainty related to resources availability within the local or nearby international market, six participants emphasized the absence of long-term planning strategy as a major challenge affecting capacity-planning strategy on their project.

The next three prominent themes that emerged across data collected from five cases considered that limitations to effective capacity-planning practices include communication issues between management and customer, inconsistent site management by contractors, and delays caused by contractors and subcontractors. This communication gap between management and customers was reported to often trigger delay in critical decision making which eventually slows down overall construction process and ultimately disrupts resource schedule. Similarly, inconsistent site management by

contractors which often leads to huge delay by contractors and subcontractors was reported to jeopardize the effectiveness of capacity-planning on infrastructure project.

Three other prominent themes that emerged repeatedly across three cases including lack of long-term planning for resources, lack of budgeting for unexpected changes, and local economic conditions also express the challenges faced by project managers in managing government-funded infrastructure projects in Qatar. Because the nature of infrastructure projects is characterized by complexity and uncertainty, data shows that capacity-planning practices have been found ineffective considering that these uncertainties are neither factored in the schedule nor are their resources. Qatar local economic conditions also contribute to challenges of inadequate skilled and professional personnel within the country.

Triangulation

Triangulation of data sources promotes a more comprehensive consideration of data and enhances the overall trustworthiness of data while improving the quality of the study (Yin, 2017). Hence, it became paramount for me as the researcher to ensure appropriate choice of instruments that would yield themes to support insights resulting from studying the perception of government-funded infrastructure project managers in Qatar regarding how they utilize capacity-planning practices to mitigate project delay and cost overrun. Three sources of data were used for this study and included (a) a semistructured interview protocol (see Appendix C) whose items have been designed and standardized by previous researchers, (b) archival data in the form of government reports on the Qatari construction sector (Yin, 2017), and (c) reflective field notes (Merriam &

Grenier, 2019) where I recorded nonverbal cues during face-to-face interview and which was kept by the researcher throughout the entire data collection process.

My positionality and reflexivity as researcher was also aided through interview transcription (Berger, 2015). Credibility of findings was also sustained by sharing interview transcripts with participants for content validation, a process known as member checking which allows participants to review and correct their interview transcript (Merriam & Tisdell, 2015). Interview transcripts were also supplemented with handwritten notes where contextual report of nonverbal cues such as smile, nod, tone of voice, and facial expression was recorded, yielding a more inclusive documentation of participants interchange.

To ensure standardized data collection process, I used an interview protocol to guide my face-to-face semistructured interviews (see Appendix C). Audit trial reveals the evidence concerning the study's plan development (Stake, 2013), and it comprises the documentations including memos and articles, as well as any changes in term of addition that occurred in the study (yin, 2017). Dependability of this study was also enhanced through audit trial and methodology triangulation where data from reflective notes and government archival data such as Qatar's 2019 Annual Budget, Qatar index and Qatar Central Bank QCB Annual Report were comprehensively referenced.

I read approximately 250 scientific peer-reviewed scholarly articles and journals to allow me to continue method triangulation process towards answering the research question. I annotated approximately 100 articles out of the 250 articles including government, business, and media reports, which I found to be relevant to my

phenomenon of study. Although not substantial enough for use in the literature review, these articles and journals were used as a source to compliment the face-to-face semistructured interview. The information from these archival data helped me to question the underlying meaning behind recurring concepts and ideas towards generating accurate and credible themes that are grounded in the conceptual framework. Triangulation as such enhances the richness of data (Fusch & Ness, 2015).

Finally, methodological triangulation of three sources of data ensures availability of adequate and comprehensive information to replicate the study design (Yin, 2017). Study results and findings were analyzed and interpreted within the context of the conceptual framework and comprehensive illustration of how findings added to the body of knowledge, practice and social implications were presented.

Summary

In this chapter, I present a case by case analysis of eight participants, followed by a cross-case analysis and synthesis to answer this study's central research question: How project managers in Qatar utilize capacity-planning practices to mitigate project schedule delay and cost overrun in government-funded infrastructure projects? Grounded in the three conceptual models developed by Gill (2015) to outline the capacity management needs within a construction company, a total of five codes emerged from the findings of this multiple case study which encloses a total of 15 themes. These provided rich data on the experiences of participants. The five codes that emerged are (a) resource to meet performance capacity, (b) knowledgeable and skillful staff, (c) short- and long-term planning strategy, (d) cost overrun issue, and (e) time management.

I deployed cross-case analysis and synthesis as data analysis technique to consolidate critical findings from individual case study as soon as themes across multiple cases in the study were arranged. The 15 themes that emerged from the data analysis process include (a) lack of long-term planning for resources, (b) inconsistent monitoring of resource flow, (c) communication issues between management and customer, (d) challenge of unskilled workers, (e) shortage of professional personnel, (f) challenge of managing a multinational workforce, (g) inconsistent long-term planning strategy, (h) inconsistent site management by contractor, (i) inadequate accounting of time-shortened activities, (j) communication on cost issues with management, (k) lack of budgeting for unexpected changes, (l) project complexity, (m) local economic conditions, (n) slow correction of mistakes in the construction phase, and (o) delays caused by contractors and subcontractors.

Supplementing the binding data source, I enhanced the study's data trustworthiness by deploying methodological triangulation of three data source which include a semistructured interview protocol, archival data in the form of government reports on the Qatari construction sector (Yin,2017), and reflective field notes (Merriam & Grenier, 2019). The multiple case study results were further comprehensively analyzed and interpreted within the context of the conceptual framework by Gill (2015) to outline the capacity management needs within a construction company.

In Chapter 5, I will capture future interpretation of the findings from this study in contrast to the literature review in Chapter 2 of this document. Implication of the findings to social change, theory, practice, and policy will also be detailed in Chapter 5. I will also

demonstrate how my study extends the body of knowledge on capacity-planning practice in Qatar infrastructure project. Finally, I will describe how future scholars and researchers can extend the findings of this study.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this qualitative multiple case study was to explore the perceptions of project managers in Qatar regarding how they utilize capacity-planning practices to mitigate project schedule delay and cost overrun in government-funded infrastructure projects.I used multiple case study methodology to meet the purpose of the study. Data were collected from multiple sources, including semistructured interviews, reflective field notes, and archival data in the form of government reports.

A qualitative multiple case study approach allowed me to give voice to infrastructure project managers in Qatar to express their perceptions regarding how they utilize capacity-planning to manage their government-funded infrastructure projects. This study was framed by three conceptual models developed by Gill (2015) to outline the capacity management needs within a construction company: (a) the time horizon model, (b) the individual-organization-industry levels model, and (c) the capacity development across components model.

Thematic analysis and cross-case synthesis and analysis of data from face-to-face interviews with eight participants revealed 15 themes: (a) lack of long-term planning for resources, (b) inconsistent monitoring of resource flow, (c) communication issues between management and customer, (d) challenge of unskilled workers, (e) shortage of professional personnel, (f) challenge of managing a multinational workforce, (g) inconsistent long-term planning strategy, (h) inconsistent site management by contractor, (i) inadequate accounting of time-shortened activities, (j) communication on cost issues with management, (k) lack of budgeting for unexpected changes, (l) project complexity,

(m) local economic conditions, (n) slow correction of mistakes in the construction phase, and (o) delays caused by contractors and subcontractors.

Interpretation of Findings

The findings of this multiple case study extend current knowledge on the subject of capacity-planning practice. In this section, I present the findings of the study and review them in the context of the five conceptual categories that emanated from data analysis. I compare each of the five codes with relevant concepts and models from the conceptual framework and the extant literature review reviewed in Chapter 2. In addition to providing replication evidence, extension studies such as this multiple case study extend knowledge by offering new insight and theoretical direction (see Bonett, 2012). I substantiate the study's findings with evidence from the eight semistructured interviews to show how the findings affirm, disaffirm, or extend existing knowledge.

Resources to Meet Performance Capacity

In the concept of performance capacity, Gill (2015) proposed that resource capacity level influences response rate, costs, inventory level, and other performance measures. Performance capacity ensures adequate supply of tools, capital, and equipment available to meet capacity need. The findings of my study confirmed Gill's model that performance capacity is pivotal in effective project delivery and that absence or inadequate provision can drive a project toward failure. Data that I gathered from government-funded infrastructure project managers in Qatar also confirmed findings from previous researchers in which insufficient resources were identified as challenges of mega infrastructure projects in Qatar (Abdelaal, 2015; Al-Hazim et al., 2017; Emam et

al., 2014). The findings from my study also confirmed findings from previous studies that revealed a strong relationship between resource planning/allocation and project success (Emam et al., 2014; Bansal & Agarwal, 2015). My study results indicated the resource availability challenges faced by infrastructure project managers in Qatar affecting performance capacity supported with original qualitative data from Qatari infrastructure project managers.

Knowledgeable and Skillful Staff

The concept of personal capacity refers to whether the staff are sufficiently skilful and knowledgeable in their respective trade (Gill, 2015). My results confirmed and extended this concept with original qualitative data from Qatari infrastructure project managers. The challenge of unskilled workers and shortage of professional personnel was repeatedly highlighted as the challenge faced by project managers in meeting capacity need while leading infrastructure projects in Qatar. My findings were consistent with findings from previous studies that indicated that effective resource and human distribution is one of the critical project success factors (Alias et al., 2014). My findings also confirmed the findings of Gündüz and AbuHassan (2016) who found that lack of technical knowledge is one of the leading causes of project failure in Qatar, and Jarkas and Younes (2014) who attributed project failure in Qatar to inexperience and inadequate technical knowledge of construction personnel.

Short- and Long-Term Planning Strategy

According to the time horizon model, strategic capacity-planning must consider the resources available and the time dimension in term of short-, medium-, and long-

range planning to meet current and future capacity need (Gill, 2015). The results of my study were consistent with and extended this model and confirmed findings from previous studies (Abdelaal, 2015; Al-Hazim et al., 2017; Emam et al., 2014; Gunduz & AbuHassan, 2016; Senouci et al., 2016) in which inconsistent long-term planning strategy and lack of long-term planning for resources emerged repeatedly from the data. My study also emphasized the importance of capacity-planning in project success considering that resources are the driving force for any project (Gill, 2015). Findings confirmed those from Haider et al. (2015) that effective capacity-planning and management can help an organization meet its current and future business needs in a timely and cost-effective manner. In agreement with Damoah and Kumi (2018), the findings of my study indicated that capacity-planning and management go beyond employee and equipment resource deployment and management by extending to higher management's knowledge and understanding of its importance in project management to meet capacity need.

Cost Overrun Issues

Regarding spending beyond the allotted project budget (Seddeeq et al., 2019), researchers noted that cost overrun is the recurring and dominant challenge facing project managers in leading urban planning projects in Qatar (Senouci et al., 2016). According to three themes of communication on cost issues with management, lack of budgeting for unexpected changes, and project complexity, the findings of my study confirmed previous researchers' assertion that costs are mostly consequences of other types of delay from varying project stakeholders including the client and management (Al Jurf & Beheiry, 2012). Findings from my study confirmed that project managers in Qatar often

struggle with completing the project within available budget mostly due to unforeseen risks and circumstances that were not accounted for in the initial phase of the project (Albhaisi, 2016). These unforeseen activities lead to unforeseen and unplanned additional costs and often require unplanned and unforeseen labor, material, and equipment resources. Consistent with the research by Senouci et al. (2016) on 122 public projects in Qatar and the assertion that the challenge of cost overrun is dominant in most developing countries (Othman & Ahmed, 2013), the findings of my research indicated that cost overrun is a prominent challenge project managers are faced with in managing capacity need in Qatari government-funded infrastructure projects.

Time Management

Projects are not only limited by budget but also by time (Ermias et al., 2017). Because capacity is measured within the parameter of time, time management entails adequate planning and managing capacity within a given period of time to drive project success. Encapsulating three themes, namely local economic conditions, slow correction of mistakes in the construction phase, and delays caused by contractors and subcontractors, the findings of this study confirmed those from previous studies in which statistical data analysis from 120 registered Grade 1–3 contractors with Ministry of Works and Urban Development in Ethiopia on the relationship between project planning and project success revealed the time management role of the project manager as critical for project success (Ermias et al., 2017). My research findings were also consonant with the assertion by previous researchers that projects are usually constrained by time and

only task execution skill gives managers a sense of urgency making it easier to meet all forms of schedule deadlines without facing time pressures (Izmailov et al., 2016).

Limitations of the Study

One limitation of this qualitative multiple case study was the unheard voice of a large sample of project managers who met the inclusion criteria but did not have the opportunity to participate in this study due to the limited sample size in qualitative studies. To mitigate this limitation, I ensured an invitation was sent to project managers from different infrastructure projects in Qatar, including roads, bridges, hospitals, and portable water sewer, thereby allowing for a variety of opinions and experiences. Also, the scope of this research was limited to government-funded infrastructure project managers and did not include privately funded infrastructure project managers or other types of construction projects. Limitations with regard to years of experience and knowledge on topic of discussion was also mitigated using the purposeful criteria strategy. Participants responded to preinterview questions confirming their age, years of experience, and knowledge of the topic of capacity-planning in project management.

Careful interpretation of data and findings was also used to mitigate the limitation of small sample size and the issue of generalizability, considering that the sample size of eight used in this study may not have been a comprehensive representation of the overall population. The issue of transferability common to qualitative case study was also addressed by giving a detailed account of the study's original context so that grounded judgments can be made about the findings. A comprehensive account of the context and

the method deployed in the study was also provided followed by the documentation of extensive data analysis supported by representative samples of raw data.

Because the study's central purpose was to explore the perception of participants as a unit represented by each government-funded infrastructure project manager, limitations of transferability were further mitigated by providing a detailed and explicit account of participants' invitation, recruitment, interactions, and interviews, as well as data recording, data transcription, and data analysis. I provided a detailed account of the research process to ensure that readers would be fully aware of the context in which the data were collected. A detailed audit trail would allow future researchers to apply the methodology of this study in different contexts.

Recommendations

The significance of a study includes the need to fill a theoretical knowledge gap and provide recommendations for future study (Merriam & Tisdell, 2015). The voice of government-funded infrastructure project managers in this study provided firsthand information on their capacity-planning approaches to managing project success. Findings from this study may provide a better understanding of challenges faced by project managers in enhancing capacity-planning practice in their government-funded projects to improve project success rates. Project managers of privately funded infrastructure projects and other project types may also benefit from the findings of this study to improve capacity-planning practice for their respective projects to mitigate delay and cost overrun and to improve delivery.

Future researchers are encouraged to replicate the findings of this study using quantitative approaches to validate these findings from similar or different contexts. A quantitative approach allows for a broader study involving greater numbers of participants, enhances generalizability of findings, and allows for greater objectivity and improved accuracy (Quick & Hall, 2015). The use of quantitative approach such as survey to validate these findings will give voice to more project managers in the industry. Because my study was limited by location as only Qatari project managers were considered for the study, a quantitative approach may extend the findings beyond infrastructure projects and Qatar to allow for generalization of findings.

Future qualitative multiple case study researchers willing to replicate this research may also do so using different context such as different project type or different geographical location. This will be useful in not only providing how findings differ under different context and across different region but also present diverse perceptions of how capacity-planning is being used to mitigate project time delay and cost overrun across different context and region. Finally, more contextual examination of themes that emanated from my research may be considered as recommendation for future research to allow for disintegration of theme and analyzing each element in detail.

Implications

Implications for Positive Social Change

This study is essential because it addresses the under-researched area of capacity-planning practice and how project managers in Qatar mitigate project delay and cost overall with effective capacity-planning (Azzali & Tomba, 2018; Kangwa & Ebohon,

2019). Infrastructure and construction industry are the means through which countries and societies accomplish their economic developmental goals, as well as their economic development, especially developing countries like Qatar (Agyekum-Mensah & Knight, 2017). This study presented the voice of government-funded infrastructure project managers in Qatar regarding their perceptions of capacity-planning, their challenges, and recommendations towards improving the success rate of infrastructure projects and a promising future for the construction industry.

Improved success rate of infrastructure projects in Qatar can affect social change because the sole aim of an infrastructure project is to improve the standard of living for citizens and residents, aid those living in areas of social disadvantage to access basic economic opportunity as well as contribute to the nation's economic growth and development (Djukic et al., 2016; Al Jurf & Beheiry, 2012). The findings of my study may spark a national discourse among government-funded infrastructure project managers in Qatar or infrastructure project managers in general on ways to improve infrastructure project delivery in Qatar by optimizing their use of capacity-planning practice.

The result of my study may also move clients, stakeholders, and government bodies towards ensuring improved welfare of construction human resources as well as improved adequacy and functionality of facilities used in the infrastructure construction process. Ultimately, such improved infrastructure project delivery and enhanced working condition may bring about improved social living for citizens and residents of the State of Qatar as well as contribute to the growth and development of the country.

Implication for Theory

The challenges of delay and cost overrun in the construction industry have attracted the attention of researchers over the last 40 years to identify the possible underlying factors behind increasing project delay and cost overrun in various countries and using varying context (O'Neill, 2019; Akhund et al., 2018; Shahhosseini et al., 2018). The absence of a study on project manager's capacity-planning practices in Qatar infrastructure projects leaves a critical knowledge gap in literature (Azzali & Tomba, 2018). This study provided a unique approach to this challenge by exploring the perception of project managers on how they utilize capacity-planning to drive project success. The findings of my study unveiled how project managers in Qatar utilize capacity-planning to drive project success and shed light on capacity-planning challenges faced by project managers in Qatar paving ways for future theoretical investigation towards improving project success rate.

Ultimately, my study confirmed the importance of adequate capacity-planning practice in mitigating the risk of project delay and cost overrun on infrastructure project. As such, future researchers can benchmark on the findings of this research and the recommendation provided for future study to extend the conceptual framework of this study in different or similar context using a different project type or geographical location.

Policy Implications

The adoption of well-established and adequately structured capacity-planning practice in government funded infrastructure project management in Qatar by project

managers, client, and stakeholders can potentially bring about efficient construction process and improved project success rate. The findings of this study may also give room for foundational awareness to policy makers regarding the capacity-planning and resource challenges faced by project managers leading government-funded infrastructure projects in Qatar. This may bring about a change in policy making towards increasing, improving, and strengthening the resource pool within the Qatar labor, equipment, and resource market. Such inclusion policy may attract specialist labor and technicians from other nations, thereby increasing the availability of resources within the country and improving infrastructure project delivery.

Implications for Practice

The findings of this study may inform government-funded infrastructure before managers in Qatar regarding how productivity can be enhanced through improved capacity-planning. The knowledge gained from the findings of this research may bring about a more effective project management culture aimed at improved Qatar infrastructure project delivery through effective manpower and resource planning. Infrastructure project managers in Qatar may also benchmark on the findings of this research to limit employee redundancy by ensuring projects are not overstaffed and improve productivities by ensuring adequate facility and support services are available as at when required both for immediate and future need.

Conclusions

Each participant in this qualitative multiple case study played a vital role in exploring the perceptions of project managers in Qatar regarding how they utilize

capacity-planning practices to mitigate project schedule delay and cost overrun in government-funded infrastructure projects. Everyone provided in-depth insight regarding their experiences on capacity-planning and management which led to emergence of themes used to answer the central research question. Improved capacity-planning practice in managing infrastructure projects in Qatar can bring about effective project delivery towards improving the standard of living for citizens and residents, aid those living in areas of social disadvantage to access basic economic opportunity as well as contribute to the nation's economic growth and development (Djukic et al., 2016; Al Jurf & Beheiry, 2012). Enhancing availability of resources to meet performance capacity need, knowledgeable and skillful staff, short- and long-term planning strategy, effective cost and time management are some of the recommendations that emerged from the data. Furthermore, future researchers are encouraged to promote alternative view by replicating the findings of this study using quantitative approach to validate these findings from similar or different context, enhance the generalization of findings and allow for greater objectivity and improved accuracy (Quick & Hall, 2015). Extending the findings of this study by future research can also foster pathways for theory, innovation, and policy making in Qatar towards enhancing capacity-planning practices in Qatar.

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Appendix A: Letter of Introduction and Recruitment

Good day, I am a doctoral student at Walden University inviting your voluntary participation in my research about how infrastructure project managers in Qatar utilize capacity-planning and its effect on project success. The purpose of the study is to explore the perceptions of project managers in Qatar regarding how they utilize capacity-planning practices to mitigate project schedule delay and cost overrun in government-funded infrastructure projects.

Participant's eligibility for this study includes the following criteria: (a) adult over the age of 18, (b) 3 years continuous experience as a project manager in a Qatar government-funded infrastructure project, and (c) adequate knowledge regarding the topic of study. I am positive that your experience grounded in the study phenomenon would contribute greatly to the study. Hence, I am extending this invitation to perceive your interest in participating in the research.

The importance of this study to the field of management is such that the findings may advance Qatari project managers' understanding of capacity-planning and provide recommendations to address the under-researched area of capacity-planning toward successful project delivery. It is also hoped that the knowledge gained from this research may bring about a more effective project management culture aimed at improved Qatar infrastructure project delivery through effective manpower and resource planning. In addition, Qatar infrastructure project managers may also limit employee redundancy by ensuring projects are not overstaffed. Finally, the social impact of this study may

contribute to the Qatar's economic growth and shore-up the standard of living for citizens and residents of the country.

If you would be interested in participating in this study, kindly review and return the signed consent form attached to this email. Should you require additional information or have questions regarding this study or your intended interest, you may reply to this email. Thank you in advance for your kind consideration.

Respectfully,

Emmanuel Ojo

Appendix B: Consent Form

You are invited to take part in a research study about the perceptions of project managers in Qatar regarding the use of capacity-planning to drive project success. The researcher is inviting project managers who have 3 years continuous experience leading Qatar government-funded infrastructure projects to be in the study. I obtained your detail through professional social media platform (LinkedIn). This "informed consent" is part of the process which allows you to understand this study before deciding whether to take part or not. You may keep/print a copy of this consent form for your future reference.

This study is being conducted by a researcher named Ojo Emmanuel Opeyemi, who is a doctoral student at Walden University.

Eligibility for participation in this study includes the following inclusion criteria: (a) adult over the age of 18, (b) 3 years continuous experience as a project manager in a Qatar government-funded infrastructure project, and (c) adequate knowledge regarding the topic of capacity-planning processes in project management.

Background Information:

The purpose of the study is to explore the perceptions of project managers in Qatar regarding how they utilize capacity-planning practices to mitigate project schedule delay and cost overrun in government-funded infrastructure projects.

Interview Procedures:

Should you agree to participate in this study, you will be asked to:

- Participate in an interview that will last approximately 35–45 minutes. The interview will be face-to-face at agreed venue or via Skype. The choice of option will be your preference.
- Respond to questions related to your experiences, success, and barrier in managing and driving government-funded infrastructure projects in Qatar using capacity-planning.
- Agree to the interview session being recorded to allow for transcription of the interview by the researcher, noting that only audio recording will be taken, and no recording of the video feed will be done.
- Copies of transcript will be shared with you for review once audio recording has been transcribed and you will have 48 hours to correct or edit any omission, addition, or misinterpretation in the transcript. This process called member checking helps to improve the accuracy and credibility of the research. Please note that it will be understood that you agree with the content of the transcript if no reply is received from you within this time.

Below are typical interview questions:

1. How do you ensure that adequate supply of tools, capital, equipment, and resources are available to meet performance capacity in your government-funded infrastructure project and what challenges do you face in this area?

2. How do you ensure that the staff are sufficiently knowledgeable and skillful in their respective trades to meet personal capacity in your government-funded infrastructure project and what challenges do you face in this area?

Voluntary Nature of the Interview:

This interview is voluntary as you are free to accept or turn down the invitation. If you decide to take part now, you can still change your mind later. If you decide not to participate in this research, there will be no negative consequence to you.

Risks and Benefits of Being Interviewed:

Being in this type of study involves some risk of the minor discomforts that can be encountered in daily life, such as fatigue, stress, or becoming upset. Being in this study would not pose risk to your safety or well-being.

There will be no direct benefit or compensation to you for participating in this research. Though the findings of this research may benefit you as it is hoped the findings may advance the population of Qatari project managers' understanding on the use of capacity-planning to drive project success by providing insight on effective capacity-planning strategy, tools and technique to manage process resources. The findings may also bring about a more effective project management culture aimed at improved Qatar infrastructure project delivery through effective manpower and resource planning.

Privacy:

Interview recordings and full transcriptions will be shared with each interviewee for member checking. Transcript with identifiers redacted will be shared with my university faculty along with my analysis. The interview recording and transcript will be

kept safe by password protection and codes will be used in place of names. Interview recording and transcript will be kept for a period of at least 5 years as required by the institution and destroyed afterwards.

Contacts and Questions:

You may ask any questions you have now. Or if you have questions later, you may contact the researcher via email at emmnauel.ojo@waldenu.edu. If you want to talk privately about your rights as a participant, you can call the Research Participant Advocate at my university at 612-312-1210. Walden University's approval number for this study is **IRB will enter approval number here** and it expires on **IRB will enter expiration date.**

Please share any questions or concerns you might have at this time or you may contact the researcher via email emmanuel.ojo@waldenu.edu for any future question.

Obtaining Consent:

If you agree to be interviewed as described above, please reply to this mail with the words, "I consent"

Thank You.

Emmanuel Ojo

Ph.D. Candidate-Walden University

Appendix C: Interview Protocol

Demographics

Gender: ___

Age: ____

Nationality: _____

Years working in Qatar Construction Sector:_____

Working on which Qatari government-funded infrastructure project:

_____

Years working on this specific project: _____

Introduction:

My questions today will relate to the issue of capacity-planning practices of project managers in Qatari government-funded infrastructure projects. For the purposes of this interview, the term *capacity-planning practices* refers to the processes used by an organization to determine their productivity and resource capacity required to meet their project needs.

Do you meet the following participant inclusion criteria?

1. Team leaders ___

   1) adult over the age of 18 ____

   2) minimum 3 years continuous experience as a project manager in a Qatari government-funded infrastructure project _____

   3) adequate knowledge regarding the topic of capacity-planning processes in project management_____

Capacity-Planning Practices Questions

1. How do you ensure that adequate supply of tools, capital, equipment, and resources are available to meet performance capacity in your government-funded infrastructure project and what challenges do you face in this area? **(*organization level*)**

2. How do you ensure that the staff are sufficiently knowledgeable and skillful in their respective trades to meet personal capacity in your government-funded infrastructure project and what challenges do you face in this area? (***individual/organizational level)***
3. How do you ensure that you have adequate and enough resources to manage current and future capacity need in your government-funded infrastructure project and what challenges do you face in this area? (***individual/organizational level)***
4. How do you ensure the effective performance of the resources deployed in your government-funded infrastructure project to enhance productivity and minimize redundancy and how do you manage challenges faced in this area? (***individual level)***
5. How do you ensure the available organization's facility or facilities are adequate both operationally and physically to meet your government-funded infrastructure project capacity requirement and what challenges do you face in this area? **(*organization level*)**
6. How do you ensure adequate organizational support services such as training facilities, quality control, safety & health etc. are available to enhance the

capacity need for your government-funded infrastructure project and how do you manage any changes in this area? **(*organization level*)**

7. How do you ensure effective flow of communication within your government-funded infrastructure project to enhance project capacity need? (***individual/organizational level)***
8. How do you ensure adequate organizational decision making and accountability structure in your government-funded infrastructure project and how do you manage any changes in this area? (***individual/organizational level)***
9. How do you ensure adequate delegation of authority and responsibility to team members within your government-funded infrastructure project to enhance project capacity need?
10. Have we missed any point that you think is relevant and important to the topic that you would like to address?